BCA 101 FUNDAMENTALS OF MATHEMATICS

Set, Relation and Functions: Set, Cartesian product of sets, relations, functions, binary operations.

Trigonometric Functions: Angles, trigonometric functions and trigonometric identities.

Cartesian system of rectangular coordinates: The number plane, distance formula area of a triangle, section formulae, slope of a line, locus and equation.

Straight line: To find equation of a straight line parallel to an axis: the point slope form, two point form, intercept form, slopeintercept form, normal form, condition of concurrency for three straight lines, analytical proof of geometric theorems.

Circle and family of circles: Standard form of equation of a circle, its general form, condition of tangentancy.

Quadratic equation : Solution of quadratic equations, symmetric functions of roots.

Determinants and Matrices: Properties and applications, definition and type of matrices, elementary transformation of a matrix, inverse of a matrix, normal form of a matrix, orthogonal matrices.

BCA 102 PROGRAMMING WITH C

Program Concept, Characteristics of Programming, Various stages in Program Development Programming aids Algorithms, Flow Charts - Symbols, Rules for making Flow chart, Types of flowchart, Advantage & Disadvantage, Pseudocodes, Decision Table, Programming techniques & tools Programming Techniques Top down, Bottom up, Modular, Structured - Features, Merits & Demerits, Comparative study, Programming Logic- Simple, Branching, Looping, Recursion, Cohesion & Coupling, Programming Testing & Debugging & their Tools. Introduction & features of C, Structure of C program, Variables, Expressions, Identifiers, Keywords, Data Types, Constants, Operator and expression Operator: Arithmetic, Logical, Relational, Conditional and Bit wise Operators, Precedence and Associativity of Operators, Type conversion in expression, Basic input/output and library functions Single character input/output i.e. getch(), getchar(). getche(), putchar(),Formatted input output i.e. printf() and scanf(), Library functions - concepts, Mathematical & Character functions.

If statement, If....Else statement, Nesting of If....Else Statement, else if ladder, The ?: operator, goto statement, Switch statement, Compound statement, Loop controls, for, while, do-while loops, break, continue, goto statement, ARRAYS Single and Multi Dimensional arrays, Array declaration and initialization of arrays, Strings : declaration, initialization, functions.

The need and form of C functions, User defined and library function, Function arguments, Return values and nesting of function, Recursion, Calling of functions, Array as function argument, Scope and life of variables - local and global variable, Storage class specified - auto, extern, static, register.

Defining structure, Declaration of structure variable, Accessing structure members, Nested structures, Array of structure, Structure assignment, Structure as function argument, Function that return structure, Union, pointers, working with text files.

BCA 103 INTERNET TECHNOLOGY

Internet: Evolution, Concepts, Internet Vs Intranet, Growth of Internet, ISP, ISP in India, Types of connectivity - Dial-up, Leased line, DSL, Broadband, RF, VSAT etc., Methods of sharing of Internet connection, Use of Proxy server. Internet Services USENET, GOPHER, WAIS, ARCHIE and VERONICA, IRC

WORLD WIDE WEB (WWW) - History, Working, Web Browsers, Its functions, URLs, web sites, Domain names, Portals. Concept of Search Engines, Search engines types, searching the Web, Web Servers, TCP/IP and others main protocols used on the Web. E-Mail: Concepts, POP and WEB Based E-mail, merits, address, Basics of Sending & Receiving, E-mail Protocols, Mailing List, Free E-mail services, e-mail servers and e-mail clients programs.

Concepts of Hypertext, HTML introduction, features, uses & versions Using various HTML tags, Elements of HTML syntax, Head & Body Sections, , Inserting texts, Text alignment, Using images in pages, Hyperlinks text and images, bookmarks, Backgrounds and Color controls, creating and using Tables in HTML, and presentation, Use of font size & Attributes, List types and its tags. Cascading Style sheets defining and using simple CSS. Design tools for HTML, Overview of MS FrontPage, Macromedia Dream weaver, and other popular HTML editors, designing web sites using MS FrontPage (using at least FrontPage 2000) Use of Frames and Forms in web pages, Image editors, Issues in Web site creations & Maintenance,

E - Commerce An introductions, Concepts, Advantages and disadvantages, Technology in E- Commerce, Internet & E-business, Applications, Feasibility & various constraints. E-transition challenges for Indian corporate, the Information Technology Act 2000 and its highlights related to e-commerce.

Electronic Payment Systems: Introduction, Types of Electronic Payment Systems, Digital Token-Based Electronic Payment Systems, Smart Cards and Electronic Payment Systems, Credit Card-Based Electronic Payment Systems, Risk and Electronic Payment Systems. E-security Security on the internet, network and web site risks for ebusiness, use of firewalls, secure physical infrastructure.

BCA 104 FUNDAMENALS OF COMPUTERS

Brief history of development of computers, Computer system concepts, Computer system characteristics, Capabilities and limitations, Types of computers-Analog, Digital, Hybrid, General, Special Purpose, Micro, Mini, Mainframe, Super, Generations of computers, Personal Computer (PCs) - IBM PCs, characteristics, PC/PCXT/PCAT - configurations, Pentium and Newer PCs. specifications and main characteristics. Types of Pcs- Desktop, Laptop, Notebook, Palmtop, Workstations etc. their characteristics. Basic components of a computer system - Control unit, ALU, Input/Output functions and characteristics, memory - RAM, ROM, EPROM, PROM and other types of memory.

Keyboard, Mouse, Trackball, Joystick, Digitizing tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-code Reader, Voice Recognition, Light pen, Touch Screen, Monitors characteristics and types of monitor -Digital, Analog, Size, Resolution, Refresh Rate, Interlaced / Non Interlaced, Dot Pitch, Video Standard - VGA, SVGA, XGA etc, Printers - Daisy wheel, Dot Matrix, Inkjet, Laser, Line Printer, Plotter, Sound Card and Speakers, Storage fundamentals - Primary Vs Secondary Data Storage and Retrieval methods - Sequential, Direct and Index Sequential, Various Storage Devices - Magnetic Tape, Magnetic Disks, Cartridge Tape, Hard Disk Drives, Floppy Disks (Winchester Disk), Optical Disks, CD, VCD, CD-R, CD-RW, Zip Drive.

Need, Types of Software - System software, Application software, System Software - Operating System, Utility Program, Programming languages, Assemblers, Compilers and Interpreter, Operating Systems - Functions, Types- Batch, Single, Multiprogramming, Multiprocessing, Programming languages-Machine, Assembly, High Level, 4GL, their merits and demerits, Application Software - Word-processing, Spreadsheet, Presentation Graphics, Data Base Management Software, characteristics, Uses and examples and area of applications of each of them, Virus working principles, Types of viruses, virus detection and prevention, viruses on network.

Analog and Digital Signals, Modulations - Amplitude Modulation (AM), Frequency Modulation (FM), Phase Modulation (PM), Communication Process, Direction of Transmissions Flow -Simplex, Half Duplex, Full Duplex, Communication Software, Communication Protocols, Communication Channels - Twisted, Coaxial, Fiber Optic, Serial and Parallel Communication, Modem -Working and characteristics, Types of Connections - Dialup, Leased Lines, ISDN, Types of Network - LAN, WAN, MAN etc., Topologies of LAN - Ring, Bus, Star, Mesh and Tree topologies, Components of LAN -Media, NIC, NOS, Bridges, HUB, Routers, Repeater and Gateways, Use of Communication in daily life. Introduction, History & versions of DOS.DOS basics- Physical structure of disk, drive name, FAT, file & directory structure and naming rules, booting process, DOS system files, DOS commands. Internal - DIR, MD, CD, RD, COPY, DEL, REN, VOL, DATE, TIME, CLS, PATH, TYPE etc, External - CHKDSK, XCOPY, PRINT, DISKCOPY, DISKCOMP, DOSKEY, TREE, MOVE, LABEL, APPEND, FORMAT, SORT, FDISK, BACKUP, EDIT, MODE, ATTRIB, HELP, SYS etc. Executable V/s Non executable files in DOS.

BCA 105 DIGITAL LOGIC

Logic Gates, AND, OR, NOT GATES and their Truth tables, NOR, NAND & XOR gates, Boolean Algebra, Basic Boolean Law's, Demorgan's theorem, MAP Simplification, Minimization techniques, K -Map, Sum of Product & Product of Sum

Data types and Number systems, Binary number system, Octal & Hexa-decimal number system, 1's & 2's complement, Binary Fixed-Point Representation, Arithmetic operation on Binary numbers, Overflow & underflow, Floating Point Representation, Codes, ASCII, EBCDIC codes, Gray code, Excess-3 & BCD, Error detection & correcting codes

Combinational & Sequential circuits, Half Adder & Full Adder, Full subtractor, Flip-flops - RS, D, JK & T Flip-flops, Shift Registers, RAM and ROM, Multiplexer, Demultiplexer, Encoder, Decoder, Idea about Arithmetic Circuits, Program Control, Instruction Sequencing

I/O Interface, Properties of simple I/O devices and their controller, Isolated versus memory-mapped I/O, Modes of Data transfer, Synchronous & Asynchronous Data transfer, Handshaking, Asynchronous serial transfer, I/O Processor

Auxiliary memory, Magnetic Drum, Disk & Tape, Semiconductor memories, Memory Hierarchy, Associative Memory, Virtual Memory, Address space & Memory Space, Address Mapping, Page table, Page Replacement, Cache Memory, Hit Ratio, Mapping Techniques, Writing into Cache

BCA 106 ENVIRONMENTAL STUDIES

The multidisciplinary nature of environmental studies, Definition, scope and importance. Need for public awareness.

Renwel of non-renewable resources: Natural resources and associated problems.

a).Forest resources: Use and over-exploration, deforestation, mining and their effects on forest and tribal people.

b).Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, benefits

and problems.

c).Mineral resources: Use and exploitation, environmental effects of extracting and using minerals resources.

d) Food resources: World food problem, changes caused by Agriculture and overgrazing, effects of modern agriculture, Fertilizer-pesticide problems.

e). Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy source.

f).Land resource: Land as a resource, land degradation, soil erosion and desertification.

Conservation of Natural Resources

Equitable use of resources for sustainable development.

Ecosystem

Concept of Ecosystem, structure and function of an ecosystem, Producers, consumers and decomposers. Energy flow in the ecosystem. Food Chains, food webs and ecological pyramids.Introduction types, characteristics features, structure and function of following ecosystems:

a). Forest ecosystem

b). Desert ecosystem

c). Aquatic ecosystem (Ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and its conservation: Introduction-Definition : genetic, species and ecosystem diversity. Value of biodiversity:

con umptive use, productive use, social, ethical, aesthetic and opin on values.

Biodiversity at global, national and local levels. Threats to bi diversity: habitat loss, poaching of wildlife, man-wildlife cc iflicts. Important Endangered and endemic species of India.

Environmental Pollution: Definition, causes, effects and control measures of:

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- a). Air Pollution
- b). Water Pollution
- c). Soil Pollution
- d). Noise Pollution
- e). Thermal Pollution
- f). Nuclear Hazards

Soil water Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Role of NGOs.

BCA 107 HTML LAB

- Design a simple HTML document using basic elements like: 1.
- <HTML>, <body>, <head>, <title>,
, <hr>. 2.
- 3. Design a HTML document which show the use of following Text formatting tag:
- center, sup, em, ins, sub, font, h1 to h6. 4.
- Design a HTML document to demonstrate all computer output 5. tag:
- code, kbd, samp, tt, var, pre, listing, xmp. 6.
- Design a HTML document which demonstrate the use of 7. following tag: abbr, acronym, address, bdo, blockquote, q.
- Apply these character entities in your HTML document: 8.

Non-breaking space 9.

a.

b.

- 10. Demonstrate how to create a link in an HTML document.
- 11. Demonstrate how to use an image as a link in HTML document.

program to show the use of Do while statem.

Vrite a program to show the use of while statemed

- 12. Demonstrate how to link to another page by opening a new window...
- 13. Demonstrate how to use a link to jump to another part of same document.
- 14. Demonstrate how to make a vertical and horizontal frameset with three different documents.
- 15. Design a HTML document which does not allow a user to resize frame.
- 16. Demonstrate how to make a navigation frame. This navigation frame contains a list of links with the second frame as the target.
- 17. Design a HTML document which shows how to jump to a specified section in a frame.
- 18. Design a HTML document having
- 19. Colored background table.

d. &

e.

- 20. Table having image in background.
- 21. Colored background cell.
- 22. Table having image in only one cell.
- 23. Demonstrate how to use the "frame" attribute (with values like: box, void, above, below, hside, vside, lhs, rhs) and border attribute to control the borders around the table.

BCA 108 C PROGRAMMING LAB

- Write a program to show the use of arithmetic operations and library functions in evaluating expressions.
- Write a program to show the use of Input Output statement.
 Write a program to show the use of if else statement.
 Write a program to show the use of switch statement.
- 5. Write a program to show the use of one dimensional and multi dimensional arrays.

- 6. Write a program to show the use of while statement.
- 7. Write a program to show the use of Do while statement.
- 8. Write a program to show the use of for statement.
- 9. Write a program to show the use of functions.
- 10. Write a program to show the use of recursion.
- 11. Write a program to define and use a structure.
- 12. Write a program to manipulate strings.

BCA 109 MS OFFICE LAB

- 1. Write a paragraph in MS-Word and show the use of various tools.
- 2. Write an application & copy it to another document and differentiate between paste and paste special.
- 3. How to Insert a picture or chart in a document and reference it to
- 3. How to Insert a picture or chart in a document a another document?
- 4. Write a paragraph in MS-Word of 12 lines and Explain these Formatting tools:-
- Columns.
- Drop cap.
- Paragraph.
- Alignment.
- Bullet and Numbering.
- Tab Setting.
- What is mail merge? How to use this facility? Describe it Step by Step.

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dimensional arrays.

- Create a Student Table(Rno, Name, Fname, Class, Address, Phone and insert 5 records in it.
- 7. To study various charts and their implementations using a

marksheet of 10 students.

8. Create a salary statement of an organization of 10 employees using if condition (S.no., Name, Designation, Basic, Da, Hra, total, net salary)

- What is a pivot table? How to create and use a pivot table? 9.
- 10. Create a power point presentation to present your institution detail, create at least 7 slides with different animation effect.
- 11. Create a power point presentation on "destination India" using images from clipart.
- 12. Create a power point presentation on "youth icon of India" and show the following
- 13. Custom Animation.
- 14. Compare and Merge Presentations.
- 15. Slide Design.
- 16. Cascade.

BCA 110 DIGITAL ELECTRONICS LAB

Verify various logic gates : NOT, AND, OR, NAND, NOR, 1.

XOR AND XNOR

- Verify various Boolean Laws 2.
- Ferformonce of Demand Verify NAND gate as Universal Gate 3.
- Verify NOR gate as Universal Gate 4.
- Realize Half Adder and Half-Subtractor Circuit. 5.
- Realize Full Adder and Full-Subtractor Circuit. 6.
- Realize BCD to Seven segment Decoder 7.
- Realize RS Flip flops using NAND and NOR gates. 8.
- Realize D flip flops using NOR and NAND gates. 9.
- 10. Realize JK Flip Flop using gates.
- 11. Realize JK Flip Flop using IC.
- 12. Realize 3 bit ripple up counter
- 13. Realize 3 bit ripple down counter
- 14. Realize mod-5 counter



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BCA SECOND YEAR BCA 201 OPERATING SYSTEMS

Definitions, functions and types of operating system, System components, Operating system Services, System Calls, System programs, System structure.

Process Concepts, process state & process control block, Process Scheduling, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling Real-Time Scheduling, Threads, Threads in Linux.

Critical Section Problem, Semaphores, Classical Problem Of Synchronization, , Deadlock Characterizations, Method for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Process Scheduling in Linux. Logical versus physical address space, Swapping, Contiguous

Allocating, Paging, Segmentation, Virtual Memory, Demand Paging, Performance of Demand Paging, Page Replacement, Page Replacement Algorithms, Memory Management in Linux.

Disk Scheduling, Disk Management, Swap Space Management, Disk reliability, Stable Storage Implementation. File Concepts Directory structure, Protection, File system in Linux

BCA 202 DATA STRUCTURES AND ALGORITHMS

Elementary data Structures: Arrays and Records, STACKS: Definition, implementation, operations on stack, application of stacks, evaluation of arithmetic expression and recursion, Prefix fix and post fix notations, evaluation of post fix expression using stacks.

Queues: Queue data structure, implementation, operations on queues, Circular queue.

Linked lists: Singly linked list, Ordered list, Inserting and deleting element from ordered lists, Circularly linked list, Doubly

linked list, Application of linked list: Implementations stack and

queue using linked lists.

Trees: Concepts and terminology, Binary tree, Linear and linked representation of binary tree, Operation on a tree, Tree traversal, Inorder, Preorder and post order traversal.

Graphs: Representation, Adjacency matrix, Graph traversal, Breadth first search and Depth first search traversal.

Searching and Sorting: Sequential searching, binary searching, Hashing, Hashing methods, Internal and external sorting, Selection, Insertion, Bubble and quick sort algorithms.

Instruction set of \$6085. Station

BCA 203 OBJECT ORIENTED PROGRAMMING WITH C++

Principles of OOP, data hiding, encapsulation, inheritance, polymorphism, overloading. C + +: Token, keywords, basic, user defined and derived data types, variables, dynamic initialization of variables, reference variables, operators, control structures.

Functions, function overloading, classes and objects, friendly functions, construcut5ors and destructors : operator, overloading, rules of overloading operators.

Inheritance, single, multilevel, multiple, hierarchical, hybrid inheritance, pointers, virtual functions, polymorphism and working with files. Templates, Naming space.

Objects and interfaces, overloaded methods, state method, constructors, references, class inheritance, null, thin and super variable, encapsulation, access modifiers, interfaces, packages, strings and characters, files and streams, sequential access files, random access files.

Data structures, linked lists, stacks, queues, trees, dynamic memory allocation. Exception handling, throwing, catching and rethrowing and exception, exceptions and inheritance.

BCA 204 COMPUTER SYSTEM ARCHITECTURE Micro operations: Bus transfer, Memory transfer, Arithmetic

and logic micro-operations, Control functions, Instruction codes: Computer instructions, Timing and control, instruction cycles, I/O and interrupt.

I/O Architecture: I/O devices and their controllers, Hex keyboard, LED Display, VDU, Floppy disk drive, Transfer of

information between I/O devices, CPU and memory, Elementary concept of I/O mapped and memory mapped I/O, Direct memory Access.

CPU Organization: Data bus and address bus, ALU, Instruction formats, Addressing modes-Direct, indirect, Immediate, Indexed and relative. Addressing formats one, two and three addresses.

Microprocessor: Organization of 8085 microprocessor, Instruction set of 8085, Mnemonics and operation codes of data transfer group, Arithmetic group, Logic group, Branches group and stack, I/O and Machine control group, Assembly language, Assembler, Simple programs in assembly language.

BCA 205 DATABASE SYSTEM CONCEPTS

Purpose of the data base system, data abstraction, data model, data independence, data definition language, data manipulation

language, data base manager, data base administrator, data base users, overall structure.

ER Models, entities, mapping constrains, keys, E-R diagram, reduction E-R diagrams to tables, generatio, aggregation, design of an E-R data base scheme.

Oracle RDBMS, architecture, kernel, system global area (SGA), data base writer, log writer, process monitor, archiver, database files, control files, redo log files, oracle utilities.

QL: commands and data types, data definition language commands, data manipulation commands, data query language commands, transaction language control commands, data control language commands.

Joins, equi-joins, non-equi-joins, self joins, other joins, aggregate functions, math functions, string functions, group by clause, data function and concepts of null values, sub-querries, views.

PL/SQL, basics of pl/sql, data types, control structures, database access with PL/SQL, data base connections, transaction management, data base locking, cursor management.

BCA 206 VISUAL PROGRAMMING

Introduction to .NET, .NET Framework features & architecture, CLR, Common Type System, MSIL, Assemblies and class libraries. Introduction to visual studio, Project basics, types of project in .Net, IDE of VB.NET- Menu bar, Toolbar, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, Object Browser.

The environment: Editor tab, format tab, general tab, docking tab. visual development & event drive Programming -Methods and events.

The VB.NET Language- Variables -Declaring variables, Data Type of variables, Forcing variables declarations, Scope & lifetime of a variable, Constants, Arrays, types of array, control array, Collections, Subroutines, Functions, Passing variable Number of Argument Optional Argument, Returning value from function, Control flow statements: conditional statement, loop

statement. Msgbox & Inputbox.

Working with Forms : Loading, showing and hiding forms, controlling One form within another.

GUI Programming with Windows Form: Textbox, Label, Button, Listbox, Combobox, Checkbox, PictureBox, RadioButton, Panel, scroll bar, Timer, ListView, TreeView, toolbar, StatusBar.There Properties, Methods and events. OpenFileDilog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog. Link Label.

Designing menues : ContextMenu, access & shorcut keys.

Database programming with ADO.NET Overview of ADO, from ADO to ADO.NET, Accessing Data using Server Explorer. Creating Connection, Command, Data Adapter and Data Set with OLEDB and SQLDB. Display Data on data bound controls, display data on data grid.

Generate Reports Using CrystalReportViwer

BCA 207 VB .NET LAB

L.R. Common Type System, MSIL, Assemblies

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The VB, MET Language Warnahles

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1.Design a form in vb.net using the following controls

- **3** TextBoxes
- 4 Buttons

Task to be performed

- Change the text of the buttons as
- Button1 "+"
- Button2 "-"
- 66 99 Button3
- Button4 "/"
- input values on textbox1 and textbox2 and display the result on textbox3 according to the type of the button clicked.
- Using the above form Display the result on textbox3 when any 2. changes made on Textbox1 and Textbox2.
- Design a simple Text Editor in vb.net to implement find and 3. replace operation. Working with Forms : Loading
- Design 2 ListBoxes on a Form 4. Task to be performed init die sciencesore Dolla
- Add at least 5 Items on Listbox1
- Display the selected item on the Textbox
- Remove selected item from the ListBox1
- Move selected item of ListBox1 into ListBox2
- Design a form using 1 ListBox and 1 textBox 5. trom ADO'IS NO. 101 Accessing Data Task to be performed
- Add 5 items on ListBox
- Highlight the item of the ListBox, if typed character/s on TextBox1 is matched with the character/s of the ListBox.
- Design MDI (Multiple Document Interface) Form in vb.net that 6. consists of MenuBar and ToolBar.
- Create a basic text editor that enables user to open the selected 7. text file on TextBox.

Hint. Use OpenFileDialog control

- Design a form using checkboxes and radiobuttons 8. Task to be performed And and the she had the water all the S.
- Display the text of selected checked boxes and RadioButton
- Create a digital clock using timer and label controls 9.
- 10. Design a form using TextBox and Horizontal Scroll Bar. Change the background colour of the textbox as the Horizontal Scroll Bar is Scrolled

19. Display all the employees who are not MANA

20. Write a query se calculate the Height's!

21. List the employee name and selary

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vier site instrumentoiselt find moody

IT. Display

- 11. Create a database "employee.mdb" in ms-access. Create a table emp whose fieilds are as follows
- EmpId
- EmpName
- Emp Dept
- Emp salary

Task to be performed

- Establish the connection to employee.mdb
- Display the first record of emp on TextBoxes used on form. -
- Display all the records on DataGridView control

BCA 208 ORACLE SQL LAB

- Display all the employees' details that belong to department 10. 1.
- Display employees name along with their Salary who are 2. MANAGER.
- Display the employees who are getting Salary between 12000 3. and 25000.
- Display the annual Salary of employees of dept. 30. 4.
- Display employees that are CLERK and managed by 7698. 5.
- Display employees of department 10 and 20. 6.
- Display employees that are not managers. 7.

Display employees whose name begins with Character 'R'. 8. Display employees that are analyst but getting salary greater than 9. 32. Write a PESQL block to Demonstrate Ir 10000. 10. Display employees those are not getting any commission.

- 11. Display all the employees name along with their jobs.
- 12. Display all the employees having 'A' in their names.
- 13. Display all the employees having T and 'R' in their names.
- 14. Display employees that are not there in department 30.
- 15. Display Department located in 'xxx'.
- 16. Display all the employees who are not 'SALESMAN' or 'CLERK'.

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- 17. Display all the employees Names in lowercase.
- 18. Display all employees name with their length.
- 19. Display all the employees who are not MANAGERS.
- 20. Write a query to calculate the length of time any employee has been with the company.
- 21. List the employee name and salary increased by 15% and expressed as a whole number.
- 22. List all the employees who joined after '01-jan-2000' and before 18-aug-2005.
- 23. Display the difference between Highest and the lowest salary for each department.
- 24. List all jobs for MANAGER and difference between Average and maximum salary.
- 25. Display Minimum and Maximum salary for each job type.
- 26. Display employees who earn more than lowest salary of department 30.
- 27. Display all the employees who do not manage anyone.
- 28. Find all the employees who have the same job as 'RAM'.
- 29. List the average salary for each department. Then find out the employees who are getting more than that average salary.
- 30. Display all the employees who working in same department on same post where SMITH is working.

31. Write a PL/SQL block to raise the salary of all managers by 2000 and 1200 for all clerks.

32. Write a PL/SQL block to Demonstrate Trigger.

33. Write a PL/SQL block to Demonstrate Cursor.

BCA 209 PROGRAMMING C++ LAB

- 1. Create three overloaded function named area for calculating area of circle, triangle, with two arguments, triangle with three arguments.
- 2. Write a program that swaps two nos using call by reference.
- 3. Create a matrix class with following functions.
- 4. create matrix dynamically.
- 5. Print matrix.
- 6. Addition.
- 7. Multiplication
- 8. Check matrix is unit matrix or not.
- 9. Create employee class with four constructors including copy constructor.
- 10. Write a program that clearly shows use of static member and
 - static function.
- 11. create string class with following
- 12. function that creates string dynamically.
- 13. Three overloads constructors.
- 14. Functions to join, copy, compare two strings.
- 15. Overload following operators for matrix class.
- + =

+ +

- (unary minus).
- 16. Write a program to implement hybrid inheritance.
- 17. Implement link list in c + + with following functions.
- 18. create liked-list.

19. Insertion after and before a particular node.

20. Delete a particular node.





- 22. Reverse linked-list.
- 23. Implement stack and make PUSH and POP function of STACK.

BCA 210 8085 MICROPROCESSOR LAB Vrite a program that swaps two nes using call by reference

- Write a program to find the Sum of a series of 8 bit numbers. 1.
- write a program to find the sum of two 16 bit numbers. 2.
- 3. write a program to find 2's complements of 16 bit numbers.
- write a program to mask off least/ most significant 4 bit of an 8 4. bit no.
- write a program to find the smallest of the series of 8 bit 5. numbers. employee class wild foor
- write a program to find the largest of the series of 8 bit numbers. 6.
- write a program to to arrange a series of 8 bit numbers into ascending order/ descending order.
- write a program to find the product of 8 bit * 8 bit numbers. 8.
- write a program to divide an 8 bit number by an bit number. 9.
- 10. write a program to find square root of a perfect / imperfect 8 bit number 14. Tempons to joint copy, aunofaire 140 strings

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BCA THIRD YEAR BCA 301 JAVA PROGRAMMING

C++ Vs JAVA, JAVA and Internet and WWW, JAVA support systems, JAVA environment.

JAVA program structure, Tokens, Statements, JAVA virtual machine, Constant & Variables, Data Types, Declaration of Variables, Scope of Variables, Symbolic Constants, Type Casting.

Operators : Arithmetic, Relational, Logical Assignments, Increment and Decrement, Conditional, Bitwise, Special, Expressions & its evaluation.

If statement, if...else... statement, Nesting of if...else... statements, else...if Ladder, Switch, ? operators, Loops While, Do, For, Jumps in Loops, Labelled Loops.

Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods.

Inheritance: Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract methods and Classes, Visibility Control.

Arrays: One Dimensional & two Dimensional, strings, Vectors, wrapper Classes, Defining Interface Extending Interface, Implementing Interface, Accessing Interface Variable, System Packages, Using System Package, Adding a Class to a Package, Hiding Classes.

Creating Threads, Extending the Threads Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the Runnable Interface.

Local and Remote Applets Vs Applications, Writing Applets, Applets Life Cycle, Creating an Executable Applet, Designing a Web



BCA 302 MULTIMEDIA TOOLS

Multimedia: Needs and areas of use, Development platforms for mul.imedia DOS, Windows, Linux. Identifying Multimedia elements Text, Images, Sound, Animation and Video, Making simple multimedia with PowerPoint. Text Concepts of plain & formatted text, RTF & HTML texts, using common text preparation tools, Conversion to and from of various text formats, using standard software, Object Linking and Embedding concept, Basics of font design, overview of some fonts editing and designing tools, Understanding & using various text effects.

2.4

Images importance of graphics in multimedia, Vector and Raster graphics, image capturing methods scanner, digital camera etc. various attributes of Images size, color, depth etc, Various Image file format BMP, DIB, EPS, CIF, PEX, PIC, JPG, TGA, PNG and TIF format their features and limitations, graphic file formats conversions, processing images with common software tools such as Photoshop, Paint Shop pro, Corel draw etc..

Sound: Sound and it Attributes, Mono V/s Stereo sound, Sound channels, Sound and its effect in multimedia, Analog V/s Digital sound, Basics of digital sounds-Sampling, Frequency, Sound Depth, Channels, Sound on PC, Sound standards on PC, Capturing and Editing sound on PC, Overview and using some sound recording, editing software. Overview of various sound file formats on PC WAV, MP3, MP4, Ogg Vorbose etc.

Animation: Basics of animation, Principle and use of animation in multimedia, Effect of resolutions, pixel depth, Images size on quality and storage. Overview of 2-D and 3-D animation techniques and software- animation pro, 3D studio & Paint Shop pro animator.

Animation on the Web features and limitations, creating simple animations for the Web using GIF Animator and Flash.

Video: Basics of Video Analog and Digital Video, How to use video on PC. Introduction to graphics accelerator cards, DirectX Introduction to AV/DV and IEEE1394 cards, Digitization of analog video to digital video, Interlacing and non-interlacing, Brief note on various video standards NTSC, PAL, SECAM, HDTV, Introduction to video capturing Media & immunent Videodisk, DVCAM, Camcorder, Introduction to digital video compression techniques and

D.C.A. 21

Remains file formats AVI, MPEG, MOVE Real Video.

Multimedia on the Web: Bandwidth relationship, broadband restrictions Text in the web Dynamic and embedded font and MP3/MP4, Audio and MP3/MP4, Audio and HTML, Graphics HTML safe color palate, Interlaced V/s and interlaced model, Graphics support in HTML, Image Map, and the Web Streaming video, Real Video, MPEG and SMIL, and Reality on the Web.

BCA 303 COMPUTER NETWOKS

Principles o Data Communication: General features and tasks of munication system, The need for modulation, theory of munication, general principles of frequency modulation and phase modulation, Evolution of computer networks, elements of LAN, MAN

Mervorking Architecture: ISO-OSI, IBM SNA architecture, there functions and implementation. Concepts of circuit switching, mervine and network switching. Introduction to serial mervine standards and parallel communication interfacing. Data communication concepts: Types of signals encoding and mervine techniques, signal bandwidth requirements, signal formats in LAN., switching, and broadcast techniques, modulation, mervine techniques, network protocols.

Error detection and correcting codes: Hamming codes, parity include correction codes. CRC

Transmission media, twisted pair, coaxial cable, optical fibre. LAN topologies: STAR, BUS and RING network LAN access techniques: ALOHA, CSMA, token ring and token



BCA 304 WEB TECHNOLOGY

Overview of ASP.NET framework, Understanding ASP.NET Controls, ApplicationsWeb servers, installation of WS.Web forms, web form controls -server controls, client controls, web forms& HTML, Adding controls to a web form ,Buttons, Text Box, Labels,Checkbox, Radio Buttons, List Box, etc. Running a web Application, creating a multiform web project.

Form Validation: Client side validation, server Side validation, Validation Controls: Required Field Comparison Range. Calendar control, Ad rotator Control, Internet Explorer Control.State management-View state, Session state, Application state.

Architecture of ADO.NET, Connected and Disconnected Database, Create Connection using ADO.NET Object Model, Connection Class, Command Class, Data Adapter Class, Dataset Class. Display data on data bound Controls and Data Grid. Database Accessing on web applications: Data Binding concept with web, creating data grid, inding standard web server controls. Display data on web form using Data bound controls.

Writing datasets to XML, Reading datasets with XML. Web services: Introduction, Remote method call using XML, SOAP, web service description language, building & consuming a web service, Web Application deployment.

Overview of C#, C# and .NET, similarities & differences from JAVA, Structure of C# program.Language features: Type system, boxing and unboxing, flow controls, Classes, interfaces, Şerialization, Delegates, Reflection.

BCA 305 SYSTEM ANALYSIS AND DESIGN

Pansmission med a. twisted pair, coasial cable, optical

System Concept: Definition, Characteristics, Elements of system, Physical and abstract system, open and closed system, manmade information systems.

System Development Life Cycle: Various phases of system development, Considerations for system planning and control for system success. System Planning: Base for planning a system, Dimensions of Planning.

Intermining users requirements and articles fact finding process and techniques. istenine Skills

Entry Determination of feasibility study, Technical, Economic Feasibilities, System performance and the second of system objectives, feasibility report.

Const Bettern Analysis Data analysis, cost and benefit analysis of ' a termination and system proposal.

Analysis: Logical and Physical models, dictionary, data diagram, form driven PO and HIPO charts, Gantt charts, system model, First First System flow chart, run flow charts etc., decision tables, data validation,

Current and Form Design: Input and output form design menn, screen design, layout consideration.

Systems analysis standards, Prgramming

Comercating standards.

Description standards User Manual, system development manual, programming specifications, operator The sector of the sector of the

& quality: System testing and quality assurance, memeration and software maintenance.

Security: Data Security, Disaster/ recovery and ethics in threat and risk analysis.

BCA 306 COMMUNICATION SKILLS

H- - WTATION

Concern of Motivation

Twomen of Mentivation

Transformer States

Wind Mapping

General A wareness

- MANAGEMENT

Memory and Retention Techniques

Reading Skills Listening Skills Revision Techniques Examination Skills *COMMUNICATION EFFECTIVENESS* Fluency Enhancement Removal of barriers to communication Group Discussion Role Play Anchoring Voice Modulation Management *COMPREHENSIVE COMMUNICATION* Principles of Communication

Art of effective Public Speaking Written Communication Skills Principles of Effective Writing Reading Habit Development Oral Presentation Skills *PRESENTATION SKILLS* Techniques of Presentation Methods of preparing Presentation Removal of stage fear Tools of Presentation (Transparencies, Slides & Audio-Visual Tools)

BCA 307 JAVA PROGRAMMING LAB

NOTE: All programs should be done using DOS editor

1. write a program that products the following output:-

Hello World

This Is Java.

Good Buy.

- Write a program that prints all integer between 0 and 36. 2.
- Create an array of 4 random numbers.
- Generate Fibonacci series up to 10 numbers.
- Write a program to calculate income tax for the given income of user as per rules.
- Write a program that reads two numbers from command line and 6. print all the prime numbers between them.
- Write a program that prints command line arguments in reverse 7. S. ~ Confirm Password order.
- Write a program that reads two numbers from the command line, 8. the number of hours worked by an employee and their basic pay rate. Then output the total pay due. Add warning messages to the payroll program if the pay rate is less then the minimum wage(\$ 4.35 an hour as of mid 1996) or if the employee worked more then the number of week.

 - give your circle a getarea method that calculates its area, and a 9. printinfo method that prints out the radius and area. Make a test case that tries capabilities out.
 - 10. make a program that create an array of 10 circle, each with a random radius. Print out the sum of area of the 10 circles. Also print the biggest and smallest areas.
 - 11. create a rectangle class that contains width and height fields also give it a getarea method again. Make a few test cases.
 - 12 create a square class with width and getarea. Then, give both square and circle setarea methods that let you specify a desire area. Make a few test cases.
 - 13. Write an application program in Java to implement the different uses of static keyword.
 - 14. Write an application program in Java to implement the different uses of final keyword.

15. Write an application program in Java to implement the different hentrand

uses of super keyword.

16. write a program to demonstrate multiple inheritance using it to another web form interface.

The a program to demonstrate multi threading in JAVA.

BCA 308 ASP .NET LAB

- Design a web form using HTML controls and change the 1. controls properties. Generate Fibonacci series ap to 10 numbed
- Design a form to create account in website using following fields 2.

rate. Then output the total pay due: Add v

sive your entite a genues merhod that calculates

ALL INT TATA PROVIDE BRIDE SERVICE TO ESEL

inen tie domber of week.

case that tries capebilities out.

" eive n's second the inechool and

. uses of final keyward.

uses or super her word.

12. ortate a square class with width at

print the inggest and amallest areas.

- First name
- Last name
- Username
 - Password
 - **Confirm Password**
 - Gender og edt mont ergemmen owe abeier seite mensonn a ern k the number of hours worked by an employee and t Birthday
 - Mobile Number
 - Security Question
- Answer

 - Location
- printinto and that prints out the radius Terms and condition
- Validate the account form using validation control 3.
 - Required field Validation
 - Range Validation
 - Compare Validation
 - **Regular Expression Validation**
 - Summary Validation
- . sobare and circle secares metho Design multiform web project with following menus. 4.
 - Home
 - 13. Write an itigication program in Java to implement Courses
 - Departments
 - Staff profile



Downloads

Write a program to retrieve data from one web form and display 5. it to another web form.

write a program to demonstrate multi threading in LAVA.

Chicas Int have it

6. Design a web form using calendar control and display the monthly events(holidays).

7. Design a web form using Adrotator control and display advertisements on form.

- 8. Design a webform using Navigation Controls.
- 9. Design a web form using File Upload control.
 - (I) Write the code to save the file in to the uploads folder.
 - (II) Write the code to display the information of uploaded file.
 - Name of file
 - Type of file
 - Size of file
 - 10. Design a web form using Image Map and redirect form using following:
 - Navigate
 - PostBackUrl
 - 11. Design a web form using following controls:
 - Wizard control.
 - Panel Control
 - Multiview Control
 - 12. Create a XML file and display its data on web form.
 - 13. Create a database college and create following tables:

Login

Department

Staff

Student

14. Create a program to connect the web form to Database College.



B.Sc./B.A. Part III Examination 2020

STATISTICS

TEACHING AND EXAMINATION SCHEME

| STATISTICS | | | | | - |
|------------|---|---|---|----|------------|
| Paper I | 2 | - | 3 | 50 | 5 4 |
| Paper II | 2 | - | 3 | 50 | |
| Paper III | 2 | - | 3 | 50 | |
| PRACTICALS | | 6 | 4 | 75 | 27 |

B.Sc./B.A. Part III Examination 2020

Statistics

Paper I : Sampling Distribution, Estimation and Testing of Hypothesis

Paper II : Statistical Quality Control & Operation Research

Paper III: Designs of Experiments and Non-Parametric Tests

Practical

Note: Each theory paper is divided in three parts i.e. Section -A, Section -B and Section -C. **Section A:** Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 1 mark.

Section B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 3.5 marks.

Section – **C:** Will consist of total 05 questions one from each unit. The paper setter will set one question from each Unit and Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 7.5 marks. **Total Marks: 50**

Paper I Sampling Distribution, Estimation and Testing of Hypothesis

Unit 1: Concepts of sampling distribution and standard error, derivation of X^2 (chi-square), t and F distribution, their simple properties.

Unit 2: Concepts of point estimation, properties of point estimators such as consistency, unbiasedness, minimum variance. Unbiased estimators, efficiency and simple notion of sufficiency, factorization theorem (without proof).

Unit 3: Different methods of finding estimators such as method of moments, method of minimum variance, method of least square and maximum likelihood (without detailed discussion of their properties).

Unit 4 : Testing of hypothesis, siple and composite hypotheses, two types of errors, idea of best critical region, power of a test, power curves in simple cases. Nayman- Pearson lemma.

Unit 5 : General theory of test of significance, Large sample tests for mean and proportions. Applications of X^2 (chi-square) t and F in testing of hypotheses. The interval estimation of Normal population mean, variance, difference of means, ratio of variances.

SUGGESTED BOOKS

Gupta, S.C. and Kapoor, V.K.: Fundamental of Mathematical Statistics, Sultan Chand and Sons, Delhi.

Surendran, P.U. and Saxena, H.C.: Statistical Inference, S.Chand & Co., Delhi.

Paper II

Statistical Quality Control & Operation Research

Unit 1: Concept of Statistical quality control, Control charts: $(\bar{x}, R), (\bar{x}, \sigma), p, np$, c-charts, their constructions and uses.

Unit 2: Sequential Analysis: Sequential probability ratio test, O.C. and A.S.N. functions and their applications.

Unit 3: Sampling Inspection by attributes: Producer's risk, consumer's risk, AOQL, ASN, OC, Single, Double and Sequential Sampling plans and their comparison.

Unit 4: Introduction to operation Research, Queuing theory (I): Queuing systems, characteristics of queuing system, Poisson process, exponential distributions of number of arrivals, inter arrival time, service time.

Unit 5: Queuing Theory (II): Classification of queues, model I: Model $(M/M/I): (\infty/FIFO)$ and its characteristics, waiting time distribution. Introduction of Model II $(M/M/I): (<\infty > > / SIRO)$.

BOOKS SUGGESTED

Gupta, B.N.: Statistics (Theory and Practical), Sahitya Bhawan, Agra.

Saini, Yashpan and Fiedman: Operation Research Methods and Problems, Hohn Wiley and Sons, New York.

Goon, Gupta, Dasgupta: Fundamentals of Statistics, Vol. II

Grant, E.L.: Statistical Quality Control, Mc-Graw Hill, New York.

Paper III

Designs of Experiments and Non-Parametric Tests

Unit 1 : Analysis of variance, one way and two way classification, including multiple but equal number of observations per cell.

Unit 2 : The completely randomized design, Randomized block design, comparison of RBD with CRD, Lay-out of RBD.

Unit 3 : The latin square design, its layout and analysis. Factorial experiments, the main effects and interactions layout and its analysis (in 2^2 and 2^3 carried out in a RBD only).

Unit 4 : Non-parametric Tests: Order Statistics Cumulative and probability distribution function of a Single Order Statistics, expectation of function of order statistics. Non-parametric methods and advantages and disadvantages, Power efficiency, Sign test (Simple, for paired observations), Run test for randomness.

Unit 5 : Wilcoxon signed Rank test, Median Test, Mann-Whitney Wilcoxon U-Test, Wald-wolfowitz Run test (two sample problem), Kolmogorov-Smirnov Goodness of fit test.

BOOKS SUGGESTED

Gupta, S.C. and Kapoor, V.K.: Fundamentals of Applied Statistics, Sultan Chand & Sons, Delhi. Goon, Gupta, Dasgupta: Fundamentals of Statistics, Vol. II, World Press, Calcutta. Rahatgi, V.: Statistical Inference, Wiley.

PRACTICAL

The students will be asked to attempt three exercises out of five exercises. The distribution of marks will be as follows:

| | | Regular Students | Ex-Students | |
|-----------------------------|-------|------------------|-------------|--|
| a) Three Practical exercise | | 45 Marks | 45 Marks | |
| b) Practical record work | | 10 Marks | - | |
| (c) Viva-Voce | | 20 Marks | 20 Marks | |
| | Total | 75 Marks | 65 Marks* | |

*To be converted out of 75 marks.

The following topics are prescribed for practical works:

- 01. Analysis of variance: One way and two way classifications.
- 02. Analysis of (i) completely randomized (ii) randomized block and latin square designs, factorial experiments.
- 03. Practical on SQC (Covered in Paper III).
- 04. Test of significance based on normal, X^2 , t and F tests, power curve.
- 05. Practical on Non-Parametric Tests (covered in Paper III).
- 06. 'Working knowledge of SPSS Package'.

BOTANY 2018

Theory

| Course | Nomenclature | Number of | Number of | Maximum | Minimum |
|------------------|----------------|-----------|-----------|---------|---------|
| | | Papers | Periods | marks | marks |
| | | | per week | | |
| Paper I | Algae, Lichens | 1 | 2 | 50 | |
| | and Bryophytes | | | | |
| Paper II | Mycology, | 1 | 2 | 50 | |
| | Microbiology | | | | 54 |
| | and | | | | |
| | Phytopathology | | | | |
| Paper III | Palaeobotany, | 1 | 2 | 50 | |
| | Pteridophytes | | | | |
| | and | | | | |
| | Gymnosperms | | | | |
| PRACTICAL COURSE | | | 6 | 75 | 27 |

Duration of examination of each theory papers3 hoursDuration of examination of practicals5 hours

PAPER I: ALGAE, LICHENS AND BRYOPHYTES

- **Unit I:** General characters, Classification and economic importance of Algae. Important features and life history of Chlorophyceace and Charophyceae. Structure and life cycle of *Volvox,Oedogonium, Coleochaete* and *Chara*.
- **Unit II:** Important features and life history of Xanthophyceae and Phaeophyceae. Structure and life cycle of Vaucheria, Ectocarpus and Sargassum.
- **Unit III:** Important Features and life history of Rhodophyceae. Structure and life cycle of Polysiphonia. Lichens: Morphology and structure of the two components; biological, ecological and economic importance.Vegetative multiplication methods with special reference to Parmelia and Usnea.
- **Unit IV:** Bryophytes: General characters, alternation of generations and classification.Characters and Classification of Hepaticopsida. Morphology and life history of Riccia, Marchantia and Plagiochasma.
- **Unit V:** Characters and classification of Anthocerotopsida and Bryopsida. Morphology and life history of Anthoceros and Sphagnum.

Suggested Laboratory Exercises

Algae: Microscopic preparation and study of following algal materials: *Volvox, Oedogonium, Coleochaete, Vaucheria, Chara, Ectocarpus, Sargassum* and *Polysiphonia* Lichens: Study of Lichens

Bryophytes: Study of external morphology and microscopic preparations of following Bryophytes: *Riccia*, Marchantia, *Plagiochasma*, *Anthoceros* and *Sphagnum*

Suggested Readings

Bold, H.C., Alexopoulous, C.J. and Delevoryas, T. Morphology of Plant and Fungi (4th Ed.) Harper & Foul Co., New York, 1980.

Ghemawat, M.S., Kapoor, J.N. and Narayan, H.S. A text book of Algae, Ramesh Book Depot, Jaipur, 1976.

Gilbert, M.S. Cryptogamic Botany, Vol. I & II (2nd Ed.), Tata McGraw Hill, Publishing Co. Ltd., New Delhi, 1985.

Kumar, H.D. Introductory Phycology, Affiliated East-West Press, Ltd., New York, 1988.

Pandey, S.N. and Trivedi, P.S.A Text Book of Botany 2000 Volume I, Vikas Pub. House Pvt. Ltd., New Delhi.

Puri, P.Bryophytes, Atmaram & Sons, Delhi, Lucknow, 1985.

Singh, V., Pande, P.C. and Jain, D.K.A Text Book of Botany, Rastogi & Co., Meerut, 2001.

Vashista, B.R. Botany for Degree Students (Algae, Fungi Bryophyta), S. Chand & Co. Ltd., New Delhi, 2002.

PAPER II: MYCOLOGY, MICROBIOLOGY AND PHYTOPATHOLOGY

- **Unit I:** General characters, Classification and economic importance of fungi. Important features and life history of Mastigomycotina–*Pythium* and *Albugo*; *Zygomycotina–Rhizopus*; *Ascomycotina–Saccharomyces*, *Aspergillus* and *Penicillium*.
- **Unit II:** Important features and life history of Basidiomycotina– *Puccinia, Agaricus* and wild Mushroom and *Ustilago*; Deuteromycotina–*Collectotrichum* and *Alternaria*.
- **Unit III:** Viruses: Chemical and physical nature; Structure, multiplication and transmission of plant viruses. Tobacco mosaic virus and yellow vein mosaic virus disease. General account of Viroids, AIDS and Prions.
- **Unit IV:** Bacteria–Structure, nutrition, cell division, reproduction and economic importance. Biofilms and Quorum sensing in microbes.Cyanobacteria–Life history of *Nostoc* and *Oscillatoria*; Nitrogen fixation – by BGA (Blue green algae).General account and biology of Mycoplasma and Phytoplasma.
- **Unit V:** Causes and symptoms of plant diseases with special reference to green ear disease of Bajra, smut of wheat, citrus canker, little leaf of brinjal and root knot disease. A brief account of principles of plant protection.

Suggested Laboratory Exercises

Microscopic preparation and study of following fungal materials: *Albugo, Rhizopus, Saccharomyces, Aspergillus, Penicillium, Ustilago, Agaricus,* local Mushroom, *Colletotrichum* and *Alternaria*. Viruses: Study of disease symptoms caused by Tobacco mosaic virus and yellow vein mosaic virus.

Bacteria: Gram staining of bacteria. *Nostoc, Oscillatoria* and study of bacteriological specimens. Study of symptoms of following diseases: (specimen or photographs)

Green ear disease of bajra Smut of wheat Citrus canker Rust of wheat Little leaf of bringal Root knot nematode.

Suggested Readings

Alexopoulos, C.J. and Mims.Introductory Mycology, John Wiley and Sons, New York, 2000. Bilgrami, K.S. and Dube, H.C. A Text Book of Modern Plant Pathology, Vikas Publ. House,

New Delhi, 1976.

Biswas, S.B. and Biswas, A.An Introduction to Viruses, Vikas Publ. House, New Delhi, 2000. Clifton, A.Introduction to Bacteria, McGraw Hill Co., New York, 1985.

Dube, H.C. Fungi, Rastogi Publication, Meerut, 1989.

Kaushik, P. Microbiology, Emkay Publication, 2001.

Madahar, C.L. Introduction to plant viruses, S. Chand & Co. Ltd., New Delhi, 1978.

Palezer, Chan and King. Microbiology, McGraw Hill Book Co., London, 1995.

Pathak, V.N. Fundamentals of Plant Pathology, Agro Botanica. 2000.

Purohit, S.S. Microbiology, Agro. Bot. Publication, Jodhpur, 2002.

Sharma, O.P. Fungi, Today and tomorrow Publication, 2000.

Sharma, P.D. Microbiology and Plant Pathology, Rastogi Publ. Meerut, 2003.

Singh, V. and Srivastava, V.Introduction to Bacteria, Vikas Publication, 1998.

Vashista, B.R. Botany for Degree student Fungi, S. Chand & Co., New Delhi, 2001.
PAPER III: PALAEOBOTANY, PTERIDOPHYTES AND GYMNOSPERMS

- **Unit I:** Geological time scale, Fossilization. General characters and classification and Pteridophytes.Important characteristics of Psilopsida, Lycopsida, Sphenopsida and Pteropsida.Stelar systems in Pteridophyta.Structure and reproduction in *Rhynia*.
- Unit II: Occurrence, Structure and life history of Lycopodium, Selaginella and Equisetum.
- **Unit III:** Occurrence, structure and life history of *Adiantum, Marsilea* and *Azolla*. Heterospory in Pteridophyta.
- **Unit IV:** Characteristics of seed plants, evolution of the seed habit. General features of gymnosperms and their classification; evolution, diversity and economic importance of Gymnosperms.*Cycas*:Morphology of vegetative and reproductive parts, anatomy of root, stem and leaf; Reproduction and life cycle.
- **Unit V:** *Pinus* and *Ephedra*: Morphology of vegetative and reproductive parts, anatomy of root, stem and leaf, reproduction and life cycle.

Suggested Laboratory Exercises

Palaeobotany: Microscopic examination of slides of Rhynia.

Pteridophytes: Study of external morphology of *Lycopodium*, *Selaginella*, *Equisetm*, *Adiantum*, *Marsilea*, and *Azolla*. Microscopic study of temporary double stained preparations of stem/rhizome of *Lycopodium*, *Selaginella*, *Equisetum* and *Marsilea*.

Study of temporary single stained microscopic preparations of cone of *Selaginella* and T.S. of Sporophyll of *Adiantum* and sections of sporocarp of *Marsilea*.

Gymnosperms:Study of external morphology of plant parts of *Cycas*: young and old foliage leaf, scale leaf, bulbils, male cone, microsporophyll, megasporophyll and mature seed (if material is not available show photographs).

Microscopic temporary double stained preparations of rachis and leaflet of Cycas. Study of T.S. normal and Corolloid root by permanent slides.

Study of external morphology of plant parts of *Pinus* habit, long and dwarf shoot, male cone; female cone; winged seeds.

Microscopic temporary preparation of pollen grains (W.M.) of *Pinus*. Study through permanent slides T.S. stem: young and old; male/female cone of *Pinus*.

Study of habit and structure of whole male and female cone of *Ephedra*.

Microscopic preparation of male and female flowers of *Ephedra*.

Suggested Readings

- Bold, H.C., Alexopolous, C.J. and Delevoryas, T. Morphology of plant and fungi (4th ed.), Harper and Foul, Co., New York, 1980.
- Gifford, E.M. and Foster, A.S. Morphology and Evolution of Vascular Plants, W.H. Freeman and Company, New York, 1988.
- Pandey, S.N., Mishra, S.P., Trivedi, P.S. A Text Book of Botany Vol. II, Vikas Pub.House Pvt. Ltd., New Delhi 2000.
- Raven, P.H. Evert, R.F. and Eichhom, S.C. Biology of plants, (5th ed.), W.H. Reema and Co., Worth Publication, New York, U.S.A., 1999.
- Sharma, O.P. Pteridophytes, Today and tomorrow Publication, 2000.
- Sporne, K.R. The Morphology of Gymnosperms, B.I. Publ. Pvt., Bombay, Calcutta, Delhi, 1991.
- Vashista, P.C. Gymnosperm, S. Chand & Co. Ltd., New Delhi, 2002.
- Vashista, P.C. Pteridophyta, S. Chand & Co. Ltd., New Delhi, 2002.
- Wilson, N.S. and Rothewall, G.W.Palaeobotany and evolution of Plants, (2nd ed.), Cambridge University Press, U.K., 1993.

BIOTECHNOLGOY 2018

PAPER I: BIOCHEMISTRY AND BIOSTATISTICS

Max Marks: 50

Unit 1:Introduction: General Composition of living matter-A Brief account and function of biomolecules.Bioenergetics: Principles of bioenergetics. Energy Rich compounds. Biological oxidation-reduction reactions.

Water: Properties of water molecule, Hydrophilic and hydrophobic groups in biological molecules.

Carbohydrates: Classification and general structure and properties of monosaccharides. Lipids: Classification and general structure, properties of fats and Oils.

Unit II: Amino Acids: Classification, general structure and properties

Proteins: Classification three-dimensional structure (helicity, bending, pleats, salt-bridges etc) and the basis for intermolecular interactions in enzyme- substrate and antigenantibody recognition.

Nucleotides: Composition, General structure and properties.

Nucleic Acids: Types and general structure, Non-canonical DNA Structures (Bent DNA, cruciform triple stranded, G quartet, slipped DNA)

Unit III:Enzymes: Classification, Nature specificity & mechanism of catalysis, kinetics, inhibition, allosteric control.

Enzyme Technology: Enzyme Production, various sources of enzymes, extraction, purification & packaging.

Enzyme Applications: Therapeutic, Manipulative, Industrial and Analytical (ELISA & Biosensors)

- **Unit IV:**Collection, classification, Tabulation and diagrammatic and graphical representation of statistical data: Histogram, pie chart, bar diagram, frequency polygon. Measurement of central tendency: Mean, Median, Mode.
- **Unit V:**Measurement of dispersion : Mean Deviation, Standard Deviation, Standard Error, Variance, Coefficient of correlation, test for significance : t-test, (Single sample Mean and Two sample Mean), Chi-Square Test and F-Test.

PAPER II:CELL BIOLOGY AND GENETICS

Max Marks: 50

Unit I: Cell as a basic unit of living systems: The cell theory.Prokaryotic and Eukaryotic Cell, Eukaryotic Cell – Shape Size, Volume, and Number.

Broad classification of cell types: PPLOs, Bacteria, Plant and Animal cells. A detail classification of cell types within an organism.Cell, tissue, organ and organisms as different levels of organization.

- **Unit II:** Structure and functions of cell organelles; ultra structure of cell membranes, Cytosol, Golgibodies, Endoplasmic reticulum (rough and smooth), Ribosome, Cytoskeletal structure (actins, microtubule etc), Mitochondria, Chloroplasts, Lysosomes, Peroxisomes, and Nucleus (Nuclear membrane, nucleoplasm, nucleolus and chromatin). Cell division, cell cycle and cell growth.
- **Unit III:** Nature of genetic material, nucleic acids, DNA replication, Mendelian laws of inheritance, gene interaction. Sex determination in plants and animals.Sex linkage, non-disjunction as a proof of chromosomal theory of inheritance.Linkage mapping of genes, interference, coincidence in Prokaryotes and Eukaryotes.
- **Unit IV:**Chromosome: Chemical composition: Structural organization of chromatids, centromeres, chromatin, telomeres, nucleosomes, euchromatin and heterochromatin. Special types of chromosomes (e.g. polytene and lampbrush chromosomes); Mutations; spontaneous and induced; chemical and physical mutagens.
- **Unit V:** Basic microbial genetics; conjugation, transduction and transformation.Isolation of auxotrophs, Replica plating techniques, analysis of mutations in biochemical pathways, one-gene-one-enzyme hypothesis. Extra chromosomal inheritance, genetic systems of mitochondria and chloroplast

PAPER III:MICROBIOLOGY AND COMPUTATIONAL BIOLOGY

Max Marks: 50

- **Unit I:**Development of microscopy (Optical, TEM and SEM).The Concept of sterilization, Methods of sterilization (Dry heat, wet heat, radiation, chemicals and filtration etc.)
- **Unit II:**Prokaryotic and eukaryotic microbial cells. The various forms of microorganisms-PPLO'S, Cocci,Bacilli and Spirilla. Nature of microbial cell surfaces,gram (+) ve and gram (-) ve bacteria, Types of bacteria on the basis of flagella. Flagellar types in Gram (+) ve and Gram (-) ve bacteria.
- **Unit III:**Nutritional classification of microorganisms-symbiosis and antibiosis among microbial populations.Microorganisms in extreme environments.Pathogenicity among microorganisms. Defence mechanism against microorganisms and Serotypes.
- **Unit IV:**Microbial metabolism: Spontaneous and induced variation arising in microbial population.Recombination events in bacteria. Nitrogen-fixing microbes in Agriculture.Products from microorganisms-fermentation products, and antibiotics.

Unit V: Computers: General introduction to Computers, organization of computers, digital and analog computers, computer algorithms. Computer in online monitoring and automation. Application of computers in co-ordination

Computer in online monitoring and automation. Application of computers in co-ordination of solute concentration, pH and temperature etc. of a fermenter in operation.

Introduction to Bioinformatics. Molecular databases, application of data associates tools e.g. BLAST, FASTA, Storage, Retrieval and analysis of sequences. Application of bioinformatics.

Practical

- 1. Quantitative estimation of the following in biological samples:
 - a. Sugar in given solution
 - b. Sugar in biological sample
 - c. Extraction and separation of lipids
 - d. Estimation of proteins
 - e. Estimation of DNA/RNA
 - f. Isolation and purification of proteins
 - g. Assays for enzyme activity
 - h. Kinetic activities on enzymes
 - i. Chromatographic methods of separation of macromolecules
- 2. Demonstration of computers and application.
- 3. Aseptic techniques:
 - a. Preparation of media, cotton plugging and sterilization
 - b. Personal hygiene-microbes from hands, teeth and other body parts.
 - c. Isolation of microorganism from air, water and soil sample. Dilution and pour plating, colony purification
 - d. Enumeration of micro organism from: Total v/s viable counts.
 - e. Identification of isolated bacteria. Gram staining, other staining methods, metabolic characteristic.
 - f. Growth curve of microorganisms.
 - g. Antibiotic sensitivity of microbes- use of antibiotic discs.

Suggested Readings

Cox, Nelson & Lehninger- Principles of Biochemistry, CBS Publishers & Distributors

L.Stryer- Biochemistry- W.H. Freeman & Co.

- Geoffrey Zubay- Biochemistry- Mac-Millan Publishing Co.
- J.L. Jain Biochemistry S. Chand & Co.
- Conn, Stumpf & Blueumming- Outlines of Biochemistry- Wiley Eastern Ltd.
- G.M. Malacinski & David Freifelder Essentials of Molecular Biology- Jonnes &Barlet , Boston
- Gardner, Simmons & Snustad- Principles of Genetics, John Wiley & Sons.
- P.K. Gupta- a Text book of cell & molecular biology, Rastogi Publication Meerut.
- Trevor Palmer- Enzymes- biochemistry, Biotechnology & Clinical Chemistry- Horwood Publishing House.
- P D Sharma- Microbiology- Rastogi Publications
- Pawar & Daginawala-General Microbiology Vol I & II Himalaya Publishing House

A J Salle- Fundamental Principles of Bacteriology- Tata McGraw Hill

Pelczar, Chan & Kreib Microbiology – Tata McGraw Hill

Brock & Madigan- Biology of microganisms.Prentice Hall, Inc.

Higgins & Taylor - Bioinformatics, Oxford University Press.

Stephen P Hunt & Rick Liveey- Functional Genomics, Oxford University Press

Rashidi- Bioinformatics basic- Application to life Sciences & Medical Science ASM B D Singh- Genetics, Kalyani Publishers

Practical

| Time | : 5.00 Hrs Max N | Max Mark: 75 | | |
|------|---|--------------|----|--|
| | | Min Mark: 27 | | |
| 1. | Perform and explain the given biotechnology experiment. | | | |
| | Show the result to the examiner | 15 | | |
| 2. | Perform and explain the given microbiology experiment. | | 10 | |
| 3. | Prepare a bacterial slide by Gram's staining method and | | | |
| | report result | | 06 | |
| 4. | Identify and comment upon the spots (1 to 6) | | 24 | |
| 5. | Viva-Voce | | 10 | |
| 6. | Practical Record | | 10 | |

BOTANY 2018

| Course | Nomenclature | Number of | Number of | Maximum | Minimum |
|-----------|-----------------|-----------|-----------|---------|---------|
| | | Papers | Periods | marks | marks |
| | | | per week | | |
| Paper I | Taxonomy and | 1 | 2 | 50 | |
| | Embryology of | | | | |
| | Angiosperms | | | | |
| Paper II | Anatomy of | 1 | 2 | 50 | 54 |
| | Angiosperms, | | | | |
| | Economic | | | | |
| | Botany and | | | | |
| | Ethnobotany | | | | |
| Paper III | Cell Biology, | 1 | 2 | 50 | |
| _ | Genetics, Plant | | | | |
| | Breeding and | | | | |
| | Evoloution | | | | |
| PRACTICA | AL COURSE | | 6 | 75 | 27 |

Theory

Duration of examination of each theory papers Duration of examination of practicals 3 hours 5 hours

PAPER I: TAXONOMY AND EMBRYOLOGY OF ANGIOSPERMS

- **Unit I:** Diversity in plant form in annuals, biennials and perennials, Canopy architecture in angiosperms: tree-origin, development, arrangement and diversity in size and shape, Flower-modified shoot, structure and development of flower, Inflorescence-types of Inflorescence.
- **Unit II:** Angiosperms: Origin and evolution. Some examples of primitive angiosperms. Angiosperm taxonomy; (Alpha-taxonomy, Omega-taxonomy, holotaxonomy) Taxonomic literature. Botanical nomenclature; principles and rules; taxonomic ranks, type concept, principle of priority. Classification of angiosperms; salient features of the systems proposed by Bentham and Hooker and Engler and Prantl.
- **Unit III:** Major contributions of cytology and molecular biology, phytochemistry and taximetrics to taxonomy. Diversity of flowering plants as illustrated by members of the families Ranunculaceae, Papaveraceae, Caryophyllaceae, Capparidaceae, Cucurbitaceae, Rutaceae and Apiaceae.
- **Unit IV:** Diversity of flowering plants as illustrated by members of the families Asteraceae, Acanthaceae, Apocynaceae, Asclepiadaceae, Scrophulariaceae, Lamiaceae, Euphorbiaceae, Musaceae and Poaceae.
- **Unit V:** Embryology: Structure of anther and pistil. Development of the male and female gametophytes; pollen-pistil interactions, self incompatibility; Double fertilization; Development of endosperm and embryo; Brief account of experimental embryology. Basics of gene imprinting.

Suggested Laboratory Exercises

Field study of diversities found in leaf shapes, size, thickness and surface properties. The following families are for detailed taxonomic studies:

- 1. Ranunculaceae: Ranunculus, Delphinium
- 2. Papareraceae: *Papaver*, *Argemone*
- 3. Caryophyllaceae: Dianthus, Gypsophylla, Saponaria
- 4. Capparidaceae: *Capparis*, *Cleome*
- 5. Rutaceae: Murraya, Citrus
- 6. Apiaceae: *Coriandrum, Foeniculum, Anethum*
- 7. Cucurbitaceae: *Luffa* or any Cucurbit
- 8. Asteraceae: Helianthus, Calandula, Sonchus
- 9. Acanthaceae: Adhatoda, Barleria
- 10. Apocynaceae: Catharanthus, Thevetia, Nerium
- 11. Asclepiadaceae: Calotropis
- 12. Scrophulariaceae: *Linaria, Antirrhinum*
- 13. Euphorbiaceae: Euphorbia, Phyllanthus
- 14. Lamiaceae: Ocimum, Salvia
- 15. Musaceae: Musa
- 16. Poaceae: Avena, Triticum, Hordeum, Poa, Sorghum

Suggested Readings

Bhandari, M.M. Flora of Indian Desert.

Bhojwani, S.S. and Bhatnagar, S.P. The Embryology of Angiosperms, 4th Revised and enlarged edition, Vikas Publ., New Delhi, 2002.

Davis, P.H. and Heywood, V.H. Principles of Angiosperm Taxonomy, Oliver and Boyd, London, 1963.

Fegerig K. and Vender Pifi The Principles of Pollination Ecology, Pergamon Press, 1979.

Gifford, E.M. and Foster, A.S. Morphology and Evolution of Vascular Plants, W.H. Freemad and Company, New York, 1979.

Heywood, V.H. and Moore, D.M. (eds.) Morphology and Evolution of Vascular Plants, W.H. Freeman and Company, New York, 1984.

Jeffrey, C. An Introduction to Plant Taxonomy, Cambridge University Press, Cambridge, London, 1982.

Jones, S.D. Jr. and Suchsinger, A.E. Plant Systematic (2nd ed.) McGraw-Hill Book Co., New York, 1986.

Maheshwari, J.K. Flora of Delhi, CSIR, New Delhi, 1963.

Redford, A.E.: Fundamentals of Plant Systematics, Harper and Row, New York, 1986.

Sharma, O.P. Taxonomy: Tata McGraw Hill Pub. Company Ltd., New Delhi 2000.

Singh, G. Plant Systematics – Theory and Practices, Oxford and IBH Pvt. Ltd., New Delhi, 1999.

Singh, V., Pandey, P.C. and Jain, D.K. Angiosperms, 2005, Rastogi Pub., Meerut.

PAPER II: ANATOMY OF ANGIOSPERMS, ECONOMIC BOTANY AND ETHNOBOTANY

- **Unit I:** Anatomy of Angiosperms: Concept of stem cell in plants. Root system; Root apical meristem; differentiation of primary and secondary tissues and their roles; structural modification for storage, respiration, reproduction and for interaction with microbes.
- **Unit II:** Shoot system: The shoot apical meristem and its histological organization; vascularization of primary shoot in monocotyledons and dicotyledons; cambium and its functions; formation of secondary xylem, a general account of wood structure in relation to conduction of water and minerals; characteristics of growth rings, sapwood and heart wood; secondary phloem-structure, function relationship; Periderm.
- **Unit III:** Abnormal secondary growth and Leaf: Abnormal secondary growth in stems due to abnormal origin and activity of cambium. Leaf: Internal structure in relation to photosynthesis and water loss; adaptations to water stress; senescence and abscission.
- **Unit IV:** Economic Botany, Food plants: Rice, wheat, maize, potato, sugarcane. Fibers: Cotton and Jute. Vegetable oils: Groundnut, mustard and coconut, General account of sources of firewood, timber and bamboos. Beverages: Tea and coffee; Rubber.
- **Unit V:** Spices and Condiments: General account. Medicinal plants with special reference to Rajasthan: *Aloe, Asparagus, Commiphora, Boswellia, Pedalium, Zyziphus, Haloxylon, Tribulus, Vitex,* and *Withania*. Ethnobotany: Introduction, Methods of Ethnobotanical studies, knowledge of aboriginals in Rajasthan.

Suggested Laboratory Exercises

ANATOMY: L.S. of Shoot tip of study Cytohistological zonation and origin in leaf primordial. Anatomy of primary and secondary growths in monocots and dicots using hand sections (or prepared slides). Structure of secondary phloem and xylem. Growth rings in wood. Microscopic study of wood in T.S., T.L.S. and R.L.S. Internal structure of leaf. Structure and development of stomata (using epidermal peels of leaf). Anatomy of root, primary and secondary structures, Abnormal secondary growth in stem.

ECONOMIC BOTANY: Food plants: Study of morphology and structure. Simple microchemicals tests of the food storing tissues in rice, wheat, maize, potato and sugarcane. Microscopic examination of starch in these plants (except sugarcane)

Fibers: Study of cotton fiber, tests for cellulose. Vegetable oils: study of hand sections of Groundnut, Mustard and Coconut and staining of oils droplets by Sudan III and Sudan Black

Field visits: To study sources of firewood (10 plants), timber-yielding trees (10 trees) and bamboos. A list to be prepared mentioning special features

Medicinal Plants & Spices: Black pepper, cloves, cardamom describe them in briefly. Study of 10 medicinal plants. Write their botanical and common names, parts used and diseases/disorders for which they are prescribed.

Beverages & Rubber: Cofee, Tea & Rubber

ETHNOBOTANY: Ethobotanically important plants of Rajasthan (Abrus, Leptidenia and Calotropis)

Suggested Readings

Cutter, E.G. Plant Anatomy: Experiment and Interpretation, Part II. Organs, Edward Arnold, London, 1971.

Esau, K. Anatomy of Seed Plants, 2nd John Wiley & Sons, New York, 1977.

Fahn, A. Plant Anatomy. 2nd ed. Pergamon Press, Oxford, 1974.

Kocchar, S.L. Economic Botany in Tropics. 2nd ed. Mac-millan India Ltd., New Delhi, 1998. Mauseth, J.D. Plant Anatomy, The Benjamin/Cummings Publ. Company Inc., Menloc Park, California, USA, 1988.

Sambamurthy, A.V.S.S. and Subramanyam, N.S. A Text book of Economic Botany, Wiley Eastern Ltd., New York, 1989.

Sharma, O.P. Hill's Economic Botany (Late Dr. A.F. Hill, Adapted by O.P. Sharma), Tata McGraw Hill Co., Ltd., New Delhi, 1996.

Simposon, B.B. and Conner-Ororzaly, M. Economic Botany Plants in Our World, McGraw Hill, New York, 1986.

PAPER III: CELL BIOLOGY, GENETICS, PLANT BREEDING AND EVOLUTION

- **Unit I**: History of cell biology: Concept of cell and cell theory. Cell cycle and its regulation. Mitosis and meiosis. Structural and Molecular organization of cell. Structure and function of cell wall; plasmodesmata, plasma membrane; golgi complex, plastid, mitochondria, endoplasmic reticulum, peroxisomes, vacuoles and nucleus.
- **Unit II**: Chromatin organization: Organization and structure of chromosomes. Concept of nucleosomes, chromatin remodeling. Types of chromosomes and determination of sex in plants. Chromosome alteration: Structural alteration; deletion, duplication, translocation, inversion; Numerical variation: aneuploidy and polyploidy. Molecular basis of mutation: Spontaneous and induced, brief account of DNA damage and repair. Introduction to epigenetics.
- **Unit III**: Nature of inheritance; Laws of Mendelian inheritance and its exceptions. Crossingover and linkage analysis. DNA the genetic material: Structure and replication, brief account of DNA- protein interaction. Definition of a gene-modern Concept of gene (Promoter, coding sequences, terminator). RNA polymerases and general transcription. Regulation of gene expression in prokaryotes and basics of gene regulation in eukaryotes.
- **Unit IV**: Origin of Agriculture, Centers of origin of crop plants and centers of Diversity. Concepts of Centers and Non-center (Harlan Hypothesis) Principles of plant breeding-Domestication, Introduction, Selection, Clonal propagation, Hybridization, Mutation breeding; Breeding work done on wheat; Green revolution; Assessment and Consequences; Biodiversity and Conservation of germplasm.
- **Unit V**: Theories of Evolution: Catastrophism, The Lamark's theory, Darwin's theory, Evidences of organic evolution, mechanism of evolution. Origin of basic biomolecules evolution of prokaryotic and eukaryotic cell. and Origin of species Population genetics: Allele and genotype frequency, Hardy-Weinberg principles.

Suggested Laboratory Exercises

CYTOLOGY

- 1. Study of cell structure from onion leaf peels
- 2. Comparative study of cell structure in onion cells and *Hydrilla*
- 3. Smear preparation of root tips for different stages in *Allium* root tip
- 4. Cytological examination special types of chromosomes (Slides)
- 5. Examination of electron micrographs of eukaryotic cells and cell organelles

GENETICS

- 1. Working out laws of inheritance using seed mixtures
- 2. Monohybrid, dihybrid and test crosses using seed samples

PLANT BREEDING

1. Demonstration of Emasculation techniques.

Practical Exam Scheme B.Sc. Botany Part II

Q1. Describe a given flower in semi-technical language with flower diagram and formula mentioning special feature of identification. Cut a T.S. of anther/ovary/ovule of the same flower and describe from embryological point of view.

(10+4) (10+6)

Q2. Cut a T.S./V.S. of given stem/root/leaf and make a double stained preparation of the same. Draw a labeled diagram (outline and cellular), identify with special features. (8+6) (9+7)

Q3. Prepare a smear of onion root tip, for observation of metaphase and anaphase stage of mitosis. Draw a labeled diagram of the same.

| Q4. Spots (1-9) three from each paper Q5. Practical record | (12+4) (27) (6) | | (11+3) (27) - |
|--|-----------------------|---|---------------------|
| | 75 | 7 | 75 |

Suggested Readings

Alberts, B., Bray, D., Lewis, J., Raff, M., Roberts, K. and Watson, I.D. Molecular *Biology of cell*. Garland publishing Co., New York, USA

Chaudhary, H.K. Elementary principles of plant Breeding, Oxford & IBH Publishing New Delhi.

Gupta, P.K. A Textbook of cell and Molecular Biology, Rastogi Publications, Meerut, 1999

Gupta, P.K. Cytology, Genetics, Evolution and plant Breeding, Rastogi, Publication, Meerut, 2000.

Lodish, H., Berk, A., Zipursky, S.L., Matsudaira, P., Baltimore, D. and Darnell, J. Molecular Cell Biology, W.H. Freeman & Co. New York, USA

Miglani, G.S. Advanced Genetics, Narosa publishing Co., Inc., USA

Russel, P.J. Genetics. The Benjamin/ Cummings Publishing Co., Inc., USA

Shukla, R.S. and Chandel, P.S. Cytogenetics, Evolution and Plant Breeding, S.Chand & Co.Ltd., New Delhi

Singh B.D. Textbook of plant Breeding. Kalyani publishers, Ludhiana, 1999

Sinha, U. and Sinha, S. Cytogenetics, Plant Breeding and Evolution, Vikas Publishing House, New Delhi, 1997

Sunstand, D.P. and Simmons, M.J. Principles of Genetics, John Wiley & Sons Inc., USA 2000

BIOTECHNOLGOY 2018

PAPER I: MOLECULAR BIOLOGY

Max Marks: 50

- **Unit 1:**Molecular basis of life, Structure of DNA, DNA replication in prokaryotes and eukaryotes. Concepts of genomics and proteomics.
- **Unit 2:**DNA recombination-molecular mechanism in prokaryotes and eukaryotes. Insertion elements and transposons. Structure of prokaryotic genes.
- **Unit 3:**Prokaryotic transcription, prokaryotic translation, prokaryotic gene expression (*lac*, his, *trp*, catabolic repression).
- **Unit 4:**Structure of eukaryotic genes- transcription, eukaryotic translation, eukaryotic gene expression and transcription factors.
- **Unit 5:**Gene expression in yeast, post translation regulation of gene expression. Developmental and environmental regulation of gene expression.

PAPER II: BIOPHYSICS

Max Marks: 50

- **Unit I:** Law of thermodynamics, Enthalpy, Free Energy, Heat dissipation and heat conservation.Primary events in Photosynthesis.
- **Unit II:** Strategies of light reception in microbes, plants and animals. Electrical properties of biological components.
- **Unit III:** Generation and reception of sonic vibrations. Hearing aids, Intra and intermolecular interactions in biological system.
- **Unit IV:** Physical methods applied to find out molecular structure: X-ray crystallography and NMR. General Spectroscopy, Lambert-Beer Law, Spectrophotometry & Colorimetery, UV-VIS, Fluorescence, AAS, IR, Raman Spectra
- **Unit V:** Physical methods of imaging intact structure: Ultra sound, Optical filters, X-ray, CAT scans, ECG, EEG, NMR imaging.

PAPER III: IMMUNOLOGY AND CELL CULTURE

Max. Marks: 50

- **Unit I:** The immune system along with historical perspectives. Non-specific & specific immune mechanism, organs and cells of immunity and their function.Concept of Acquired and innate immunity and antigen.
- Unit II: Structure and function of various classes of immuno-globulins Humoral Immunity – Mechanism involved Cell mediated immunity role of MHC, mechanism and cells involved. Vaccines – Dead, live attenuated, recombinant, edible and chimeric vaccines.
- Unit III: History of animal cell cultures. Biology of cultured Cells-the culture environment, Cell adhesion, Cell proliferation, energy metabolism.
 Culture Vessels: The substrate, choice of culture vessels.
 Laboratory requirements and sterilization techniques.
 Simulating natural condition for growing animal cells- Importance of growth factor is serum.
- Unit IV: Primary cultures: Isolation of tissue, primary explants cell line– Nomenclature, Subculture & Propagation, finite and continuous cell lines. Commonly used cell lines: their origin and characteristics, growth kinetic and cell lines.
- **Unit V:** Application of animal cell culture Cell Separation, characterization and differentiation Transformation–Characteristics and applications Transfection of animal cell & selectable markers.

Practical

- 1. Separation of molecules in cellular extract in aqueous buffer
- (a) Gel Filtration
- (b) Ion exchange chromatography
- (c) TLC of extracted material
- (d) Isolation of chromosomal and plasmid DNA from bacteria
- (e) Restriction digestion of DNA and assigning restriction sites (demonstrations)
- (f) Making competent cells of E-coli
- (g) Transfection cells of plasmid DNA and selection for transformants.
- 2. Purification of antigens and antibodies
- (a) Raising polyclonal antibodies
- (b) Enzyme Linked Immunoassay
- (c) Radio immunoassay
- (d) Diagnosis of an infectious disease by an immunoassay

Book Recommended

Buchanan, Gruissem & Jones: Biochemistry and molecular biology of plants –American Society of Plant Physiologist, Maryland USA

Peter Paolella: Introduction to molecular biology. Tata McGraw Hill

Alberts, Bray, Lewis, Raff, Roberts & Watson: Molecular Biology of the cell. Garland Publishing Inc.

Darnell, Lodish & Baltimore: Molecular cell Biology -Scientific American Books

Roitt, Male & Brostoff: Immunology. Mobey, London

Roitt: Essential Immunology - Blackwell Scientific

Lewin: Gene VIII, Oxford University Press

Kuby J: Immunology –Understanding of immune system Wiley Liss NY

VolKenshtein: Biophysics, Russian Press Deniel, M: Basic biophysics for biologists, Agrobios Van Holde: Principles of Physical biochemistry, Prentice Hall

Practical

| Time: 5.00 Hr | | Max Mark: 75 | |
|---------------|--|--------------|-------|
| | | Min | Mark: |
| 27 | | | |
| 1. | Perform and explain the given Molecular Biology experiment. | | |
| | Show the result to the examiner | 12 | |
| 2. | Perform and explain the given Biophysics experiment. | 12 | |
| 3. | Perform and explain the given immunology and/or cell culture | | |
| | Experiment | 12 | |
| 4. | Identify and Comment upon the spots (1 to 7) | | 21 |
| 5. | Viva-Voce | 10 | |
| 6. | Practical Record | | 08 |
| | | | |

BOTANY 2018

| Course | Nomenclature | Number of Papers | Number of Periods | Maximum marks | Minimum marks |
|-----------|--|---------------------|----------------------|------------------|------------------|
| Paper I | Ecology and Environmental Biology | 1 | 2 | 50 | |
| Paper II | Plant Physiology and Biochemistry | 1 | 2 | 50 | 54 |
| Paper III | Plant Biotechnology and Molecular Biology | 1 | 2 | 50 | |
| PRACTIC | AL COURSE | | 6 | 75 | 27 |

Theory

Duration of examination of each theory papers Duration of examination of practicals 3 hours 5 hours

PAPER I: ECOLOGY AND ENVIRONMENTAL BIOLOGY

Unit I: Plants and Environment: Atmosphere (gaseous composition), water (properties of water cycle), light (global radiation, phytosynthetically active radiation), temperature, soil (development, soil profiles, physico-chemical properties) and biota.

Morphological, anatomical and physiological responses of plants to water (hydrophytes and xerophytes) temperature (thermoperiodicity and vernalization), light (photoperiodism, heliophytes and sciophytes) and salinity

Unit II: Population ecology: Concept and characters, growth curves, biotic potential, ecotypes and ecads. Seed: The significance, suspended animation; ecological adaptation and dispersal strategies

Community ecology and Succession: Community characteristics, frequency, density, cover, life forms and biological spectrum. Succession: concept, classification and examples (hydrosere & xerosere)

Unit III: Ecosystems and Productivity: Ecosystem — Structure, abiotic & biotic components, food chain, food web, ecological pyramids, energy flow, biogeochemical cycles of carbon, nitrogen, phosphorus and Sulphur.

Productivity: Primary productivity, its measurements and factors affecting primary productivity

Unit IV: Environmental Biology of Indian Desert: Climate, vegetation types, adaptive strategies of desert plants. Desertification: meanings, causes, critical issues & driving forces. Agroforestry and its impact on desert agriculture. Desert biodiversity, Geomorphology, natural resources exploitation and their impact on desert environment

Unit V: Pollution Ecology: Definitions, classification, air, water and land pollution. Concepts of Industrial Ecology in pollution management. Global warming : Concepts and Current status. Phytogeography: Vegetation types of India — Forest and Grasslands. Biogeographical regions of India, Remote sensing: The basics and applications in ecological studies

Suggested Laboratory Exercises

- 1. To determine minimum number of quadrats required for reliable estimation of biomass in herbaceous vegetation
- 2. To study the frequency of herbaceous species and to compare the frequency distribution with Raunkaier's Standard frequency diagram
- 3. To estimate Importance Value Index for herbaceous vegetation on the basis of relative frequency, relative density and relative biomass in protected and Gochar land
- 4. To measure the vegetation cover of grassland through point frame
 - 5. To measure the above ground plant biomass in a natural field
- 6. To determine diversity indices (richness Simpson, Shannon-Weaver) in natural fields
 - 7. To estimate bulk density and porosity of soil samples
- 8. To determine moisture contents, water holding capacity and texture of soil samples
- 9. To estimate qualitatively nitrate, phosphate and potassium in soil samples
 - 10. To study the vegetation structure through profile diagram
 - 11. To estimate transparency and pH of different water bodies
- 12. To measure dissolved oxygen content in polluted and unpolluted water samples
- 13. To estimate salinity, hardness, carbonates and bicarbonate in different water samples
- 14. To determine the percent leaf area injury of different leaf samples collected around polluted site
- 15. To estimate dust holding capacity of the leaves of different plant species
 - 16. Plant adaptive modifications: Specimens/Slides:
 - i) Succulents: Opuntia, Euphorbia
 - ii) Salt secretion: *Atriplex, Chloris*
 - iii) Salt accumulation: Suaeda, Salsola, Zygophyllum
- iv) Xerophytes: Calligonum, Capparis, Leptadenia, Parkinsonia
 - v) Hydrophytes: Eichhornia, Nymphaea, Hydrilla

Suggested Readings

Dash, M.C. Fundamental of Ecology, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1996 Kormondy, E.J. Concepts of Ecology, Prentice – Hall of India Pvt., New Delhi, 1996 Kumar, H.D. General Ecology, Vikash Publishing House Pvt. New Delhi, 1995 Mukherjee, B. Environmental Biology, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1997 Odum, E.P. Basic Ecology, Sauders, Philadelphia, 1983

Sen, D.N. Environment and Plant Life in Indian Desert, Geobios International, Jodhpur, 1982 Sharma, P.D. Ecology and Environment, Rastogi Publications, Meerut 2002

PAPER – II PLANT PHYSIOLOGY AND BIOCHEMISTRY

Unit 1: Plant-water relations: Importance of water to plant life; physical properties of water; diffusion and osmosis; absorption, transport of water and transpiration; physiology of stomata

Mineral nutrition: Essential macro- and micro-elements and their role, mineral uptake; deficiency and toxicity symptoms

Introduction to phloem transport; source-sink relationship; factors affecting translocation

Unit 2: Photosynthesis: Significance; historical aspects; photosynthetic pigments; action spectra and enhancement effects; concept of two photosystems; Z-scheme; photophosphorylation; Calvin cycle; C4 pathway; CAM plants; photorespiration. Rubisco enzyme.

Unit 3: Respiration: Aerobic and anaerobic respiration; Kreb's cycle; electron transport mechanism (chemi – osmotic theory); redox potential; oxidative phosphorylation pentose phosphate pathway

Basics of enzymology: Discovery and nomenclature; characteristics of enzymes; concept of holoenzyme, apoenzyme, coenzyme and cofactors; regulation of enzyme activity; mechanism of action, Protein structures

Unit 4: Nitrogen and lipid metabolism: Biological Nitrogen fixation. Importance of nitrate reductase and its regulation; ammonium assimilation. Structure and function of lipids; fatty acid biosynthesis; B-oxidation; storage and mobilization of fatty acids

Unit 5: Growth and development: Definitions; phases of growth and development. Brief account on seed dormancy, seed germination and senescence. Photoperiodism, physiology of flowering; florigen concept, biological clock, vernalization. Plant Hormones-auxins, gibberellins, cytokinins, abscisic acid and ethylene, history of their discovery, Physiological role and general mode of actions. Photomorphogenesis; Brief account on phytochromes and cryptochromes.

Suggested Laboratory Exercises

1. To study the permeability of plasma membrane using different concentrations of organic solvents

2. To study the effect of temperature on permeability of plasma membrane

3. To prepare the standard curve of protein and determine the protein content in unknown samples

4. To study the enzyme activity of catalase and peroxidase as influenced by pH and temperature

- 5. Comparison of the rate of respiration of various plant parts
- 6. Separation of chloroplast pigments by solvent method
- 7. Determining the osmotic potential of *vacuolar sap by* plasmolytic method
- 8. Determining the water potential of *any tuber*

9. Separation of amino acids in a mixture by paper chromatography and their identification by comparison with standards

10. Bioassay of auxin, cytokinin, GA, ABA and ethylene using appropriate plant material

11. To study the regulation of stomatal movement using growth regulators, KCI and antitranspirants

Suggested Readings

- Dennis, D.T., Turpin, D.H., Lefebvre, D.D. and Layzell (eds.). Plant Metabolism (2nd ed.), Longman, Essex, England, 1997
- Galston, A.W. Life processes in Plants, Scientific American Library, Springer-Verlag, New York, USA, 1989
- Hopkins, W.G. Introduction to plant physiology, John Wiley & Sons, Inc., New York, USA, 1995
- Lea, P.J. and Leegood, R.C. Plant Biochemistry and Molecular Biology, John Wiley & Sons, Chichester, England, 1999
- Mohr, H. and Schopfer, P. Plant Physiology, Springer-Verlag, Berlin, Germany, 1995
- Salisbury, F.B. and Ross, C.W. Plant Physiology (4th ed.), Wadsworth Publishing Co., California, USA, 1992

Srivastava, H.S. Plant Physiology, Rastogi Publication, Meerut, 2001

Taiz, L. and Zeiger, E. Plant Physiology (2nd ed.), Sinauer Associats, Inc. Publishers, Massachusetts, USA, 1998

Suggested Readings

(for Laboratory Exercises)

- Amar Singh. Practical Plant Physiology, Kalyani Publishers, New Delhi, 1977
- Moore, T.C. Research Experiences in Plant Physiology: A Laboratory Manual, Springer-Verlag, Berlin, 1974
- Nifa, A.J. and Ballou, D.P. Fundamental Laboratory Approaches for Biochemistry and Biotechnology, Fitzrierald Science Press, Inc., Maryland, USA, 1998
- Robalts and Tucker, G.A. (Eds.) Plant Hormone Protocols, Humana Press, New Jersey, USA, 2000
- Scot, R.P.W. Techniques and Practice of Chromatography Marcel Dekker, Inc., New York, 1995
- Wilson, K. and Goulding, K.H. A Biologists Guide to principles and techniques of Practical Biochemistry, Ed-ward Arnold, London, 1986

PAPER-III PLANT BIOTECHONOLOGY AND MOLECULAR BIOLOGY

Unit 1: Cell theory and concept of totipotency and pluripotency. History of plant tissue culture and biotechnology. Basic tools and techniques of Plant tissue culture and molecular biology: General introduction about applications of biotechnology, bioinformatics and NanoBiotechnology.

Unit 2: Introduction to Bacterial Genome organization Genetic recombination in bacteria. Introduction to vectors for gene cloning: p-BR322, Cosmids, Phagemids and BAC. c-DNA libraries. Detection and screening of recombinant DNA.

Unit 3: Concepts of organogenesis-somatic embryogenesis and androgenesis. Somaclonal variations and its applications. Protoplast isolation, fusion and somatic hybridization. Cryopreservation of germplasm. Introduction to bioreactors and production of secondary metabolites with special reference to alkaloids obtained from *Ephedra*, shikonin, diosgenin and Strategies used to optimize secondary metabolite production.

Unit-4: Genetic engineering of plants: *Agrobacterium* mediated gene transfer, t-DNA transfer mechanism integration and expression in plants. Direct method of gene transfer in plants: Chemical methods electroporation, particle gun delivery, lipofection, microinjection, macroinjection, pollen transformation, laser induced and silicon fiber mediated. Reporter (Lucifarase, GUS and GFP) and marker genes.

Unit-5: Biotechnology and society: Development of transgenic crop plants against biotic and abiotic stresses. Genetically modified crops: Golden rice, Bt cotton (as a model system). Intellectual Property Right (IPR) and Plant Breeder's Rights (PBR) in current regime of WTO. Impact of GM crops on society and environment.

SUGGESTED LABORATORY EXERCISES

1. Demonstration of the technique of micropropagation by using different explants, e.g. auxiliary buds, shoot meristems

- 2. Demonstration of the techniques of anther culture
- 3. Isolation of protoplasts from different tissues using commercially available enzymes

4. Demonstration of root and shoot formation from the apical and basal portions of stem segments in liquid medium containing different hormones

5. Demonstrations/poster on GM Crops and related issues

Suggested Readings

- Bhojwani, S.S. Plant Tissue Culture: Application and Limitation, Elsevier Science Publishers, New York, USA, 1990
- Old, R.W. and Primrose, S.B. Principles of Gene Manipulation, Black well Scientific Publications, Oxford, U.K., 1986
- Raghavan, O. Embryogenesis in Angiosperms: A Developmental and Experimental Study, Cambridge University, Press, New York, USA, 1986
- Vasil, I.K. and Thorpe, T.A. Plant Cell and Tissue Culture, Kluwer Academic Publishers, The Netherlands, 1994 SUGGESTED READINGS

(for Laboratory Exercises)

Ball, R.D. (ed.) Plant Cell Culture Protocols, Humana Press, Inc. New Jersey, USA, 1999 Dixon, R.A. (ed.) Plant Cell culture: a Practical Approach, IRL, Press Oxford, 1987

- Glick, B.R. and Thompson, J.E. Methods in Plant Molecular Biology and Biotechnology, CRC Press, Boxa Raton, Florida, 1993
- Roberts, J. and Tucker, G.A. (eds.) Plant Hormone Protocols Humana Press, New Jersey, USA 2000.

BIOTECHNOLOGY 2018

Max Marks: 50

PAPER I: RECOMBIANT DNA TECHNOLOGY

- **Unit I:** What is gene cloning and why do we need to clone gene? Tools and Techniques: Plasmid and other vehicle. Genomic-DNA, handling of DNA and RNA. Restriction enzymes and reagents. Laboratory techniques and other requirements.
- **Unit II:** Safety measures and related regulations for recombinant DNA work, choice and selection of the tools and techniques. Vehicles: Plasmids and bacteriophages, available phagemids, cosmids and viruses.
- **Unit III:** Purification of DNA from bacteria, plant and animal cells. Manipulation of purified DNA.Introduction of DNA into living cells. Cloning vectors for *E-coli*.
- **Unit IV:** Cloning vectors for organism other than *E-coli*, yeast, fungi, plants- agro bacteria, plants viruses and animal viruses. Applications of cloning in gene analysis- how to obtain a clone of a specific gene, studying gene location and structure, studying gene expression.
- **Unit V:** Gene cloning and expression of foreign genes in research and biotechnology. Production of protein from cloned genes. Gene cloning in medicine: Pharmaceutical compounds, artificial insulin gene, recombinant vaccine, and diagnostic reagents.

PAPER II: PLANT BIOTECHNOLOGY

Max Marks: 50

- **Unit I:** Introduction to in–vitro methods. Terms and definitions. Use of growth regulators. Beginning of in-vitro cultures in India (Ovary and Ovule culture), in-vitro pollination and fertilization. Embryo culture, embryo rescue after wide hybridization and its application.
- **Unit II:** Introduction to processes of embryogenesis and organogenesis and their practical applications. Clonal multiplication of elite species (micropropagation) through axillary bud, shoot tip and meristem culture Haploids and their applications. Somaclonal variation and their applications.

Unit III: Endosperm culture and production of triploids. Single Cell suspension culture and their application in selection of variant mutants with or without mutagen treatment (of haploid cultures preferably).

Unit IV: Testing of viability of isolated protoplasts, various steps in the isolation and regeneration of protoplasts. Somatic hybridization – Introduction various methods of fusion of protoplasts (chemical

Somatic hybridization – Introduction, various methods of fusion of protoplasts (chemical and electrical), use of markers for selection of hybrid cells.

Unit V: Practical application of somatic hybridization (hybrids/cybrids). Use of plant cell, protoplasts and tissue culture for genetic manipulation of plants. Introduction to *Agrobacterium tumefaciens*: Tumour formation on plants using *A. tumefaciens* (monocots v/s dicots)

Hairy Root formation using using *Agrobacterium rhizogenes* Practical applications of genetic transformation. Plant genomics (e.g. Rice, Arabidopsis)

PAPER III: ENVIRONMENTAL AND ANIMAL BIOTECHNOLOGY

Max Marks: 50

- **Unit I:** General metabolism of animal cells. Special secondary metabolites/products (Insulin, growth hormone, Interferon, t- plasminogen activator, and factor VIII) Expressing cloned proteins in animal's cells. Over production and processing of chosen protein: The need to express in animal cells.
- **Unit II:** Production of vaccines in animal cells.Production of monoclonal antibodies. Growth factors promoting proliferation of animal cells (EGF, FGF, PGDF, IL-1, IL-2, NGF, and Erythropoietin). Bioreactors for large-scale culture of cells. Transplanting cultured cells.
- **Unit III:** Renewable and Non–Renewable resources. What is Renewable should be Bioassimable / Biodegradable. Major consumable items: Food, Fuel and Fibers. Conventional Fuels and their Environmental impacts: Fire wood, Plant and Wastes, coal, gas, animal oils. Modern fuel and their environmental impacts: Methanogenic bacteria and biogas, microbial hydrogen production, conversion of sugars to ethanol the gasohol experiment, Solar energy converters - hopes from the photosynthetic pigments, plant based petroleum industry, cellulose degradation for combustible fuel.
- **Unit IV:** Biotechnological inputs in producing good quality and natural fibers- transgenic animals and transgenic plants. Microbial quality of food and water .Treatment of municipal waste and industrial effluents.

Degradation of Pesticides and other toxic chemicals by micro organisms. Thuringiensis toxin as a natural pesticide, Biological control of other insects swarming the agricultural fields. Enrichment of ores by microorganisms, Biofertilizers. Nitrogen fixing microorganisms enrich the soil with assimilable nitrogen.

Unit V: Biodiversity and its conservation: Alpha- and Beta-biodiversity, steps to preserve biodiversity, in-situ and ex-situ conservation.

Intellectual property, IPR, and plant genetic resources, TRIPS and GATT

Patenting: Patenting of genetic material, obligations and complications, current issues: Ethics, Environmental safety.Risk assessment of GEOs (Genetically Engineered Organisms), Plant Breeder's right and farmer's rights.

Practical

- 1. Initiating Plant tissue culture: differentiation of explants.
- 2. Growth of plant cells into undifferentiated mass
- 3. Large-scale cultivation of plant cells in suspension
- 4. Induction of differentiation by modulating the hormonal balance
- 5. Culture of lymphocytes from blood samples
- 6. Preparation of media, filler sterilization, monitoring microbial contamination (bacteria, fungi & mycoplasma)
- 7. Cloning of animal cells by cell and colony purification
- 8. Fusion of cultured cells with myeloma cells.

Books Recommended

Old & Primrose: Principles of gene manipulation, Blackwell Scientific Publications Sambrose & Russell: Molecular cloning CSH Press Ausber: Current protocols in molecular biology CSH Press Michel: Introduction to environmental microbiology B.D. Singh Plant Breeding: Kalyani Publisher Alexander, M: Microbial Ecology, John Wiley & sons EC Eldowney, Hardman & Waite: Pollution Ecology biotreatment- Longman Scientific Technical
Baker &Herson - Bioremediation – Tata McGraw Hill
P.C.Debergh & R.H. Zi mmerman: Micropropagation Technique & Applications. Kluwer Academic Publishers
K. Lindsey & M.G. K. Jones: Plant Biotechnology in Agriculture
R.A. Meyers: Molecules Biology & Biotechnology VCH Publishers N.Y.
B. D. Singh: Plant Biotechnology, Kalyani Publishers
Indra K Vasil & Trevar A Thorpe: Plant Cell & Tissue Culture, Kluwer Academic Publishers
S.S Bhojwani & M.K. Razdan: Plant Tissue Culture Theory & Practice, Elsevier

Practical

| | | Time 5:00 hr |
|----|--|----------------|
| | | Max. Marks: 75 |
| | | Min. Marks: 27 |
| 1. | Preparation of nutrient medium and its sterilization | 13 |
| 2. | Preparation of explant (pretreatment), sterilization and | |
| | inoculation for the given tissue culture technique | 08 |
| 3. | Identification of microbial contamination in the given | |
| | nutrient medium | 07 |
| 4. | Identify & comment upon the Spots (1to6) | 27 |
| 5. | Viva- Voce | 10 |
| 6. | Practical Record | 10 |
| | | |

B.Sc. II YEAR-2021

PAPER - I

CH-201 Inorganic Chemistry – II

UNIT I

Chemistry of Transition Elements

General Characteristics and Periodicity in properties with emphasis on their electronic configuration and multiple oxidation states of 3d, 4d and 5d series elements. Colored ion formation, magnetic, catalytic properties and complex formation tendency in 3d series elements.

UNIT II

Coordination compounds

Werner's coordination theory and experimental verification, Effective Atomic Number concept, chelates, nomenclature of coordination compounds, stereoisomerism in complexes of coordination number 4 and 6. Complexometric titrations and theory of metallochrome indicators.

UNIT III

f-Block elements

Chemistry of Lanthanides: Electronic structure, oxidation state, ionic radii, colors, spectral and magnetic properties. Lanthanide contraction and its consequences. Chemistry of actinides: General characteristics, comparative treatment of actinides and lanthanides with respect to ionic radii, oxidation states, Magnetic behavior and spectral properties.

UNIT IV

Concepts of acids and bases: Arrhenius, Brönsted-Lowry, Lewis and Usanovich concept. Acid base titrations, Theory of indicators, Redox titrations Non aqueous solvents: Physical properties of solvent, types of solvents and their general characteristics. Reactions in non aqueous solvents with reference to liquid NH₃ and liquid SO ₂

UNIT V

Quantitative analysis

Types of quantitative analysis: Gravimetric and volumetric analysis. Precipitation, Co-precipitation and Post precipitation. Errors in chemical analysis: types of error and their minimization; Accuracy, Precision, Standard Deviation.

Books Recommended:

- 1. Inorganic Chemistry by Satya Prakash
- 2. Inorganic Chemistry by B.R.Puri & L.R. Sharma

3. Inorganic Chemistry by Sangeeta Loonkar, Ramesh Book Depot, Jaipur

PAPER - II

CH-202 Organic Chemistry

UNIT : I

Electromagnetic Spectrum : Absorption Spectra

Ultraviolet (UV) absorption spectroscopy – absorption laws (Beer-Lambert law), molar absorptivity, presentation and analysis of UV spectra, types of electronic transitions, effect of conjugation. Concept of chromophore and auxochrome. Bathochromic, hyperchromic and hypochromic shifts. UV spectra of conjugated enes and enones.UV applications including identification of groups

UNIT : II

Alcohols

Classification and nomenclature.

Monohydric alcohols – nomenclature, methods of formation by reduction of aldehydes, ketones, carboxylic acids and esters. Hydrogen bonding. Acidic nature. Reactions of alcohols.

Dihydric alcohols – nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage $[Pb(OAc)_4$ and $HIO_4]$ and pinacol-pinacolone rearrangement.

Trihydric alcohols – nomenclature and methods of formation, chemical reactions of glycerol.

Phenols

Nomenclature, structure and bonding. Preparation of phenols, physical properties and acidic character. Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols – electrophilic aromatic substitution, acylation and carboxylation. Mechanisms of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Hauben-Hoesch reaction, Lederer-Manasse reaction and Reimer-Tiemann reaction.

UNIT : III

Aldehydes and Ketones

Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3-dithianes, synthesis of ketones from nitriles and from carboxylic acids. Physical properties. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction. Mannich reaction. Use of acetals as protecting group. Oxidation and reduction of aldehydes and ketones, Baeyer-Villiger oxidation, Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, LiAIH₄ and NaBH₄.

UNIT : IV

Carboxylic Acid

Nomenclature, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids. Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Reduction of carboxylic acids. Mechanism of decarboxylation, esterification and hydrolysis of esters (acidic and basic). Reactive methylene compounds: malonic ester and acetoacetic ester – preparation and synthetic applications. Mechanism of Claisen condensation

Ethers and Expoxides

Nomenclature of ethers and methods of their formation, physical properties. Chemical reactions – cleavage and autoxidation, Ziesel's method for methoxy group. Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides, orientation

Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides, orientation of epoxide, reactions of Grignard and organolithium reagents with epoxides.

UNIT : V.

Organic Compounds of Nitrogen

Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanisms of nucleophilic substitution in nitroarenes and their reductions in acidic, neutral and alkaline media. Picric acid.

Alkyl and Aryl amines : Reactivity, structure and nomenclature of amines, physical properties. Stereochemistry of amines. Separation of a mixture of primary, secondary and tertiary amines. Structural features effecting basic nature of amines. Amine salts as phase-transfer catalysts. Preparation of alkyl and aryl amines (reduction of nitro compounds. nitriles), reductive amination of aldehydic and ketonic compounds. Gabriel-phthalimide reaction, Hofmann bromamide reaction. Reactions of amines, electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid. Synthetic transformations of aryl diazonium salts, azo coupling.

Books Recommended:

- 1. Advanced Organic Chemistry by Mukherji, Singh & Kapoor
- 2. Organic Chemistry by Bahal and Bahal
- 3. Advanced Organic Chemistry by Morrison & Boyd
- 4. Carbanic Rasayan By K.M Gangotri RBD

PAPER - III

CH-203 Physical Chemistry

UNIT I

Thermodynamics – I

First Law of Thermodynamics: statement, definition of internal energy and enthalpy. Joule-Thomson Effect, Joule – Thomson coefficient and inversion temperature. Calculation of w, q, dU & dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process. Second Law of Thermodynamics: need for the law, different statements of the law. Carnot cycle and its efficiency, Carnot theorem. Numericals.

UNIT II

Thermodynamics – II

Entropy: Concept of Entropy, entropy as a state function, entropy as a function of V & T, entropy as a function of P & T, entropy change in physical change, Clausius inequality, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases. Gibbs and Helmholtz function as thermodynamic quantities, Gibbs – Helmholtz equation. Equilibrium constant and free energy. Reaction isotherm and reaction isochore. Clapeyron equation and Clausius – Clapeyron equation, applications. Third law of thermodynamics: Nernst heat theorem, Statement of third law and evaluation of absolute entropy from heat capacity data. Numericals.

UNIT III

Phase Equilibrium

Statement and meaning of the terms – phase, component and degree of freedom, Gibbs phase rule, phase equilibria of one component system – water and sulphur systems. Phase equilibria of two-component system: simple eutectic systems, – Pb-Ag system, desiliverisation of lead.

Two Component Systems- compound formation with congruent melting point (Mg-Zn) and incongruent melting point, (FeCl₃-H₂O)system. Freezing mixtures.

Nernst distribution law, deviations from Nernst Law, applications to study of complex ion and solvent extraction.

UNIT IV

Electrochemistry – I

Conductance, Specific conductance and equivalent conductance. Activity, activity coefficient and ionic strength. Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only). Transport number, definition and determination by Hittorf method and moving boundary method.

Applications of conductivity measurements: determination of degree of dissociation, determination of K_a of acids, determination of solubility product of a sparingly soluble salt, Conductometric titrations and their types.

UNIT V

Electrochemistry – II.

Nernst equation, derivation of cell E.M.F. and single electrode potential, standard hydrogen electrode, reference electrodes, standard electrode potential, sign conventions. Electrolytic and Galvanic cells – reversible and irreversible cells, conventional representation of electrochemical cells. EMF of a cell and its measurements. Computation of cell EMF. Calculation of thermodynamic quantities of cell reactions (ΔG , ΔH and K). Concentration cell with and without transport (mathematical treatment), liquid junction potential, application of concentration cells, valency of ions, solubility product and activity coefficient.

Potentiometric titrations, Determination of pH using hydrogen, quinhydrone and glass electrodes. Numericals.

Books Suggested:

- 1. The Elements of Physical Chemistry, P.W. Atkins, Oxford.
- 2. Physical Chemistry Through problems, S.K. Dogra and S. Dogra, Wiley Eastern Ltd.
- 3. Principles of Physical Chemistry, B.R. Puri, L.R. Sharma and M.S. Pathania, Shobhan Lal Naginchand & Co.
- 4. Physical Chemistry By K.R. Genwa RBD
- 5. Physical Chemistry, Bahal & Tuli, S. Chand & Co. Ltd.
- 6. Physical Chemistry, R.C. Saraswat and A.K. Goswami, RamPrasad & Sons.

CH-204 Laboratory Course - II

Inorganic Chemistry:

Gravimetric analysis (by using Silica / Sintered Crucible)

- (i) To estimate Barium as barium sulphate.
- (ii) To estimate copper as cupric oxide/ copper (I) thiocynate.
- (iii) To estimate Zinc as Zinc oxide.

Organic Chemistry:

- (i) Calibration of Thermometer: The following compounds may be used for the calibration purpose 80⁰-82⁰ (Naphthalene), 113.5⁰-114⁰ (Acetanilide), 132.5⁰-133⁰ (Urea) and 122⁰ (Benzoic acid).
- (ii) Qualitative Analysis: Identification of organic compounds (one liquid one solid) through the functional group analysis (containing only one functional group).

Physical Chemistry:

Chemical Kinetics:

- (i) To study the hydrolysis of an ester catalyzed by an acid and determine the rate constant and order of reaction.
- (ii) To study saponification of ester and determine the rate constant and order of reaction.
- (iii) To study the reaction b/w acetone and iodine with respect to iodine and determine the rate and order of reaction.

Viva

Record

Books Suggested (Laboratory Courses):

- 1. Experimental Organic Chemistry Vol I & II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGraw Hill.
- 2. Practical Chemistry, S.Giri, D.N.Bajpai and O.P.Pandey Publ. S. Chand
- 3. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern.
- 4. Experiments in General Chemistry, C.N.R. Rao and U.C. Agarwal, East-West Press.
- 5. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House.
- 6. Advanced Experimental Chemistry, Vol. I-Physical, J.N. Gurtu and R. Kapoor, S. Chand & Co.
- 7. Selected Experiments in Physical Chemistry, N.G. Mukherjee, J.N. Ghose & Sons.

Examination & Marking Scheme

| Time: 5 hours | | Max. Marks: 75 | Min. Pass Marks: 27 |
|------------------------------|-------|----------------|---------------------|
| sh' | | Regular | Ex Student |
| Gravimetric Exercise | | 20 | 20 |
| Qualitative Organic Analysis | | 20 | 20 |
| Physical Experiment | | 15 | 15 |
| Viva- Voice | | 5 | 5 |
| Sessional and Record | | 15 | |
| | | | |
| | Total | 75 | 60* |

*To be converted out of 75

Gravimetric Exercise- An error up to 0.5% carries full marks. For each subsequent 0.1% error deduct 1 mark, 8 marks reserved for procedure.

Qualitative Organic Analysis: Two organic compounds (one solid and one liquid) 2 mark each for correct identification of functional group, 2 marks each for element detection, 4 marks each for identification and 2 mark each for systematic work and proper record.

Physical Experiment: Observations- 6 mark, Calculation and Formula-5, Result-4 marks.

[20]

[15]

[20]

[5]

[5] [15]

B.Sc. II YEAR-2021

PAPER - I

CH-201 Inorganic Chemistry – II

UNIT I

Chemistry of Transition Elements

General Characteristics and Periodicity in properties with emphasis on their electronic configuration and multiple oxidation states of 3d, 4d and 5d series elements. Colored ion formation, magnetic, catalytic properties and complex formation tendency in 3d series elements.

UNIT II

Coordination compounds

Werner's coordination theory and experimental verification, Effective Atomic Number concept, chelates, nomenclature of coordination compounds, stereoisomerism in complexes of coordination number 4 and 6. Complexometric titrations and theory of metallochrome indicators.

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f-Block elements

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Quantitative analysis

Types of quantitative analysis: Gravimetric and volumetric analysis. Precipitation, Co-precipitation and Post precipitation. Errors in chemical analysis: types of error and their minimization; Accuracy, Precision, Standard Deviation.

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PAPER - II

CH-202 Organic Chemistry

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Carboxylic Acid

Nomenclature, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids. Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Reduction of carboxylic acids. Mechanism of decarboxylation, esterification and hydrolysis of esters (acidic and basic). Reactive methylene compounds: malonic ester and acetoacetic ester – preparation and synthetic applications. Mechanism of Claisen condensation

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PAPER - III

CH-203 Physical Chemistry

UNIT I

Thermodynamics – I

First Law of Thermodynamics: statement, definition of internal energy and enthalpy. Joule-Thomson Effect, Joule – Thomson coefficient and inversion temperature. Calculation of w, q, dU & dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process. Second Law of Thermodynamics: need for the law, different statements of the law. Carnot cycle and its efficiency, Carnot theorem. Numericals.

UNIT II

Thermodynamics – II

Entropy: Concept of Entropy, entropy as a state function, entropy as a function of V & T, entropy as a function of P & T, entropy change in physical change, Clausius inequality, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases. Gibbs and Helmholtz function as thermodynamic quantities, Gibbs – Helmholtz equation. Equilibrium constant and free energy. Reaction isotherm and reaction isochore. Clapeyron equation and Clausius – Clapeyron equation, applications. Third law of thermodynamics: Nernst heat theorem, Statement of third law and evaluation of absolute entropy from heat capacity data. Numericals.

UNIT III

Phase Equilibrium

Statement and meaning of the terms – phase, component and degree of freedom, Gibbs phase rule, phase equilibria of one component system – water and sulphur systems. Phase equilibria of two-component system: simple eutectic systems, – Pb-Ag system, desiliverisation of lead.

Two Component Systems- compound formation with congruent melting point (Mg-Zn) and incongruent melting point, (FeCl₃-H₂O)system. Freezing mixtures.

Nernst distribution law, deviations from Nernst Law, applications to study of complex ion and solvent extraction.

UNIT IV

Electrochemistry – I

Conductance, Specific conductance and equivalent conductance. Activity, activity coefficient and ionic strength. Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only). Transport number, definition and determination by Hittorf method and moving boundary method.

Applications of conductivity measurements: determination of degree of dissociation, determination of K_a of acids, determination of solubility product of a sparingly soluble salt, Conductometric titrations and their types.

UNIT V

Electrochemistry – II.

Nernst equation, derivation of cell E.M.F. and single electrode potential, standard hydrogen electrode, reference electrodes, standard electrode potential, sign conventions. Electrolytic and Galvanic cells – reversible and irreversible cells, conventional representation of electrochemical cells. EMF of a cell and its measurements. Computation of cell EMF. Calculation of thermodynamic quantities of cell reactions (ΔG , ΔH and K). Concentration cell with and without transport (mathematical treatment), liquid junction potential, application of concentration cells, valency of ions, solubility product and activity coefficient.

Potentiometric titrations, Determination of pH using hydrogen, quinhydrone and glass electrodes. Numericals.

Books Suggested:

- 1. The Elements of Physical Chemistry, P.W. Atkins, Oxford.
- 2. Physical Chemistry Through problems, S.K. Dogra and S. Dogra, Wiley Eastern Ltd.
- 3. Principles of Physical Chemistry, B.R. Puri, L.R. Sharma and M.S. Pathania, Shobhan Lal Naginchand & Co.
- 4. Physical Chemistry By K.R. Genwa RBD
- 5. Physical Chemistry, Bahal & Tuli, S. Chand & Co. Ltd.
- 6. Physical Chemistry, R.C. Saraswat and A.K. Goswami, RamPrasad & Sons.
CH-204 Laboratory Course - II

Inorganic Chemistry:

Gravimetric analysis (by using Silica / Sintered Crucible)

- (i) To estimate Barium as barium sulphate.
- (ii) To estimate copper as cupric oxide/ copper (I) thiocynate.
- (iii) To estimate Zinc as Zinc oxide.

Organic Chemistry:

- (i) Calibration of Thermometer: The following compounds may be used for the calibration purpose 80⁰-82⁰ (Naphthalene), 113.5⁰-114⁰ (Acetanilide), 132.5⁰-133⁰ (Urea) and 122⁰ (Benzoic acid).
- (ii) Qualitative Analysis: Identification of organic compounds (one liquid one solid) through the functional group analysis (containing only one functional group).

Physical Chemistry:

Chemical Kinetics:

- (i) To study the hydrolysis of an ester catalyzed by an acid and determine the rate constant and order of reaction.
- (ii) To study saponification of ester and determine the rate constant and order of reaction.
- (iii) To study the reaction b/w acetone and iodine with respect to iodine and determine the rate and order of reaction.

Viva

Record

Books Suggested (Laboratory Courses):

- 1. Experimental Organic Chemistry Vol I & II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGraw Hill.
- 2. Practical Chemistry, S.Giri, D.N.Bajpai and O.P.Pandey Publ. S. Chand
- 3. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern.
- 4. Experiments in General Chemistry, C.N.R. Rao and U.C. Agarwal, East-West Press.
- 5. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House.
- 6. Advanced Experimental Chemistry, Vol. I-Physical, J.N. Gurtu and R. Kapoor, S. Chand & Co.
- 7. Selected Experiments in Physical Chemistry, N.G. Mukherjee, J.N. Ghose & Sons.

Examination & Marking Scheme

| Time: 5 hours | | Max. Marks: 75 | Min. Pass Marks: 27 |
|------------------------------|-------|----------------|---------------------|
| sh' | | Regular | Ex Student |
| Gravimetric Exercise | | 20 | 20 |
| Qualitative Organic Analysis | | 20 | 20 |
| Physical Experiment | | 15 | 15 |
| Viva- Voice | | 5 | 5 |
| Sessional and Record | | 15 | |
| | | | |
| | Total | 75 | 60* |

*To be converted out of 75

Gravimetric Exercise- An error up to 0.5% carries full marks. For each subsequent 0.1% error deduct 1 mark, 8 marks reserved for procedure.

Qualitative Organic Analysis: Two organic compounds (one solid and one liquid) 2 mark each for correct identification of functional group, 2 marks each for element detection, 4 marks each for identification and 2 mark each for systematic work and proper record.

Physical Experiment: Observations- 6 mark, Calculation and Formula-5, Result-4 marks.

[20]

[15]

[20]

[5]

[5] [15]

PAPER - I

CH – 301 Inorganic Chemistry – III

UNIT I

Metal-Ligand bonding in transition metal complexes:

Valence bond theory of complexes and its limitation, Crystal field theory, Crystal field splitting of energy levels in octahedral, tetrahedral and square planer complexes, crystal-field stabilization energy of octahedral complexes (Calculation Only).

UNIT II

Hard and soft Acid Base Concept (HSAB): Classification of acid and base as hard and soft. Pearson's HSAB concept and its application.

Magnetic properties of transition metal complexes: Types of magnetic behaviour, magnetic properties of metal complexes, spin only formula, methods of determining magnetic moment and magnetic susceptibility.

UNIT III

Stability of metal complexes: A brief outline of thermodynamic stability of metal complexes and factors affecting the stability. Kinetic stability, labile and inert complexes, colour of transition metal complexes, effective atomic number (EAN), pi accepter ligands, experimental determination of stability constant and composition of complex (Job's Method and Bjerrum's Method).

UNIT IV

Organometallic Chemistry: Defination, nomenclature and classification of organometallic compounds, bonding, preparation, properties and application of organometallic compounds of Li, Al, Hg and Sn (alkyls and aryl).

Bioinorganic Chemistry: Essential and trace elements in biological processes, Biological role of alkali (Na, K, Li) and alkaline earth (Mg, Ca) metals.

UNIT V

Basic principles of Metallurgy and metallurgical processes. Metallurgy of Copper, Zinc, Platinum and Uranium from their main ores.

Books Recommended:

- 1. Inorganic Chemistry Part I and part II by N.C.Sogani, M.L.Sharma, G.K.Rastogi
- 2. Inorganic Chemistry by G.C.Shivhare, V.P.Lawania
- 3. Text Book of Inorganic Chemistry by P.L.Soni
- 4. Text Book of Inorganic Chemistry by Satya Prakash, Tuli & Madan

CH-302 Organic Chemistry

UNIT : I.

Spectroscopy

Nuclear magnetic resonance (NMR) spectroscopy.

Proton magnetic resonance (¹H PMR) spectroscopy, nuclear shielding and deshielding, chemical shift and molecular structure, spin-spin splitting and coupling constants, areas of signals, interpretation of PMR spectra of simple organic molecules such as ethyl bromide, acetaldehyde, 1,1,2-tribromoethane, ethyl acetate, toluene and acetophenone.

UNIT : II

Heterocyclic Compounds

Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basic nature of pyridine, piperidine and pyrrole.

Introduction to condensed five and six – membered heterocycles. Preparation and reactions of indole, quinoline and isoquinoline with special reference to Fisher indole synthesis, Skraup synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of indole, quinoline and isoquinoline.

UNIT : III.

Carbohydrates

Classification and nomenclature. Monosaccharides, interconversion of glucose and fructose, chain lengthening and chain shortening of aldoses. Configuration of monosaccharides. Erythro and threo diastereomers. Conversion of glucose into mannose., mechanism of osazone formation, Formation of glycosides, ethers and esters. Cyclic structure of D(+)-glucose. Determination of ring size of monosaccharides, Mechanism of mutarotation. Structures of ribose and deoxyribose. introduction to disaccharides (maltose, sucrose and lactose) An and polysaccharides(starch and cellulose)without involving structure determination.

UNIT – IV.

Amino Acids, Peptides, Proteins and Nucleic Acids

Classification, structure and stereochemistry of amino acids; Acid-base behavior, isoelectric point, electrophoresis and separation of amino acids by chromatography.

Preparation and reactions of α -amino acids. Structure and nomenclature of peptides and proteins. Classification of proteins. selective hydrolysis of peptides. Classical peptide synthesis, solid-phase peptide synthesis. Peptide structure determination, end group analysis, Structures of peptides and proteins. Levels of protein structure. Protein denaturation/renaturation.

Nucleic acids: introduction. Constituents of nucleic acids. Ribonucleosides and ribonucleotides. The double helical structure of DNA.

UNIT –V:

Fats, Oils, Detergents and Synthetic Polymers : Natural fats, edible and industrial oils of vegetable origin, common fatty acids, glycerides, hydrogenation of unsaturated oils. Saponification value, iodine value, acid value. Soaps, synthetic detergents, alkyl and aryl sulphonates. Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers. Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins, urea formaldehyde resins, epoxy resins and polyurethanes

Books Recommended:

- 1. Advanced Organic Chemistry by Morrisom & Boyd
- 2. Organic Chemistry by Behal & Behal
- 3. Text Book of Organic Chemistry by M.K.Jain
- 4. Polymer Chemistry by P. Bahadur and N.V. shastri.

CH-303 Physical Chemistry – III

UNIT I

Elementary Quantum Mechanics

Black-body radiation, Planck's radiation law, photoelectric effect. Compton effect, De Broglie hypothesis, the Heisenberg's uncertainty principle, Schrodinger wave equation and its importance, physical interpretation of wave function.

Adsorption: Difference between adsorption, absorption and sorption, Chemisorption, adsorbent and adsorbate, reversible and irreversible adsorption, characteristics of adsorption, adsorption of gases by solids, factors affecting adsorption, types of adsorption isotherms, Freundlich and Langmuir adsorption isotherms. Numericals

UNIT II

Spectroscopy

Introduction: electromagnetic radiation, regions of the spectrum, Basic features of different Spectrometers, Born-Oppenheimer approximation, degrees of freedom.

Rotational Spectrum: Diatomic molecules, Energy levels of a rigid rotator (semiclassical principles), selection rules, spectral intensity, distribution using population distribution (Maxwell-Boltzmann distribution) determination of bond length, qualitative description of non-rigid rotator, isotope effect. Numericals.

UNIT III

Vibration and Raman Spectroscopy

Vibrational Spectrum:Infrared spectrum: Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, intensity, determination of force constant and qualitative relation of force constant and bond energies, effect of anharmonic motion and isotope on the spectrum.

Raman Spectroscopy: concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules. Numericals.

UNIT IV

Electronic Spectrum: Origin of electronic spectrum, Selection rules, vibrational course structure and rotational fine structures considering no interaction of rotational and vibrational energies. qualitative description of selection rules and Franck-Condon principle.

Photochemistry: Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grothus – Drapper law, Stark – Einstein law, Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions – energy transfer processes (simple examples). Numericals

UNIT V

Solid State

Crystal state, classification of crystals, space lattice, unit cell.

Laws of crystallography – (i) Law of constancy of interfacial angles (ii) Law of rationality of indices (iii) Law of symmetry. Symmetry elements in crystals.

X-ray diffraction by crystals. Derivation of Bragg equation. Determination of crystal structure of NaCl, KCl and CsCl (Laue's method and powder method). Numericals.

Books Suggested:

- 1. The Elements of Physical Chemistry, P.W. Atkins, Oxford.
- 2. Physical Chemistry Through problems, S.K. Dogra and S. Dogra, Wiley Eastern Ltd.
- 3 Principles of Physical Chemistry, B.R. Puri, L.R. Sharma and M.S. Pathania, Shobhan Lal Nagin Chand & Co.
- 4 Physical Chemistry by S.C.Ameta, A.V.Singh, R.Ameta, R.Mathur
- 5 Bhotic Rasayan, K.R. Genwa, RBD Jaipur

Inorganic Chemistry:

Preparations: [5]

Micro cosmic salt., Tetraammine copper(II) sulphate, Nickel ammonium sulphate, Sodium thiosulphate, Chrome Alum, Ferrous Sulphate, Ferrous Ammonium Sulphate

Organic Chemistry:

(a) Qualitative Analysis: - Analysis of an organic mixture is containing two solid components, using water, NaHCO₃ and NaOH for separation. [15]

(b) Synthesis of organic compounds:-

- (i) Acetylation of salicylic acid, aniline and p-nitroacetanilide.
- (ii) Preparation of iodoform from ethanol and acetone.
- (iii) Diazotization/Coupling of primary aromatic amines (aniline).
- (iv) Preparation of methyl orange.
- (c) Thin Layer Chromatography
 - (i) Separation of dyes
 - (ii) Separation of green leaf (Spinach) pigments.

Physical Chemistry

- (a) Colloids: To determine precipitation value for the following sols and also verify Hardy's Schultz law (i)As₂S₃ Sol (ii)Fe (OH)₃ Sol.
- (b) Distribution law: To determine the partition coefficient of benzoic acid between water and benzene at R.T.
- (c) Adsorption: To study the adsorption of acetic acid by activated charcoal and verify the Freundlich adsorption isotherm.

Viva

Record

Books Suggested (Laboratory Courses):

- 1. Practical Chemistry, S.Giri, D.N.Bajpai and O.P.Pandey Publ. S. Chand
- 2. Experimental Organic Chemistry Vol I & II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGraw Hill.
- 3. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern.
- 4. Vogel's Textbook of Practical Organic Chemistry, B.S. Furniss, A.J. Hannaford, V. Rogers, P.W.G. Smith and A.R. Tatchell, ELBS.
- 5. Experiments in General Chemistry, C.N.R. Rao and U.C. Agarwal, East-West Press.
- 6. Experiments in Physical Chemistry, R.C. Das and B. Behra, Tata McGraw Hill.
- 7. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House.
- 8. Advanced Experimental Chemistry, Vol. I-Physical, J.N. Gurtu and R. Kapoor, S. Chand & Co.

Examination & Marking Scheme

| Time: 5 hours | | Max. Marks: 75 | Min. Pass Marks: 27 |
|-----------------------|-------|----------------|---------------------|
| | | Regular | Ex |
| | | Student | Student |
| Inorganic Preparation | | 05 | 05 |
| Qualitative Analysis | | 15 | 15 |
| Organic Synthesis | | 10 | 10 |
| Chromatography | | 10 | 10 |
| Physical Experiment | | 15 | 15 |
| Viva- Voice | | 5 | 5 |
| Sessional and Record | | 15 | |
| | | | |
| | Total | 75 | 60* |

*To be converted out of 75

[10]

[10]

[15]

TEACHING & EXAMINATION SCHEME

For the Examination – 2020 ELECTRONICS

B.Sc. Part - I

| | | | Pd/W (45mts.) | Exam. Hours | Max. Marks 150 |
|-----------|-----------|--|------------------|----------------|-----------------------------|
| Elec. 101 | Paper I | Circuit Elements and Networks | 2 | 3 | 50 |
| Elec. 102 | Paper II | Semiconductor Devices | 2 | 3 | 50 |
| Elec. 103 | Paper III | Thermionic Devices and measuring Instruments | 2 | 3 | 50 |
| PRACTIC | AL | | 6 | 5 | 75 |
| | | Total | | | 225 |

B.Sc. Part -I

PAPER I CIRCUIT ELEMENTS AND NETWORKS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

Unit 1:

THEORY

Circuit elements: Types of resistors and their rating, inductance, types of inductors, mutual – inductance, transformer principle, types of transformers, capacitance, types of capacitors, LR, RC and RLC circuits, phasor diagrams, series and parallel resonance circuits, Quality factor.

UNIT 2:

Networks analysis I: Kirchhoff's Laws, superposition theorem, Thevenin's theorem, voltage source equivalent circuit, Norton's theorem, current source equivalent circuit, maximum power transfer theorem.

Unit 3:

Network analysis II: Network definitions, mesh and node circuit analysis, reduction of a complicated circuit into T and π equivalents, conversion between T and π configurations.

UNIT 4:

Coupled circuits: Coupled circuits and impedance transformation, inductive coupled circuits, equivalent circuits for transformer, tuned coupled circuits, two terminal pair networks, ladder network and characteristics impedance.

UNIT 5:

Filters: Characteristics impedance of symmetrical T and π networks, constant – k type low, high, band pass and band elimination filters, cascading of filters, attenuators.

PAPERS II SEMICONDUCTOR DEVICES

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

UNIT 1:

Semiconductors: Energy bands in metals, insulators and semiconductors, intrinsic semiconductors, mobility and conductivity, extrinsic semiconductors - n type and p type, carrier concentration, conductivity, Fermi levels, Hall effect, generation and recombination of carriers, life time, photoconductivity, diffusion, continuity equation.

UNIT 2:

Semiconductor diodes :Space charge region and potential barrier, Current - voltage equation, forward and reverse bias characteristics, d.c. and a.c resistance, Space Charge and diffusion capacitances, varactor diode, Zener diode, tunnel diode and their characteristics, metal- semiconductor contact

UNIT 3:

Transistor characteristics: Bipolar junction transistors, NPN and PNP transistors and their characteristics in CB, CE and CC configurations, α , β and hybrid parameters, simple CE amplifier and its graphical analysis, fabrication of IC components.

UNIT 4:

Field effect transistors: Junction field effect transistors (JFET) and MOSFET and their characteristics, comparison between p channel and n channel MOSFET, Comparison between BJT and FETs, Silicon controlled rectifier (SCR), Diac, Triac and UJT and their characteristics.

UNIT 5:

Optoelectronics devices : Photoconductivity cells, PN photodiodes, PIN photodiodes, Avalanche photodiode, simple applications of photodiodes, optocoupler, photovoltaic effect, solar cell, LED and Phototransistors, basic concept of laser, semiconductor lasers and LCD.

PAPERS III

THERMIONIC DEVICES AND MEASURING INSTRUMENTS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

Unit 1:

Thermionic emissions: types of cathode materials, vacuum diode and its characteristics, space charge, triode and its characteristics and parameters, tetrode, pentode and their characteristics, V-R tubes and thyratron.

UNIT 2:

Cathode ray oscilloscope: Construction of CRT, deflection sensitivity of tube, block diagram of CRO, various controls and their operation, details of X and Y sections, horizontal sweep section, synchronization of sweep, triggered sweep, measurement of voltage, current, frequency and phase angle using CRO, basic idea about dual trace CRO.

UNIT 3:

Power supplies: Half wave and full wave rectification, voltage regulation. Ripple factor, use of inductor, capacitor, L and π type filters, voltage regulation circuit using zener diode

UNIT 4:

Measuring instruments I: D' Arsonval galvanometer, galvanometer sensitivity, D.C. ammeter, voltmeter, voltmeter sensitivity, d.c. multimeter rectifier type instruments, electrodynamometer, wattmeter, transducers: variable resistance, piezoelectric and pyroelectric transducers

UNIT 5:

Measuring instruments II: A.C. bridge, balance conditions, Comparison bridges, Maxwell bridge, Hay bridge, Schering bridge, Wien bridge, impedance bridges, Qmeter

Books Suggested :

Millman & Halkias: Integrated Electronics (TMH) Grob: Basic Electronics Mcgraw Hill 1985 Mottershead: Electronics, Devices and Circuits PHI, 1984 Ryder: Networks, Lines and Fields PHI 1983 Helfrick & Cooper: Modern Electronic Instrumentation & Measurement Techniques, PHI.

EXPERIMENTSFOR PRACTICAL WORK

- 1. Design and study of constant voltage source
- 2. Design and study of constant current source
- 3. Study of voltage, frequency of the waves and phase angles of RC circuits using CRO.
- 4. Measurement of impedance by impedance bridge
- 5. Study of frequency response of series LCR resonance circuit
- 6. Study of frequency of parallel resonance circuits
- 7. Study the semiconductor diode characteristics in forward bias condition
- 8. Study the Zener diode characteristics in reverse bias condition
- 9. Study the bipolar junction transistor(BJT) characteristics in CB mode
- 10. Study the bipolar junction transistor(BJT) characteristics in CE mode
- 11. Study the FET Characteristics
- 12. Study the triodeCharacteristics
- 13. Study the frequency response of single stage BJT amplifier
- 14. Study the photocell characteristics
- 15. To measure the of maximum power transfer from source to load using reactive (resistive)circuit
- 16. Study the frequency response of single stage triode amplifier
- 17. Study the voltage regulation by Zenerdiode
- 18. Study the frequency response of single stage FET amplifier.
- 19. Study theDIAC characteristics.
- 20. Verify the Thevenin and Norton theorem.
- 21. To measure the characteristic impedance of symmetrical two-port resistive network.

Note: - New experiments may be added on availability of equipment.

TEACHING & EXAMINATION SCHEME

For the Examination – 2020 ELECTRONICS

B.Sc. Part II

| | | | Pd/W (45mts.) | Exam. Hours | Max. Marks |
|-----------|-----------|---------------------------|------------------|----------------|---------------|
| Elec. 201 | Paper I | Amplifiers | 2 | 3 | 50 50 |
| Elec. 202 | Paper II | Feedback systems | 2 | 3 | 50 |
| Elec. 203 | Paper III | Communication Electronics | 2 | 3 | 50 |
| PRACTIC | AL | | 6 | 5 | 75 |
| | | Total | | | 225 |

B.SC. PART II

PAPER I : AMPLIFIERS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

Unit 1 :

THEORY

Transistor biasing, bias stabilization and Operating point, thermal instability, stability factor, fixed bias, collector to base bias, emitter bias, voltage divider bias with emitter bias and emitter by pass capacitor.

Unit 2:

Small signal transistor amplifier Small signal hybrid equivalent circuits at low frequencies, analysis of transistor amplifier using h - parameters, current gain, input impedance, voltage gain and output impedance, comparison of CE, CB, CC amplifiers, Maximum available power gain, cascading transistor amplifiers.

Unit 3:

Frequency response of amplifier :Amplifier using triode, pentode, FET's, input capacitance, miller effect, bias methods, R.C. coupled amplifiers, voltage gain at low, mid and high frequencies, gain band width product. effect of cascading on gain and bandwidth.

$U_{\text{NIT}} \ 4:$

Large signal (power) amplifier : Class A, Class B and class C operations, efficiencies, distortions, power amplification, push pull amplifiers using transistors, transistor phase inverter, Class C tuned amplifier, commercial AF amplifier.

$U_{\mbox{\scriptsize NIT}} \ 5$:

Wide band (or video) amplifier :Band width requirement, high frequency hybrid π circuits for transistors, pulse testing, rise time, sag, various compensation techniques

PAPER II : FEEDBACK SYSTEMS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

 U_{NIT} 1:

Feedback : General theory of feedback, characteristics of negative feedback - gain, stability, distortion, noise, frequency response, effect of negative feedback on input and output impedances of an amplifier, Voltage feedback- series input, shunt input, current feedback- series input and shunt input.

Unit 2 :

Feedback amplifier: CE amplifier with current series and voltage shunt feedback, emitter follower, cathode follower and source follower, Cascade amplifier for tube, transistor and FET, Darlington pair, bootstrapping principle.

$U_{\text{NIT}} 3:$

Oscillators : Positive feedback and Barkhausen criterion, RC phase shift oscillator, Wein bridge oscillator, LC oscillators, tuned collector and tuned base, Hartley and Colpitt oscillators.

U_{NIT} 4:

Operational Amplifier : Ideal operational amplifier, practical inverting and non inverting operational amplifiers, differential amplifier, common - mode rejection ratio (CMMR) emitter coupled differential amplifier, offset error voltages and currents, universal balancing techniques, input and output impedances of Op-Amp amplifier, oscillators using Op-Amp.

$U_{\mbox{\scriptsize NIT}}\,5$:

Analog Computation : Basic building blocks of analog computer, solution of linear differential equations with constant coefficients, analog computer symbols, time and amplitude scaling technique, estimation of maximum values, combined time and amplitude scaling

PAPER III : COMMUNICATION ELECTRONICS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

UNIT 1:

Modulation : Need of a carrier frequency, AM, FM, PM, PCM, side bands, power consideration, collector and base modulation circuits. SSB transmission, FM by reactance variation using transistor, Armstrong PM system, block diagram of AM and FM transmitters

UNIT 2:

Demodulation : Demodulation of AM signals, square law demodulation, linear envelope detector, AGC, demodulation of FM signals, amplitude limiter, Foster-Seeley frequency discriminator, Ratio detector

UNIT 3:

Transmission line: Propagation constant, characteristic impedance, reflection on a line not terminated in characteristics impedance, reflection coefficient, open and short circuited lines, SWR, Impedance properties of $\lambda/4$ and $\lambda/2$ lines, stub matching.

UNIT 4:

Antennas :Dipole, quarter wave and half wave antenna and their radiation patterns, effect of ground, grounded antenna and antenna arrays

Unit 5 :

Propagation of radio waves : Ground wave, sky wave and space wave propagation, structure of ionosphere, refraction and reflection of sky wave by ionosphere, refractive index, critical frequency, MUF, skip distance and fading.

Books Suggested :

Millman and Halkais : Electronic Devcies and Circuits TMH Mottershead : Electronics Devices and Circuits PHI, 1984 Ryder : Networks, Lines and Fields PHI 1983 Terman : Electronic and Radio Engineering, McGraw Hill Kennedy: Electronic Communication Systems, McGraw Hill

EXPERIMENTS FOR PRACTICAL WORK

- 1. Study the Characteristics of Pentode
- 2. Study the frequency response of two stage RC coupled transistor Amplifier
- 3. Study the frequency response of two stage RC coupled FET Amplifier
- 4. Study the frequency response of two stage RC coupled tube Amplifier
- 5. Study the frequency response f a current series negative feedback amplifier
- 6. Measurement of gain, input and output impedance of an voltage amplifier
- 7. Measurement of gain, input and output impedance of emitter follower
- 8. Measurement of gain, input and output impedance of source follower
- 9. Study of Darlington pair emitter follower.
- 10. Design and study of passive filter Circuits (low pass, High pass and band pass)
- 11. Design and study of cascading of filters circuits to simulated transmission lines
- 12. Design and study of half wave and full wave rectifier with different filters.
- 13. To trace the output of half wave and full wave rectifier with different filters using CRO.
- 14. Study the V-I characteristics of SCR.
- 15. Study the V-I characteristics of the UJT.
- 16. Study the V-I characteristics of a solar cell.
- 17. Study the frequency response of operational amplifier as inverting amplifier.
- 18. Study of Differential amplifier and determine its CMRR.
- 19. Study of voltage divider bias for BJT amplifier and find its operating(Q) point.
- 20. Study of Cascode Amplifier.
- 21. Measurement of transistor Hybrid parameters.
- 22. Study of power amplifier.
- 23. Measurement of ac voltage operating range and determination of Band width using CRO for a single stage CE amplifier
- 24. Study of phase and gain variations in low, mid and high frequency regions of a voltage amplifier

Note: - New experiments may be added on availability of equipment.

TEACHING & EXAMINATION SCHEME

For the Examination – 2020 ELECTRONICS

B.Sc. Final

THEORY

| - | | | Pd/W (45mts.) | Exam. Hours | Max. Marks 150 |
|-----------|-----------|-------------------------------|------------------|----------------|----------------------|
| Elec. 301 | Paper I | Audio and Video systems | 2 | 3 | 50 |
| Elec. 302 | Paper II | Electronic Instrumentation | 2 | 3 | 50 |
| Elec. 303 | Paper III | Digital computer electronics | 2 | 3 | 50 |
| PRACTIC | AL | | 6 | 5 | 75 |
| | | Total | | | 225 |

B.Sc. Part III

PAPER I : AUDIO AND VIDEO SYSTEMS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

Unit 1 :

Radio Receiver : Characteristics and their measurements, tuned radio frequency receiver, frequency translation, superheterodyne receiver – block diagrams, typical transistor receiver circuit – explanation of various stages, FM receiver, trouble shooting and servicing of radio receiver, no sound, weak and noisy receiver, stereo transmission and reception.

UNIT 2:

Televison transmission : Broadcast channels, picture scanning, frequency band and resolution, camera tubes, block diagrams of transmitter and explanation of each block, colour transmission.

UNIT 3:

Television Receiver : Scanning sequence and interlacing, synchronization and blanking, block diagrams of colour and monochrome receivers and explanation of each block, video tap recording and reproduction, troubles and trouble shooting.

UNIT 4 :

Sound recording and reproduction : Construction of microphones and speakers, block diagrams of a tape recording system, recording, playback and erasing processes, tape transport system, trouble in tape transport system and magnetic heads of tape recorders, disc recording, Hi- Fi systems and stereophony system.

Unit 5 :

Radar system : Basic radar system, radar range equation, pulsed radar system, Doppler effect. CW Doppler radar system, moving target indicator principle, FM radar system.

satellite communication : orbital satellites, geo stationery satellite, orbital patterns, look angles, orbital spacing , satellite systems. link modules

PAPER II: ELECTRONIC INSTRUMENTATION

Note: The question paper for the examination will be divided in three parts i.e., Section -A, Section -B and Section -C.

Section – **A:** Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – **B:** Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

UNIT 1:

Wave shaping circuits: Waveform terminology, RC wave shaping circuits, Differentiation and integration of step, pulse and square wave inputs, clipping and clamping circuits.

UNIT 2:

Wave form generators: Astable, monostable and bistable multivibrators, Schmitt trigger, UJT as sawtooth waveform generator, synchronisation, general features of a time base signal, simple voltage and current sweep circuits.

UNIT 3:

Regualted power supplies and controlled rectification : voltage regulation using transistors, Op-Amps and IC's, Controlled rectification using SCR, current rating of SCR, DIAC and TRIAC, phase control circuits

UNIT 4:

Laboratory Equipments: Standard signal generators, FETVM, digital voltmeter, digital multimeter, frequency counter, harmonic distortion – tuned circuit harmonic distortion analyzer, heterodyne harmonic analyzer, data acquisition system.

UNIT 5:

Pulse height analysis : SCA and MCA, nuclear electronics systems, scintillation detectors, radiation counter, origin of bio-electric signals, ECG, cardiac monitor, sonography

PAPER III: DIGITAL COMPUTER ELECTRONICS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – **A:** Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

Unit 1

Number system and basic logic circuits : Binary, octal, decimal, hexadecimal, BCD, ASCII and gray codes and their inter-conversion, basic logic gates and their electronic circuits (DTL and TTL), Boolean Algebra, De'Morgan theorems, study of logic circuit, Karnaugh Map.

Unit 2

Building blocks of Computer : Half adder and full adder, half substractor, RS flip flop, clocked RS flip flop, D flip flop, JK flip flop, JK master slave flip flop, level clock versus edge triggered clock, counters and shift registers, multiplexer, demultiplexer, decoder and encoder.

Unit 3

Memories: Semiconductor memories, RAM, ROM, magnetic drum memory, magnetic disc, floppy disc, magnetic tape, magnetic bubble and CCD type memories, Hard disk, optical disk. Main and secondary memory, cache memory.

Unit 4

Microcomputer Architecture: Organisation of 8085 microprocessor: Registers, ALU, bus organization, memory and instruction set, architecture of simple I/O devices, minimum micro computer system, simple examples of 8085 programming.

Unit 5

Data transfer: Types of data transfer, DMA data transfer, interrupts of 8085 and their interfacing, D/A conversion: Basic principles, weighted register method and R-2R ladder method, A/D conversion: counter method and SAR method.

Books Suggested:

B. Ram, Fundamental of Microprocessor and Microcomputers, Dhanpat Rai Publications, New Delhi

A.P. Malvino, Digital Computer Electronics, Tata McGraw Hill

A.P. Malvino and D. Leach, Digital Principle and applications, Tata McGraw Hill Morris-Mano, Computer System Architecture, PHI

R.S. Gaonkar, Microprocessor Architecture, Programming and Applications. Wiley Eastern Ltd

EXPERIMENTS FOR PRACTICAL WORK

- 1. Design and study of AM Modulation and demodulation
- 2. Design and study of FM modulation and demodulation
- 3. Design and study of RC phase shift oscillator
- 4. Design and study of Hartley oscillator
- 5. Design and study of UJT relaxation oscillator
- 6. Design and study of differentiating and integrating RC circuits
- 7. Design and study of clipping and clamping circuits
- 8. Design and study of free running multivibrator
- 9. Design and study of timing circuit using IC555 as Astablemultivibrator
- 10. Study of various characteristics of Radio receiver.
- 11. Design and study of basic comparator, zero-crossing detector and Schmitt trigger circuit using Op Amp
- 12. Design and study of various logic gates using discrete components.
- 13. To design and verify AND, OR, NOT and XOR gates using universal (NAND/ NOR) gates.
- 14. To verify given Boolean expressions using logic gates
- 15. Design and study of half adder, half subtractor and full adder logic circuits.
- Design and study of filp- flop circuits using elementary gates (RS, clocked RS, D type and JK)
- 17. Design shift registers from D Flip-Flop, to study serial and parallel shifting.
- 18. Design and study of 4 bit counter using JK/T Flip-Flop.
- 19. Design and study of multiplexer and demultiplexer.
- 20. Design and study of regulated dc power supply using transistor and ICs.
- 21. Study of transistor switching behavior and their operating point
- 22. Design and study of first order and second order low-pass filters using Op Amp
- 23. Design and study of first order and second order high-pass filters using Op Amp
- 24. Write and run assembly language program for simple arithmetic operations using 8085 microprocessor.

Note: - New experiments may be added on availability of equipments.

B.Sc. PART I 2019-20

ENVIRONMENTAL STUDIES

Teaching : 3 periods / week in Annual System Maximum Marks : 100 Examination duration : 2 hours Objective type multiple choice question papers, 1 mark for each right answer, 20 guestions from each Unit.

Unit I : Multidisciplinary Nature of Environmental Studies : Definition, scope and importance; Human Population and Environment; Environment and Human Health; Legal Issues and Environment : Environment Protection Act; Environmental Ethics : Issues and possible solutions.

Unit II : Natural Resources : Renewable and Non-Renewable : Forest Resources -

Use and over exploitation, deforestation, introduction to afforestation activities in India.

Water Resources - Use and over utilization of surface and ground water; floods and droughts

Mineral Resources - Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

Food Resources - World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems.

Energy Resources - Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

Land Resources - Land as a resource, degradation, man induced landslides, soil erosion and desertification.

Unit III : Ecosystems : Concept of an ecosystem, Structure and function of ecosystem, Producers, consumers and decomposers; abiotic factors; food chain and web; ecological pyramids; energy flow.

Pollution – Definition, causes, effects and management strategies for (i) Air Pollution, (ii) Water Pollution, (iii) Soil Pollution, (iv) Noise Pollution, (v) Thermal Pollution, (vi) Nuclear hazards.

Solid waste management – Causes, effects and management strategies for urban and industrial wastes.

Unit IV : Biodiversity and its conservation : Introduction, definition, levels (genetic, species and ecological), Importance of biodiversity; Status – Global, National and Local; Threats to biodiversity – habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India.

Unit V : Sports for human welfare : Sports in relation to Philosophy; Sports and health fitness; Social values for sports and sportspersons, Role of sports in personality development; Sports as recreation.

India's policies for Sports : Central and State Governments; introduction to sports support facilities in India.

History and Traditional Sports of India – Kabaddi, Kho-Kho, Mallakhamb, Jallikattu.

B.A. / B.Com / B.Sc. Part I Examination, 2019-20 Foundation Course: General English

| | Duration: 2 Hrs. Max Marks: 100 |
|---|------------------------------------|
| No. of Questions: 100 Multiple Choice Questions | |
| Unit 1: Texts Prescribed: | (20 questions) |
| R.K. Narayan: <i>The Vendor of Sweets</i> (Ten questions from this text) <i>Remedial Course in English Book II</i> (Ten questions from this text) | |
| Unit II: Phrasal Verbs, Antonyms, Synonyms, Prefixes and Suffixes. | (20 questions) |
| Unit III: Compound and Complex Sentences, Transformation of simple Compound and Complex sentences. | , (20 questions) |
| Unit IV: Modal auxiliaries, Common Errors involving the use of articles, prepositions and tenses. | (20 questions) |
| Unit V: Active and Passive Voice, Direct and Indirect Speech, Formal a Informal Letters, Sequential Sentences. | and (20 questions) |
| NOTE: Division Of Questions and Marks : Each Unit will be of 20 marks (20x5=100 Marks) From Each Unit 20 multiple choice questions of one mark each will be (20x5 = 100 questions) | given. |

RECOMMENDED READINGS:

Close, R.A. A Reference Grammar of English. Corder, S. Pit. *An Intermediate English Practical Book*. Orient Longman. Seely, John. *Writing with a Purpose*. Oxford University Press. Thomson & Martinet. *A Practical English Grammar*. Oxford University Press.

Appendix 1



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B. Sc. I Year Geology 2020-2021

| Theory | | | | |
|-------------|-------------------------------|-------|-----------|--|
| Paper I | Physical Geology | | 50 Marks | |
| Paper II | Mineralogy | | 50 Marks | |
| Paper III | Palaeobiology | | 50 Marks | |
| Practicals | : Practical Examination | | 75 Marks | |
| | | Total | 225 Marks | |
| Duration of | each theory paper Examination | | 3 Hrs. | |
| Duration of | Practical Examination | | 3 Hrs. | |

PAPER I: PHYSICAL GEOLOGY

Unit I

Geology and its perspectives.Introduction to basic tenetsoforigin of the Universe, the solar system.Earth in the Solar System: origin, size, shape, mass, density, rotational and revolution parameters.Age of the Earth.Chemical composition of the Earth.Internal structure of the Earth.Formation of hydrosphere, atmosphere and biosphere.Internal heat and Radioactivity of the Earth; Convection in the earth's core and its magnetic field.

Unit II

Elementary ideas of continental drift, Sea floor spreading and the theory of plate tectonics. Types of plates. Causes and rate of plate movement. Application of theory of plate tectonics in Geology to explain origin of mineral deposits Mountains, Earthquake belts, Island arcs and various Petrogenesis.

Unit III

Rock Weathering. Difference between Weathering and Erosion. Types of weathering, Soil formation, soil profile and soil types.

Geological work of rivers, glaciers, wind and groundwater.

Unit IV

Earthquakes: Their causes, effects and distribution. Earthquake waves.Measurement of Earthquakes.

Volcanoes: Types, Products and distribution.

Unit V

Oceanography : Geological work of Ocean; Physical features of Oceans, Coasts, Deep Sea trench, Midoceanic Ridges and Abyssal plain. Generation of oceanic currents, surface currents and global ocean Conveyor system; waveerosion and beach processes; ocean as a thermostat for the earth's surface heat balance.

Climatology :Atmospheric circulation, weather and climate changes. Land-air-sea interaction, Earth's heat budget and global climatic changes.Glacial, interglacial periods and ice ages.

PAPER II: MINERALOGY

Unit I

Fundamental laws of crystallography, elements of crystal symmetry, Millers, Weiss and Millarian system of notation and parameters.Crystal forms and their classification into crystal system, Introduction to space lattice.

Study of the normal classes of following crystal systems – Cubic system, Tetragonal system, Hexagonal system, Trigonal system, Orthorhombic system, monoclinic system and Triclinic system.

Unit II

Physical properties of minerals.Physical properties of Important Silicate and economic minerals.Concept of Isomorphism, Polymorphism, Solid solution, Exsolution.Elementary idea

about structure and classification of silicate minerals. Physical properties of the following minerals.

Quartz, Jasper, Orthoclase, Plagioclase, Microcline, Muscovite, Biotite, Garnet, Olivine, Augite, Hornblende, Tourmaline, Talc, Gypsum, Fluorite, Calcite, Apatite, Barite, Asbestos, Corundum.Phosphorite, Beryl, Kyanite, Galena, Sphalerite, Chalcopyrite, Pyrite, Magnetite, Hematite,Chromite, Pyrolusite and Psilomelane, Bauxite and Coal.

Unit III

Petrological microscope and its construction; principles of optics as applied to orthoscopic and conoscopic study of minerals: color, form, Relief,pleochroism, Interference colour, Extinction. Uniaxial and biaxial characters of minerals.Study of optical properties of Muscovite, Biotite, Quartz, Orthoclase, Microcline, Plagioclase, Olivine, Augite and Hornblende.

Unit IV

Mineralogical study of the following families.

| | (i) | Olivine | (ii) Pyroxene | (iii) Amphiboles |
|--|-----|---------|---------------|------------------|
|--|-----|---------|---------------|------------------|

Unit V

Mineralogical study of the following families.

(i) Quartz (ii) Feldspar (iii) Mica (iv) Garnet

PAPER III: PALAEOBIOLOGY

Unit I

Fossils, their preservation and uses. Elementary idea of organic evolution. Morphology of hard parts and geological distribution of Foraminifera. Introduction to *Nummulites*.

Unit II

Study of morphology and geological distribution of Graptoloidea, Echinoidea and Corals.Introduction to *Monograptus*, *Diplograptus*, *Cidaris*, *Hemiaster*, *Micraster*, *Calceola*andZaphrentis.

Unit III

Study of morphology of hard parts and geological distribution of Gastropoda, Lamellibranchia and Trilobita.Introduction to*Trochus, Murex, Physa, Turritella, Natica, Conus*and*CypreaLima, Pecten, Ostrea, Graphea, Exogyra, Mytilus, Trigonia*and*Hippurites*.Calymene, Paradoxides, Trinucleus and Phacops,

Unit IV

Study of morphology and geological distribution of Brachiopoda and Cephalopoda.Introduction to *Productus, Spirifer, TerebratullaRhynchonella.Nautilus, Beleminites, Phylloceras, Orthoceras, Goniatites, Ceratites* and *Perisphinctes*.

Unit V

Elementary knowledge of Gondwana flora and vertebrates of Siwaliks.Evolutionary history of Man, Horse and elephant.Introduction to *Glosopteris, Gangmopteris, Vertibraria* and *Ptilophyllum*.

PRACTICALS

- (1) Identification and Description of fossils in hand specimens.
- (2) Identification and Physical Properties of Minerals in hand specimens.
- (3) Identification and Description of Minerals under Petrological microscope
- (4) Study of Geomorphic features and forms. Physical Geology Models.
- (5) Sessional Marks.

SUGGESTED READING

- 1. Dutta A. K. 'Physical Geology.'
- 2. Gosh Mukul 'Bhautic BhuVigyan.' Madhya Pradesh Hindi Granth Academy., Bhopal.
- **3.** Aurther Homes. 'Principles of Physical Geology'
- **4.** Savinder Singh 'BhuAkratiVigyan'
- **5.** Read H.H. 'Rutley's Elements of Mineralogy. 26th Ed CBS Pub. New Delhi
- Jain B.C 'Khaniztatha Crystal Vigyan, Madhya Pradesh Hindi Granth Academy., Bhopal.

- 7. Tiwari D. R. 'KhanizVigyan'. Madhya Pradesh Hindi Granth Academy., Bhopal.
- 8. Deer WA, Howie RA and Zussman J. 1996: 'The Rock forming minerals' Longman publishers.
- 9. Woods, H., 1985: 'Invertebrate Palaeontology' CBS Publishers and Distributions.
- 10. Mishra R P 'JeevashmVigyan'. Madhya Pradesh Hindi Granth Academy., Bhopal.
- **11.** P. C. Jain and M.S. Anantharaman: Palaeontology Evolution and AnimalDistribution.Vishal Publications.
- 12. Moore R. C., Lalicher CG and Fisher AC: 'Invertebrate fossils'. McGraw Hill.

B. Sc. II year Geology 2020-21

| Theory | | | |
|------------|-----------------------------------|-----------------|--|
| Paper I | Igneous and Metamorphic Petrology | 50 Marks | |
| Paper II | Sedimentary Petrology | 50 Marks | |
| Paper I II | Stratigraphy | 50 Marks | |
| Practicals | : Practical Examination | 75 Marks | |
| | - | | |
| | | Total 225 Marks | |
| | - | | |
| | | | |
| | | 2.11 | |

| Duration of each theory paper Examination | 3 Hrs. |
|---|--------|
| Duration of Practical Examination | 3 Hrs. |

PAPER I : IGNEOUS AND METAMORPHIC PETROLOGY

Unit I:

Composition of magma. Crystallization of Unicomponent(Silica), Bicomponent(Ab-An) and Tricomponentmagma(Ab-An-Di). Bowen's Reaction Series. Forms and Structures of Igneous rocks

Unit II:

Textures and their genetic implications for Igneous rocks. Elementary idea of classification of Igneous rocks based on Mineralogical, Mode of occurrence and Geochemical factors. Tabular classification of Igneous rocks.

Unit III:

Metamorphism and its kinds and agents. Concept of depth zones, facies and grades of metamorphism. Texture and structures of metamorphic rocks.

Unit VI:

Regional metamorphism of argillaceous, arenaceous and mafic rocks.Thermal metamorphism of carbonate rocks.Cataclastic metamorphism.

Unit V:

Megascopic and microscopic characteristics and petrogenesis of following rocks. (A)Granite, Syenite, Gabbro, Anorthosite, Peridotite, Pegmatite, Lamprophyre, Rhyolite, Basalt.(B) Quartzite, Marble, Phyllite, Schist, Slate, Gneiss, Migmatite, Granulite and Charnokite.

PAPER II:SEDIMENTARY PETROLOGY

Unit I:

Sediments and Sedimentary rocks, the process of their formation;

Sedimentary structure: Surface structure- ripple marks, sole marks, rill marks, rain prints. Internal structure: bedding, gradded bedding, cross bedding and penecontemporaneous deformation. Biogenic structures:stromatolites and ichnofossils.

Unit II:

Texture of sedimentary rocks; grain size their distribution and geological significance, shape sphericity and roundness, packing orientation and internal fabric of sedimentary rock. Heavy minerals: The process of separation and study for provenance determination.

Unit III:

Types of sediments and sedimentary rocks- clastic rocks, their classification and characteristics,Petrogenesis of common clastic rocks.Characteristics of Sandstone, Siltstone, Shale, Conglomerate and Breccia.

Unit IV:

Chemical and Biogenic Rocks : Characteristics, classification and origin. Characteristics of Limestone, Dolomite, Phosphorite, Lignite and Coal.

Unit V:

Elementary knowledge of sedimentary environments. Characteristics of their products: Glacial, Lacustrine, Fluvial, Deltaic Shore line, Shelf and deep marine environments.

PAPER III: STRATIGRAPHY

Unit I:

Geological Time Scale: various boundaries and characteristics of each division and Indian equivalents. Time -unit, Rock -unit and Time –Rock -unit, Principles of Stratigraphy Stratigraphic correlation and various methods of its determination.

Unit II:

Archean Geology of DharwarCraton, SinghbhumCraton, Baster Craton and Eastern Ghat Craton and Rajasthan Craton (BhilwaraSupergroup to include BGC and Pre-Aravallimetasediments).

Unit III:

Proterozoic: AravalliSupergroup, CuddapahSupergroup, Delhi Supergroup, VindhyanSupergroup and Malani Igneous Suite.Permian -Triassic boundary.

Unit IV:

Palaeozoicsand Mesozoics of Salt Range, Spiti, Kashmir and Kumaun Himalaya.MarwarSupergroup and Mesozoics of Rajasthan. Jurassic of Kutch, Cretaceous of Trichinopoly. GondwanaSupergroup and Deccan Traps.Cretaceous -Tertiary boundary.

Unit V

Tertiary Rocks of North-eastern India, Western Rajasthan and Kachchh. Siwalik Supergroup. Quaternary Geology: Indogangetic plains, Thar Desert. Unheavels and lost of river Saraswati.

PRACTICALS

- **1.** Petrological characteristics (Mineralogy, texture and structural and Petrogenesis) of important Igneous, Metamorphic and Sedimentary rocks in handspecimens.
- **2.** Petrologicalcharacterstics (Mineralogy, texture and structural and Petrogenesis) of important Igneous, Metamorphic and Sedimentary rocks under Petrological Microscope.
- **3.** Identification and Stratigraphic Ordering of rock samples.
- 4. Demarcation of important Supergroups of Indian Stratigraphy in outline map of india.
- 5. Preparation of Geological map of western Rajasthan in Lab.

6. Sessional Marks.

SUGGESTED READING

- **1.** Tyrrell GW: Principles of Petrology
- 2. Tyrell GW:ShailikikeSidhant, Madhya Pradesh Hindi Granth Academy, Bhopal.
- 3. Pettijohn: Sedimentary Rocks, C. B. S. Publication, New Delhi
- 4. Best, M. G.: Igneous and Metamorphic Petrology C. B. S. Publication, New Delhi.
- 5. Krishnan M S :Geology of India and Burma, C. B. S. Publication, New Delhi.
- 6. Ravindra Kumar: Fundamentals of Historical Geology and Stratigraphy of India. Willey Eastern New Delhi
- 7. Wadia D. N.: Geology of India
- 8. BharatvarshkaBhuVigyan : Madhya Pradesh Hindi Granth Academy, Bhopal.
- **9.** Roy A. B. and Jakhar S.R. : Geology of Rajasthan (Northwest India) Precambrian to Recent. Scientific Publishers (India), Jodhpur.

B. Sc. III year Geology 2020-21

Theory

| Paper I | Economic Geology | 50 Marks |
|-------------|-------------------------------|-----------------|
| Paper II | Structural Geology | 50 Marks |
| Paper I II | Applied Geology | 50 Marks |
| Practicals | : Practical Examination | 75 Marks |
| | | |
| | | Total 225 Marks |
| | | |
| Duration of | each theory paper Examination | 3 Hrs. |
| Duration of | Practical Examination | 3 Hrs. |

PAPER I :ECONOMIC GEOLOGY

UnitI:

Ore forming process and deposits: Magmatic Concentration, Pegmatite, Contact metasomatism (including Skarns), Hydrothermal process and deposits.

UnitII:

Ore forming process and deposits: Sedimentation (Chemical Precipitation and Evaporation), Weathering (Residual and Mechanical Concentration), Oxidation and Supergene sulphide enrichment. Volcanogenic, Metamorphic and Biogenic Process and deposits.

UnitIII:

Geological setup and economic aspects of (a) Gold deposits of India (including Kolar Gold Field), (b) Lead Zinc and Copper deposits of India (including Zawar, Rajpura-Dariba, Malanjkhand, Khetri and Singhbhum deposits) (c) Iron and manganese deposits of India (d) Aluminium, Chromium, Tin and Tungsten deposits of India.

Physical properties, mode of occurrence and genesis, Indian location and economic use of following Ore minerals: Native Gold, Galena, Sphalerite, Chalcopyrite, Limonite (Gossan), Magnetite, Hematite, Pyrolusite, Psilomelane, Wed Ore, Bauxite, Chromite, Wolframite and Casseterite.

UnitVI:

Description of minerals used and the industries including, Cement, Fertilizer, Refrecatory, Abrassive, and Gem Stones.

Introduction of mineral used and industries including, Glass and Ceramics, Paint and Pigments, Insulator, Electronic and Building Stones.

Physical properties, mode of occurrence and genesis, economic use and Indian location of following industrial minerals and rocks: Apatite, Phosphorite, Pyrite, Gypsum, Diamond, Zircon, Kyanite, Magnesite, Garnet, Corundum, Quartz, Feldspar, Asbestos, Wollastonite, Talc, Fluorite, Barite, Muscovite, Ochur, Malachite, Azurite, Graphite. Limestone, Marble and Granite.

Unit V:

Energy Minerals: (A) Coal: Proximate and ultimate analysis of coal, classification of coals, ranks of coal, Origin of coal. Indian coal fields (B) Petroleum: Origin of Petroleum. Petroleum Geology of Bombay High, Cambey basin, Northeastern India and Barmer-Sanchor basin, (C) Nuclear Minerals: Types and Origin of various Uranium and Thorium deposits. Geology of JadugudaUranium deposit.Coastal Thorium Sand deposits.

PAPER II: STRUCTURAL GEOLOGY

Unit I:

Concept of Bed, Dip and Strike, True and Apparent dips.Toposheet, Clinometer, BruntonCompass. Geological Map:Definition and its Components. Methods of geological mapping in the field. Determination of thickness of bed, dip and strike in the Geological map. Preparation of cross section of Geological maps.

Unit II:

Determination of top and bottom of Sedimentary beds.Outlier, Inlier, Overlap and Offlapstructures.Stereographic projection and its use in Structural analysis.

Unit III:

Fold: Definition and morphology. Geometric and genetic classifications.Elementary idea about mechanism of folding.Recognition of folds in map and field.

Unit IV:

Faults: Definition and Terminology of its parts. Classifications.Effect of Faulting on outcrops.Recognition of faults in map and field.

Unit V:

Unconformities: types and recognition. Joints: Characteristics and Types. Cleavage, Schistosity and Lineation: types and their significance to recognize the major structures.

PAPER III: APPLIED GEOLOGY

Unit I:

Environmental Geology: Concept of natural ecosystem, Interaction and interrelation of Atmosphere, Hydrosphere, Lithosphere and Biosphere. Soils.Hydrological cycle.

Remote Sensing: Fundamentals of Remote Sensing. Preparation and study of areal photographs for Geomorphology, Structural Geology and Lithology.Preparation of Geological map using Remote Sensing. Applications of Remote sensing.

Unit II:

Groundwater hydrology: Groundwater and Surface water reservoirs. Aquifer, Aquiclude and Aquifuge.Darcy's law and its validity.Groundwater provinces of Rajasthan and India.Watershed management and linking of rivers.Quality of groundwater.

Unit III:

Engineering Geology:Types and terminology of Dams and Tunnels.Geological considerations to locate dams and tunnels including (a) Structural Geology (b) Lithology and (c) Groundwater.

Geological disasters : Earthquakes and Tsunami, Volcano, Flood and Landslide.
Unit VI:

Mineral exploration: Surface and subsurface exploration methods.Remote sensing and exploratory mapping. Geophysical exploration: Gravity, Electrical, Magnetic, and Seismic methods of exploration. Geobotanical and geochemical methods of exploration. Drilling: Types, logging and problems.

Unit V:

Principles of mineral economics: National policy. Strategic, critical and essential minerals.Mineral production in India.Changing pattern of mineral consumption.Mineral concession rules.Marine mineral resources and Law of sea.

PRACTICALS

- Physical properties, mode of occurrence and genesis, Indian location and economic use of Metallic minerals (ores).
- **2.** Physical properties, mode of occurrence and genesis, Indian location and economic use of Non Metallic (industrial Minerals) and Coals.
- 3. Preparation of map showing distribution of important economic deposits.
- 4. Preparation of Cross section of Geological maps and/or completion of outcrop maps.
- 5. Use of Stereographic projections for Structural Geology.
- 6. Sessional Marks.

SUGGESTED READING

- Jenson M and Bateman A M.: 'Economic Mineral Deposits'. John Wiley and Sons Newyork.
- 2. GokhleKVand GK Rao: 'Ore Deposits of India,. Thomson Press
- 3. Vyas GK: 'ArthikBhuVigyan'. Madhya Pradesh Hindi Granth Academy
- Manjrekar RP: 'ArthikevamVyavharikBhuVigyan'. Madhya Pradesh Hindi Granth Academy
- 5. Rakshpal R. 'Bharat kiKhanizSampdaevamUdyog'. Rajasthan Hindi GranthAcademy.
- 6. Billings M. P.: 'Structural Geology'

- 7. Shrivastava D.K. SanrachnatmakBhuVigyan Madhya Pradesh Hindi Granth Academy
- 8. Arogyaswami RNP 'Mining Geology' CBS publishers
- 9. Todd 'Groundwater Hydrology'
- **10.** Todd D. K. 'BhaumJalVigyan' Madhya Pradesh Hindi Granth Academy
- 11. Satyanarayan Swami B. S. 2000 : 'Engineering Geology' DhanpatRai and Cop Delhi
- 12. Pandey SN 1987 'Principles and Applications of Photogeology' Wiley Eastern New Delhi
- 13. Guha P.K., 2013. Remote Sensing for Beginners. East-west Press Pvt. Ltd. ISBN 9788176710961

SYLLABUS

BACHELOR OF SCIENCE

B. Sc. (Home Science) Part I Examination, 2019-20

B. Sc. (Home Science) Part II Examination, 2020-21

B. Sc. (Home Science) Part III Examination, 2021-22

Introduction:

Home Science as a field of Education is fully women oriented, preparing women for playing multifarious roles such as a professional career woman, an enlightened homemaker and awakened community worker.. Home Science syllabus has a built-in extension and outreach programme extending the knowledge to the masses. The requisitions of the department are directly in line with the focus of the eleventh plan fulfilling the key elements. The Home Science Department was established in the University in 1969 with Home Science only as a Subject in B.A. In1991. B.Sc. Home Science programme was started in the department with an intake of 50 students per year. **The department became a Post Graduate department in 1999 offering specialization in M. Sc. (Final) in 3 areas-**

- 1. Clothing & Textile
- 2. Food & Nutrition
- 3. Human Development

BACHELOR OF SCIENCE General Information for Students

The course of study for the examination shall extend over a period of one year.

The examination shall be conducted by means of written papers and practicals wherever prescribed.

MEDIUM

Candidates are not allowed to use any medium other than English or Hindi for answering question papers. For answering question papers in the subject of English the medium will only be English. For answering question papers in the subject of Hindi the medium will only be Hindi.

EW; e %

विद्यार्धी को प्रश्न–प्रत्रों का उत्तर देने के लिए हिन्दी या अंग्रेजी के अतिरिक्त अन्य कोई माध्यम अपनाने की अनुमति नहीं है। अग्रेजी प्रश्न–पत्र के उत्तर देने के लिए अंग्रेजी की माध्यम होगा। हिन्दी प्रश्न–पत्र के उत्तर देने के लिए हिन्दी ही माध्यम होगा।

DIVISION

For a pass, a candidate must secure 36% marks in each subject in theory and practicals separately.

Division will be awarded as follows:

I Division – 60% of the aggregate marks

II Division – 48% of the aggregate marks

III Division – 36% of the aggregate marks

Division is awarded on the aggregate of marks of all the subjects.

Jskh %

उत्तीर्ण होने के लिए विद्यार्थी को प्रत्येक विशय में 36 प्रतिशत अंक प्राप्त करना अनिवार्य है। सैद्धान्तिक और प्रायोगिक परीक्षा में अलग–अलग न्यूनतम 36 प्रतिशत अंक प्राप्त करने होंगे।

उत्तीर्ण विद्यार्थियों को श्रेणी निम्नलिखित प्रकार से दी जायेगीः

पूर्णाकों के योग का 60 प्रतिशत – प्रथम श्रेणी

पूर्णाकों के योग का 48 प्रतिशत – द्वितीय श्रेणी

पूर्णाकों के योग का 36 प्रतिशत – तृतीय श्रेणी

ATTENDANCE

0.78 A

- 1. For all regular candidates in the Faculties of Arts, Education and Social Sciences, Law, Commerce and Engineering, the minimum attendance requirement shall be that a candidate should have attended at least71% of the lectures delivered and the tutorials held taken together as well as 70% of the practices and sessionals form the date of her/his admission.
- 2. Condonation of shortage of attendance: The shortage of attendance up to the limit specified below may be condoned on valid reasons:
 - a. Up to 6% in each subject plus 5 attendance in all in aggregate of the subject/papers be condoned by the Vice Chancellor on the recommendation of the Den/ Directory/ principal for under-graduate students and on the recommendation of the Head of the Department for the post Graduate classes.
 - b. The NCC/NSS Cadets sent out to parades and Camps and such students who are deputed by the University to take part in games, athletic or cultural activities may for purposes of attendance, be treated as present for the days of their absence in connection with the aforesaid activities and that period shall be added to their subject wise attendance.

Note : The attendance for supplementary student will be counted from the date of admission

B. Sc (Home Science) Part – I Examination and Teaching Scheme

| No. | Subject | Peri | iods | The | eory | Pra | ctical |
|-----|-------------------------------|------|------|-------|-------|-------|--------|
| | | Th. | Pr. | Max. | Min. | Max. | Min. |
| | | | | Marks | Marks | Marks | Marks |
| Ι | Elements of Household Physics | 3 | 2 | 50 | 18 | 30 | 11 |
| II | Elements of Textile Science | 3 | 2 | 50 | 18 | 30 | 11 |
| III | Science of Human | 3 | 2 | 50 | 18 | 30 | 11 |
| | Development | | | | | | |
| IV | Elements of Nutrition & Food | 3 | 2 | 50 | 18 | 30 | 11 |
| | Science | | | | | | |
| V | Elements of Extension | 3 | 3 | 50 | 18 | 30 | 11 |
| | Education | | | | | | |

| VI | Applied Physics | | 2 | - | 50 | 18 | - | - |
|------|-----------------|-------------|------|----|-----|----|-----|-----|
| VII | Applied Chemist | ry | 2 | - | 50 | 18 | - | - |
| VIII | Applied Biology | | 2 | - | 50 | 18 | - | - |
| IX | Human Physiolog | gy | 3 | - | 50 | 18 | - | - |
| | | | 25 | 11 | 450 | | 150 | |
| | | T | otal | | | | | 600 |
| X | Hindi/English | (Foundation | 6 | - | 100 | 36 | - | - |
| | 2011 (20) | | | | | | | |

ch, **I** - **I** h ¼ g foKku¼ Fle o K Examination and Teaching Scheme

| No. | Subject | Peri | ods | Theory | | Pra | ctical |
|------|--------------------------------------|------|-----|--------|-------|-------|--------|
| | | Th. | Pr. | Max. | Min. | Max. | Min. |
| | | | | Marks | Marks | Marks | Marks |
| Ι | घरेलू भौतिकी के घटक | 3 | 2 | 50 | 18 | 30 | 11 |
| II | वस्त्र विज्ञान के तत्व – I | 3 | 2 | 50 | 18 | 30 | 11 |
| III | मानव विकास का विज्ञान | 3 | 2 | 50 | 18 | 30 | 11 |
| IV | पोषण एवं खाद्य विज्ञान के तथ्य | 3 | 2 | 50 | 18 | 30 | 11 |
| V | प्रसार शिक्षा के तत्व | 3 | 3 | 50 | 18 | 30 | 11 |
| VI | अनुप्रयुक्त भौतिकी | 2 | - | 50 | 18 | - | - |
| VII | अनुप्रयुक्त रसायन विज्ञान | 2 | - | 50 | 18 | - | - |
| VIII | अनुप्रयुक्त जीव विज्ञान | 2 | - | 50 | 18 | - | - |
| IX | मानव शरीर क्रिया विज्ञान | 3 | - | 50 | 18 | - | - |
| | | 25 | 11 | 450 | | 150 | |
| | Te | otal | | | | | 600 |
| Х | हिन्दी / अग्रेंजी(Foundation course) | 6 | - | 100 | 36 | - | - |

B. Sc (Home Science) Part – II Examination and Teaching Scheme

| Paper | Subject | Theory per We | / period ek | Practical Period per | Exa Hor | amination urs | Max. Mark | Min. Marks |
|---------------------------|---|------------------|----------------|-------------------------|------------|------------------|-----------------|---------------|
| Domor | | | | Week | | | | |
| Paper | Growth & Development I (H.D. I) | | 2 | - * | | - | 50 - | |
| 1 | and Infancy) | | J | | | | 50 | 36 |
| Paper | Human Development II | + | | - | | _ | ├── ≻ | 50 |
| II | (H.D. II) (Development Aspects: | | 3 | | | | 50 | |
| | Infancy to Old age) | | - | | | | | |
| Paper | Home Management I | | | - | | - | | |
| Î | (H. Mgt. I) | | 3 | | | | ר 50 | |
| | (Principles of Home Management) | | | | | | | 36 |
| Paper | Home Management II | | | | | - | | |
| IV | (Housing and Home Furnishing) | | 3 | * | | | 50 J | |
| | | | | | | | | |
| Paper | Foods and Nutrition I (F.N. I) | | 2 | - | | - | 50 | |
| V | (Fundamentals of Nutrition Science) | | 5 | * | | | ⁵⁰] | 36 |
| Paper | Foods and Nutrition II | | | - | | - | } | 20 |
| VI | (F.N. II) | | 3 | | | | 50 | |
| | (Bio-Chemistry) | | | | | | | |
| Paper | Clothing & Textile I | | | - | | - | | |
| VII | (Cl.T. I) | | 3 | | | | ך 50 | |
| | (Textile Fibers and Fabric | | | | | | [| 36 |
| | Construction) | ļ | | | | | | |
| Paper | Clothing & Textile II | | - | | | - | | |
| VIII | (CI.T. II) | | 2 | * | | | 50 | |
| D | (Textile Chemistry) | | | | | | | |
| Paper | Extension Education I (Teaching and | | 2 | * | | - | 50 | 10 |
| IA *Civa | Departely | <u> </u> | 3 | .1. | | | 50 | 18 |
| 1 | 7 | | 2 | 1 | 5 | 6 | 7 | |
| Practi | cal Human Development | | | 3 | - | 30 | 11 | |
| Practical Home Management | | | 3 | _ | 30 | 11 | | |
| Practi | cal food and Nutrition (Bio-Chemistry) | | - | 3 | - | 30 | 11 | |
| Practi | cal Clothing and Textile (Textile and Lau | ındry) | - | 3 | - | 30 | 11 | |
| Practi | cal Extension Education | | - | 2 | - | 30 | 11 | |
| | | | L | | | | | |

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| | Examination and Teaching Scheme | | | | | | | | |
|-------|--------------------------------------|------------|------------|-------------|-----------------|-------|--|--|--|
| Paper | Subject | Theory | Practical | Examination | Max. | Min. | | | |
| _ | | period per | Period per | Hours | Mark | Marks | | | |
| | | Week | Week | | | | | | |
| Paper | oĭ),oafodki]izioiwz,oa | | - | _ | | | | | |
| Ι | ' ISIoILFI K | 3 | * | | ך 50 | | | | |
| | | | | | l | 36 | | | |
| Paper | fodki dsigy yk%'Kkok. Fik is | | - | _ | ſ | | | | |
| II | o) loLfik rd | 3 | | | 50 J | | | | |
| | | | | | | | | | |
| Paper | xg izU/u dsfl)Kr | | - | - | | | | | |
| III | | 3 | | | ך 50 | | | | |
| | | | | | | 36 | | | |
| Paper | vloki ,oaxg ifji Ttk | | | - | [| | | | |
| IV | | 3 | * | | 50 J | | | | |
| Paper | vk/HjHarikskk foKku | | - | - | | | | | |
| V | | 3 | * | | ך 50 | | | | |
| | | | | | | 36 | | | |
| Paper | [k] ,oaikkk& II | | - | - | ſ | | | | |
| VI | t s jki k;u | 3 | | | 50 J | | | | |
| Paper | oL= foKku & II | | - | - | | | | | |
| VII | oL= jśksrfik oL= fuek.k | 3 | | | ך 50 | | | | |
| | | | | | l | 36 | | | |
| Paper | oL= j k;u'HL= & III | | | - | ſ | | | | |
| VIII | | 2 | * | | 50 ^J | | | | |
| Paper | ial lj f'i(lik esf'i(k k , oal h[luk | | | _ | | | | | |
| IX | | 3 | * | | 50 | 18 | | | |

*Given Separately

B. Sc (Home Science) Part – III Examination and Teaching Scheme

| Paper | Subject | Theory period per Week | Practical Period per Week | Examination Hours | Max. Mark | Min. Marks |
|---------------|--|---------------------------|---------------------------------|----------------------|-----------------|---------------|
| Paper I | Foods and Nutrition III F.N. III (Meal Planning and Diet Therapy) | 3 | * | - | 50 | 36 |
| Paper II | Foods and Nutrition IV F.N. IV (Food Science) | 3 | * | - | 50 ∫ | |
| Paper III | Home Management III H. Mgt. III (Family Economics | 2 | - | - | ⁵⁰] | 36 |
| Paper IV | Home Management IV H. Mg. IV (House Hold Equipment) | 3 | * | - | 50 | |
| Paper V | Human Development III (H.D. III) (Marriage and Family) | 3 | - | - | 50 | 36 |
| Paper VI | Human Development IV (H.D. IV) (Pre-School Children: Education, Guidance & Counseling) | 2 | * | - | 50 | |
| Paper VII | Clothing & Textile III (Cl.T. III) (Family Clothing and Historic Textile) | 3 | * | - | 50] | 36 |
| Paper VIII | Extension Education II (Ex. Edu.) (Extension Education in Home Science and Rural Development) | 3 | * | - | 50 | |
| Paper IX | Foods and Nutrition V F.N. V (Community nutrition) | 2 | - | - | 50 | 18 |

*Given Separately

| 1 2 | 3 | 4 | 5 | 6 | 7 |
|-----------------------------|---|---|---|----|---|
| Practical Meal Planning and | - | 3 | - | 25 | - |
| Therapeutic Diets | | | | | |
| Practical Food Science | - | 2 | - | 20 | - |

| Practical Home Management | - | 3 | - | 30 | |
|-------------------------------|---|---|---|----|---|
| Practical Human Development | - | 3 | - | 25 | - |
| Practical Clothing | - | 3 | - | 30 | - |
| Practical Extension Education | - | 2 | - | 20 | - |

B. Sc (Home Science) Part – III Examination and Teaching Schem

| Examination and Teaching Scheme | | | | | | | | |
|---------------------------------|--|---------------|------------|-------------|--------------|-------|--|--|
| Paper | Subject | Theory period | Practical | Examination | Max. | Min. | | |
| | | per Week | Period per | Hours | Mark | Marks | | |
| | | | Week | | | | | |
| Paper | [k] ,oaikkk& III | 3 | * | - | | | | |
| Ι | vigij fu;ktu ,oavigijh; fpfdRi k | | | | ך 50 | | | |
| | | | | | | 36 | | |
| Paper | [k] ,oaikkk& IV | 3 | * | - | } | | | |
| II | [k] & foKku $\frac{1}{26}$N - 4) | | | | 50 J | | | |
| Paper | x`q izUk & III | | - | - | | | | |
| III | ifjolfjd vfk/kL= | 2 | | | ר 50 | | | |
| | • • | | | | | 36 | | |
| Paper | ?lj sywni dj . k | 3 | * | - | ۲ ۲ | | | |
| IV | | | | | 50 J | | | |
| Paper | HD III | 3 | - | - | | | | |
| V | foolg vl§ ifjolj | | | | ך 50 | | | |
| | | | | | | 36 | | |
| Paper | inuZ'Hkyh; ckyd%{'K(Hk] funšku vk§ | 2 | * | - | ۲ ۲ | | | |
| VI | ijle'K | | | | 50 J | | | |
| Paper | ikjokjd oL= ,oa,\$rgkid oL= & | 3 | * | - | | | | |
| VII | IV | | | | ך 50 | | | |
| | | | | | | 36 | | |
| Paper | x`g foKku ,oaxteh k fociki eaçi ij | 3 | * | - | <pre> </pre> | | | |
| VIII | f' K k | | | | 50 J | | | |
| Paper | [k] ,oaikk k& V | 2 | - | _ | 50 | 18 | | |
| ĪX | lleghf;dikkk | | | | | | | |
| | • • | | | | | | | |

*Given Separately

| 1 2 | 3 | 4 | 5 | 6 | 7 |
|-------------------------------|---|---|---|----|---|
| Practical Meal Planning and | - | 3 | - | 25 | - |
| Therapeutic Diets | | | | | |
| Practical Food Science | - | 2 | - | 20 | - |
| Practical Home Management | - | 3 | - | 30 | |
| Practical Human Development | - | 3 | - | 25 | - |
| Practical Clothing | - | 3 | - | 30 | - |
| Practical Extension Education | - | 2 | - | 20 | - |

B. Sc (Home Science) Part – I Examination – 2019-20 Paper - 1 Elements of Household Physics

M.M. : 50 Time : 3 p/w

UNIT-1 Ventilation

- a. Meaning, need and purpose
- b. Terms related to ventilation- infiltration, distribution and circulation
- c. Types- Natural ventilation, mechanical ventilation, whole house ventilation, spot ventilation, mix mode ventilation
- d. Ventilation for different climates
- e. Ventilation for different parts of the house- Kitchen, Bathroom and Bed room

UNIT-2 Environment and its relation with human being

- Heat
- i. Sources of heat metabolic and environment
- ii. Heat exchange between human body and its surroundings- Conduction, Convection, evaporation and radiation
- iii. Factors affecting heat exchange between human body and the environment climatic and non climatic
- iv. Health problems and control measures of heat cramps, heat exhaustion, heat stroke, transient heat, fatigue

Cold

i. Effect of cold on health and control measures

Energy

- ii. Meaning, Measurement and selection of energy
- iii. Introduction to Conventional and non conventional energy and their types

UNIT –3

Light

- i. Introduction and sources of light-
- ii. Properties of light
- iii. Factors affecting visual acuity- light intensity, freedom from dazzle, uniform lighting throughout the room, and steady level of illumination.
- iv. Colour- source of colour, physical and psychological properties of colour, responses of eye to colour, methods of producing colour
- v. Light pollution
- vi. Meaning and purpose of illumination
- vii. Health problems generated by light pollution and remedial measures

UNIT-4 Noise and atmospheric pollution

(I) Noise in the house

Definition

Sources (indoors and Out door)

effect of noise auditory (loss of hearing), and non auditory- hypertension, hyperacidity, loss of concentration, interference with verbal communication

Measures taken for reducing noise levels in houses.

(II) Atmospheric pollution-

Definition

Source

Effect on health and control measures

UNIT- 5 Modern house hold equipments-

Introduction, parts, functioning, care and maintenance of -

- a. Dishwasher
- b. Microwave and its types
- c. Induction cooker
- d. Food processor
- e. Water purifier and its types
- f. Automatic washing machine
- g. Equipments work by Solar energy- Solar dryer and water heater

Practical Elements of Household Physics

M.M- 30 Internal – 10 External - 20 **Time- 2p/w**

- 1. Resource file
- 2. Parts, principle and working mechanism of equipment mentioned in theory
- 3. Market survey for the equipments and preparation of the report
- 4. Meter reading, fixing of fuse, gas cylinder fitting.
- 5. First aid for the sickness of heat and cold
- 6. Reading and recording of body temperature, blood pressure, pulse and sugar
- 7. Plan colour scheme for different rooms with the help of model.
- 8. Floor Decorations

Reference-

Leithead and Lind: Heat stress and heat disorder Home & Interior: Anna hung Rutt Home management: B. B. Swanson Hosee hold ergonomics: Grandjean Household Equipments: Peet & Picket

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- 1. अर्थ, आवश्यकता एवं उपयोगिता
- 2. सवहन से सम्बन्धित शब्द रिसना, विभाजन, संचार
- 3. प्रकार प्राकृतिक सवहन, यान्त्रिक सवहन, पूर्ण गृह सवहन, स्थान संवहन, संवहन के मिश्रित प्रकार
- 4. विभिन्न मौसमों के लिए संवहन
- 5. गृह के विभिन्न भागों के लिए संवहन रसोई, स्नान घर, शयन कक्ष

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- 1- ताप
 - अ. ताप के स्त्रोत अपचयोपचय क्रियाएं एवं पर्यावरण
 - ब. मानव शरीर और इसके आसपास के वातावरण के बीच में ताप संवहन —चालन, संवहन, वाष्पन एवं विकरण स. वातावरण और मानव शरीर के बीच ताप संचरण को प्रभावित करने वाले कारक — मौसमी एवं बिना मौसमी

MM**&50** 3 P/W द. स्वास्थ्य समस्याएँ एवं उनका नियन्त्रणः ऊष्मा ऐंठन, ऊष्मा का निकास, ऊष्मा प्रभाव, अस्थायी ऊर्जा, फटीक (थकान)
 शीत

- अ. स्वास्थय पर शीत का प्रभाव एवं उपचार
- **3-** জর্জা
 - अ. अर्थ, मापन एवं ऊर्जा का चुनाव
 - ब. परम्परागत एवं अपरम्परागत ऊर्जा और उसके प्रकार

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- प्रकाश अ. परिचय एवं प्रकाश के स्रोत
 - ब. दृश्य की तीक्ष्णता को प्रभावित करने वाले कारकः प्रकाश की तीव्रता, चकाचौंध से आजादी, पूरे कमरे में एक समान रोशनी, प्रकाश का स्थिर स्तर
 - स. रंग–रगं की स्रोत, रंग के शारिरीक एवं मानसिक विशेषताएं, रंग के प्रति आंखों की प्रतिक्रिया, रंग उत्पन्न की विधियाँ
 - द. प्रकाश प्रदूषण
 - य. प्रकाश का अर्थ एवं उपयोगिता
 - र. प्रकाश प्रदुषण से उत्पन्न होने वाली स्वास्थ्य समस्याएं एवं उपचार

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- घरेलू घ्वनि परिभाषा, स्रोत (आन्तरिक एवं बाहरी) ध्वनी का प्रभाव– श्रवणता (श्रवण शक्ति के कमी) एवं अश्रवणता उच्चतनाव, अति अम्लता, केन्द्रता में कमी, शाब्दिक संवाद के साथ सम्बन्ध। घरेलू ध्वनी स्तर को कम करने के लिए प्रयुक्त किये जाने वाले उपाय
- 2. वातावरण प्रदूषण परिभाषा, स्रोत, स्वास्थ्य पर प्रभाव एवं उपचार

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- आधुनिक घरेलु उपकरण अर्थ, भाग, कार्य विधि, देखभाल और रखरखाव
 - अ. बर्तन धाने के उपकरण (डिशवाशर)
 - ब. माइक्रोवेव और इसके प्रकार
 - स. इन्डक्शन कुकर
 - द. फूंड प्रोसेसर
 - य. वाटर प्यूरिफायर एवं इसके प्रकार
 - र. स्वचालित वाशिंग मशीन
 - ल. सौर ऊर्जा से चलने वाले उपकरण सौर ड्रायर एवं वाटर हीटर

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- 1- स्रोत फाइल
- 2- भाग, सिद्धान्त एवं उपकरणों के क्रिया प्रणाली (प्रश्न पत्र 1 से सम्बन्धित)
- 3- उपकरणों का बाजार सर्वेक्षण एवं रिर्पोंट बनाना
- 4- मीटर पठन, पयूज बनाना, गैस सिलेण्डर फिट करना
- 5- ताप और शीत के बीमार के लिए प्राथमिक चिकित्सा
- 6- शरीर के तापमान, ब्लड प्रेशर, पल्स एवं शुगर को नापना एवं रिकार्ड करना
- 7- मॉडल के मदद से विभिन्न कक्षों के लिए रंग योजना बनाना
- . 8- फर्श सज्जा

Paper - II Elements of Textile Science

M. M. : 50 Time : 3 p/w

Unit – 1

- 1. Importance of studying textiles, its relation to Home Science.
- 2. Essential properties of textile fibers.
- 3. Classification of textile fibers.
- 4. Identification of textile fibers

Unit – 2

- 1. Types of Textile fabrics.
- 2. Textile terminology
- 3. Fashion Terminology
- 4. The consumer's interest in fibers and fabrics

Unit – 3

- 1. Introduction to weaving
- 2. Terms used in weaving
- 3. Loom its parts and working
- 4. Knitting Terminology and types of knits

Unit – 4

- 1. Fashion change and consumer acceptance
- 2. Careers in Fashion industry
- 3. Labeling of Textiles
- 4. Textile Research Associations

Unit – 5

- General Principles of Clothing Construction:
- (1) Drafting & making paper pattern.
- (2) Taking body measurement for different types of garments.

(3) Preparation of fabrics for Garment Making.

(4)Estimation of material required for different garments

(5) Laying out of patterns, cutting & marking

Practical Elements of Textile Science

M.M-30 Internal - 10 External - 20 Time- 2p/w

- 1. Part of sewing machine equipment for measurement, planning, cutting and sewing
- 2. Construction process in garment making (samples)
 - a. Stitches
 - b. Seams
 - c. Darts, pleats, tucks, gathers
 - d. Mending, patches and darning
 - e. Different embroidery stitches (making their samples)
 - f. Knitting samples
- 3. Infant garment
 - Baby's layette diaper, jhabla, bib,
- 4. Making of soaps and detergents.

References;

Anna Jacob: Art of Sewing

Corbman, B.P.: Textile Fiber to Fabric

Joseph, M.L.: Essentials of Textiles

Readers Digest: Complete guide to Sewing

Savitri Pandit: Manual for children's Clothing

Wingate, I.B.: Textile Fabrics and their Selection

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bdlbZ& 1

- 1. वस्त्र विज्ञान पढ़ने का महत्व तथा इसका गृह विज्ञान से सम्बन्ध
- वस्त्र रेशों की आवश्यक विशेषतॉएं 2.
- 3. वस्त्र रेशों का वर्गीकरण
- 4. वस्त्र रेशों की पहचान

bdlbZ& 2

- 1. कपड़ा वस्त्रों के प्रकार
- 2. वस्त्र शब्दावली
- 3. फैशन शब्दावली
- उपभोक्ता की रेशों तथा वस्त्रों मे रूचि 4

bdlbZ& 3

- 1. वस्त्र बुनाई की प्रस्तावना
- 2. बुनाई की शब्दावली
- 3. करघे की कार्यप्रणाली
- 4. निटिंग (बुनाई) की शब्दावली एवं प्रकार

bdlbZ& 4

- फैशन बदलाव तथा उपभोक्ता द्वारा अनुमोदन
 फैशन उद्योग में आजीविका
- 3. वस्त्रों के सूचक पत्र
- 4. वस्त्र अनुसन्धान संस्थाएँ

bdlbZ& 5 oL= fuek lZds i leki; fi) kir

- 1. ड्राफिटंग तथा पेपर पैटर्न का निमार्ण
- 2. विभिन्न प्रकार के वस्त्रों के लिए शरीर का नाप
- 3. वस्त्र निमार्ण के लिए कपडे की तैयारी
- विभिन्न वस्त्रों के लिए कपड़े का आकलन 4.
- पैटर्न का अभिन्यास, कटिंग तथा अंकन 5.

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- सिलाई मशीन के भाग, नाप के उपकरण, नियोजन कटिंग तथा सिलाई 1.
- वस्त्र निमार्ण की विधि (नमूने) 2.
- टाकें 3.
- 4. सेवन

MM**&50** 3 P/W

- 5. डार्ट, प्लीट, टक, गैदर
- मरम्मत, पैबन्द तथा रफू
- 7. विभिन्न कशीदा टाकें तथे उनके नमूने
- 8. बनाई के नमूने
- 9. शिशु के वस्त्र नवजात शिशु के वस्त्र, डायपर, झबला, बिब
- 10. साबुन तथा डिटरजेट। का निमार्ण

Paper III Science of Human Development

MM: 50 3 P/W

Unit – 1

- a) 1. Meaning and importance of studying human development and family studies.2. Concept of life span development.
- b) Development: definition of growth and development and the difference, Dimensions of development: Physical, Motor, Cognitive, Socio and emotional development
- c) Principles of development.
- d) Stages of human development and their importance.

Unit – 2

- a) Concept of developmental task and tasks of all the stages.
- b) Context of development: Introduction to concept of nature and nurture.
- c) Genetic inheritance: introduction to genes and number of chromosomes, Genotype and Phenotype.
- d) Context of development: Family, SES, gender and culture.

Unit – 3

- Learning, Intelligence and Creativity
- a) Learning: meaning and principles.
 - i) Learning and reinforcement.
 - ii) Motivational factors in learning.
- b) Intelligence
 - i) Meaning definition and nature of intelligence.
 - ii) Development of Intelligence and factors influencing it: nutrition, stimulation and IQ.
- c) Creativity
 - i) Meaning and importance.
 - ii) Relationship of intelligence and creativity.

Unit – 4

Socio-emotional and language development, concept of personality.

- a) Meaning and aspects of social development.
 - i) Acquiring social behavior.
 - ii) Understanding social rules.
 - iii) Developing social attitude
- b) Emotions
 - i) Meaning and difference between emotions and feelings.
 - ii) Functions of emotions
 - iii) Emotional needs of children: love, security, stability and attention.
- c) Personality
 - i) Definition and types of personality.
 - ii) Concept of mental health

Unit – 5

- a) Scope of the field of HDFS.
 - i) Opportunities for roles and employment.
 - ii) Researches on issues related to HD.
 - iii) Educationist: ranging from Preschool to University.
 - iv) Trainer
 - v) Planner of policies or programmes related to women & children.
 - vi) Implementing intervention for different aspects related to HD (including special education) vii)Counselor
- b) Setting & availability
 - i) Early childhood care & education.
 - Preschool Centers
 - Crèches
 - Hobby resource centers
 - Early stimulation programme
 - ICDS and anganwadies
 - ii) Family welfare programmes.
 - Family welfare programmes
 - Child welfare programmes
 - Programmes for the care of elderly
 - Organizations related to advocacy
 - iii) Children with special needs.

- Specialization counseling centers
- Schools (as planners)
- Early intervention
- Development testing

Practical Science of Human Development

M.M- 30 Internal – 10 External - 20 **Time- 2p/w**

2. Child Development

- i. Making a growth enhancing toy/material
- ii. Preparation of resource file containing
 - a. 10 stories for children
 - b. 10 songs for children
 - c. Collect 10 current articles on child development from news paper/magazines etc. and its display on board.
- iii. Prepare a chart/flip/book/album depicting all the stages of human development covering at-least one developmental task at each stage.
- iv. Techniques of anthropometric measurement (height, weight and head circumstances)
- v. Accidents and emergencies in childhood and their first aid Electric shock, foreign body in nose, ears and eyes, animal bite: dog, snakes and insects and burns.

Books reference

Hilgard, E. R.: Atkinson, R. C. and Atkinson, R. L.: Introductions to Psychology, Oxford, 1976

Boaz, G. D.: General Psychology, Gunalya Press, 1971

Pandey, General Psychology

Hurlock, E. 1995, Child development, New York: McGraw Hill Book Co.

Hurlock, E. 1995, Child developmental, Psychology New York: McGraw Hill Book Co.

Bee, H. 2000 The development child

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MM**&50 3** P/W

bdłbZ& 1

- 1. अ. मानव विकास और परिवारिक अध्ययन का अर्थ और महत्ता
 - ब. जीवन काल विकास का अप्रत्यय
- विकास : वृद्धि एवं विकास की परिभाषा और उनमें अन्तर। विकास के आयमः शारीरिक, क्रियात्मक, संज्ञात्मक, सामाजिक और संवेगात्मक विकास
- 3. विकास के सिद्धान्तों
- 4. मानव विकास की अवस्थाएँ एवं उनकी महत्ता

bdłbZ& 2

- 1. विकासात्मक कार्य की अवधारणा और सभी अवस्थाओं के कार्य
- 2. विकास के प्रसंग में : प्रकृति और पोषण की अवधारणा से परिचय
- 3. जीन्स द्वारा वंशानुक्रमः जीन्स और क्रोमोसोम्स की संख्या, जीनोटाइप और फीनोटाइप
- 4. विकास के सन्दर्भ में: परिवार, SES लिंग और संस्कृति

bdlbZ& 3

- 1. अधिगम, बुद्धि और सृजनात्मकता
 - अ. अधिगमः अर्थ और सिद्धांत
 - ब. अधिगम और सुदृढ़िकरण
 - स. अधिगम में प्रेरक कारक
- 2. बुद्धि
 - अ. अर्थ, परिभाषा और बुद्धि की प्रकृति
 - ब. बुद्धि का विकास और उसे प्रभावित करने वाले कारकः पोषण, उत्तेजना और बुद्धिलविध
- 3. सृजनात्मकता
 - अं. अर्थ और महत्ता
 - ब. बुद्धि एवं सृजनात्मकता में पारस्पिक सम्बन्ध
- bdlbZ& 4 I lelftd & I axiled vis Hkn विकास। व्यक्तित्व का संप्रत्यय
 - 1. सामाजिक विकास का अर्थ और उसके पहलु
 - अ. सामाजिक व्यवहार की प्राप्ति
 - ब. सामाजिक नियमों को समझना
 - स. सामाजिक व्यवहार का अधिग्रहण
 - 2. संवेग
 - अ. संवेग और अनुभूतियों का अर्थ एवं अन्तर
 - ब. संवेगो का कार्य
 - स. बालकों की संवेगात्मक आवश्यकताः स्नेह, सुरक्षा, स्थिरता और ध्यान
 - 3. व्यक्तित्व
 - अ. परिभाषा और व्यक्तित्व के प्रकार
 - ब. मानसिक स्वास्थ्य के अप्रत्यय

bdłbZ& 5

- 1- HDFS क्षेत्र का विस्तार
 - अ. भूमिका और रोजगार के अवसर
 - ब. मानव विकास के शौध से सम्बन्धित मुद्दे
 - स. शिक्षाविदः पूर्वशाला से विश्वविद्यालय तक
 - द. प्रशिक्षक
 - य. महिला एवं बालकों से सम्बन्धित नीतियाँ एवं प्रोग्राम के योजना कर्त्ता
 - र. मानव विकास के विभिन्न पहलुओं से सम्बन्धित हस्तक्षेप को कायन्वियन करना (विशिष्ट शिक्षा सहित)
 - ल. परामर्शदाता
- 2- सेंटिग और उपलब्धता
 - अ. प्रारम्भिक बाल्यावस्था देखभाल और शिक्षा (ECCE)
 - ब. पूर्वशालीय क्रेन्द
 - स. क्रेच
 - द. रूचि संसाधन क्रेन्द्र
 - य. प्रारंभिक उत्तेजित प्रोग्राम
 - र. ICDS और ऑगनवाडी
- 3- पारिवारिक कल्याण योजनाएँ
 - अ. परिवार कल्याण योजनाएँ
 - ब. बाल कल्याण योजनाएँ
 - स. वृद्धों की देखभाल के प्रोग्राम
 - द. वकालात से सम्बन्धित संस्थाएं
- 4 बालक जिन्हें विशेष देखभाल की आवश्यकता है
 - अ. विशेष देखभाल वाले परामर्श केन्द्र
 - ब. विद्यालय (योजनाकारों के रूप में)
 - स. समय से पहले हस्तक्षेप
 - द. विकास के परीक्षण

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1. बाल विकास

अ. वृद्धि के बढ़ाने वाले खिलौने, सामग्री

- ब. संसाधन फाइल को बनाना जिसमें
 - 10 बालकों की कहानियाँ •
 - 10 बालकों के गाने •
 - 10 ताजे समाचार बाल विकास पर समाचार पत्रों से/मैकजिन्स इन्यादि में से और उन्हें बोर्ड पर प्रदर्शन
- स. कम से कम एक विकासात्मक कार्य को मानव विकास की सभी अवस्थओं में से प्रदर्शित करते हुए एक चार्ट/पिलप/एलबम बनाइयें द. मानव मितय (अंथ्रोपोमेट्रिक) नाप की तकनीक (लम्बाई, वजन और शीर्ष का घेरा)
- य. बाल्यावस्था में दुर्घटना और आपात काल और उसकी प्राथमिक चिकित्साः बिजली का करंट, आंख, कान, नाक में बाह्य पदार्श जानवर का काटना : कुत्ता, सॉप और बिच्छु और जलना

Paper - IV **Elements of Nutrition and Food Science**

MM - 503P/W

Unit – 1

Food meaning, functions, classifications.

Food groups, characteristics of food groups balanced diet. Recommended daily allowances for various age groups ICMR.

Food preparation.

- a. Reasons for cooking.
- b. Principles of food preparation.
- c. Methods: classification, procedure, merits and limitations.
- d. Effect of cooking.
 - Food constituents, chemical, physiochemical and microbiological. I.
 - II. On nutritive value of food.
- Unit -2
- Factors affecting selection of food, availability, economy, importance of colour, texture and flavour of food, quality, socio-cultural etc.

Objective in the study of food retention of nutritive value, development of flavour and palatability, control of economy, improvement of digestibility, preservation of quality and safety.

Unit – **3**

Physio-chemical properties of food, study of composition colloids, somatic pressure hydrogen ion concentration (_pH), Bound water in foods.

Methods of improving nutritional quality of food germination, fermentation, supplementation fortifications.

Unit – 4 Food Preservation.

- a. Definition.
- b. Causes of food spoilage.
- c. Importance of preserving foods.
- d. Principles of food preserving.
- e. Methods of food preservation home and commercial.

Unit – 5

- Food packaging
- 1. Introduction.
- 2. Packaging: concepts, significance & functions.
- 3. Classification of packaging materials: flexible package, rigid package, retail or shipping containers.
- 4. Interactions between packaging and food toxicity hazards.
- 5. Biodegradable materials and environment issues.
- 6. Labeling requirements
 - a) Nutrition labeling
 - b) Nutrition claims
 - Coding of food products
- 7. Packaging laws and regulation

Practical **Elements of Nutrition and Food Science**

M.M-30 Internal - 10 External - 20 Time- 2p/w

- (i) Cookery:
- Terms, weight & Measures, principles for designs in lying of meals, types of serving (ii) **Cooking Methods**
- Demonstration of methods: Boiling, Steaming, Baking, Roasting and Frying (Shallow & Deep)
- (iii) Preparation of Five dishes each of the following:

 - a. Drinks, Soupsb. Snacks, Raita & Chutney
 - Vegetables, Pulses, Salads c.
 - d. Rice preparation Pulav, Biryani etc.
 - e. Sweets deserts and Ice Cream
 - f. Cakes & Biscuits
 - g. Demonstration on Cake Icing
 - h. Food Preservation Jam, Jelly, Pickle, Sauce, Vegetables. Drying
- iv) Theme parties with decoration
- a. Festivals, birthdays etc.

Books references.

- 1. Norman, P.N.: Food Science.
- 2. Palmer: Food Theory and Application.
- 3. Charley, H.: Food Science.
- 4. Shakuntala Manay: Food Science.
- 5. Marry and Benin: Introductory Food.
- 6. Griswald: The Experimental Study of Food.
- 7. Peckam, L. H.: Food Chemistry.
- 8. Shadakshar Swamy: Food Foundation.

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MM**&50** 3 P/W

bdłbZ& 1

- 1. खाद्य का अर्थ, कार्य, वर्गीकरण
 - खाद्य समूह खाद्य समूह की विशेषतायें, सन्तुलित आहार विभिन्न वर्ग के आयु अनुसार पोषक तत्वों की ICMR द्वारा दैनिक मात्रा
 - भोजन पकाने की कला
 - अ. भोजन पकाने के कारण
 - ब. भोजन पकाने के सिद्धान्त
 - स. भोजन की विधियों का वर्गीकरण इसके लाभ एवं कमियाँ
 - द. भोजन पकाने का प्रभाव
- 2- विभिन्न खाद्य पदार्थों पर रासायनिक, भौतिक एवं जैवकीय प्रभाव
- 3- खाद्य पदार्थों के पौष्टिक मूल्यों पर प्रभाव

bdlbZ& 2

- 1. भोज्य पदार्थों के चयन को प्रभावित करने वाले कारक भोज्य पदार्थों की उपलब्धता, आर्थिक आधार, रंग की महत्ता, बनावट एवं गन्ध, गुणता एवं समाजिक सांस्कृतिक प्रभाव
 - भोजन की पौष्टिकता को संग्रहित हेतु योग्य उद्वेशय सुगन्ध बनाये रखना, खाने योग्य बनाना, आर्थिक बचत, पचने की क्षमता को बढाना, गुणता को संचित रखना एवं नष्ट होने से बचाव

bdlbZ& 3

1. भोजन की भौतिक रासायनिक विशेषतायें, संगठन का अध्ययन, कौलाइँडस, रसाकर्षण दबाव, हाइड्रोजन आयन की सान्द्रता (PH), भोज्य पदार्थों में बाध्य जल, भोजन की गुणता को सुधारने हेतु विभिन्न विधियाँ – अंकुरण, किण्वन, सम्पूरकता, प्रबलीकरण

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- 1. परिभाषा
- 2. भोजन के खराब होने के कारण
- 3. भोजन के संरक्षण की महत्ता
- 4. भोजन संरक्षण के सिद्धान्त
- 5. पारम्परिक एवं व्यवसायिक रूप से भोज्य पदार्थों की संरक्षण विधियाँ

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- 1. प्रस्तावना
- पैंकिगः तथ्य, महत्ता एवं कार्य 2.
- पैंकिंग हेतु प्रयोग होने वाली साम्रगी लचीली पैकिंग, ठोस पैंकिंग, जहाज हेतु प्रयोग होने वाले कन्टेनर 3.
- पैकिग विधियॉ 4
- नमी से बचाव हेतु रोकथाम विधियाँ साम्रगी का चयन व विशेष गुण वाली पैंकिंग साम्रगी 5
- पैंकिंग तथा भोज्य पदार्थों के दूषित होने वाले समन्यवय 6.
- जैव रासायनिक साम्रगी से वातावरण को प्रभावित होने का खतरा 7.
- 8. लेबल हेतु प्रयोग-
 - अ. बार कोडिंग
 - ब. पोषण हेतु लेबल का प्रयोग
 - स. पौष्टिकता हेतु प्राथमिक तथ्य
 - द. भोज्य पदार्थों की अलग से कोडिंग
 - य. पैंकिंग हेतु नियम एवं अवधारणायें

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MM**230** /Urfid & 10 & 20 a P/W

- 1. पाक कला शब्दावली, नाप एवं तोल, भोजन परोसने की कला, परोसने के विभिन्न प्रकार
- पाक विधियाँ प्रत्यक्षीकरण द्वाराः उबालना, भाप विधि, बेंकिंग, सेंकना, तलना (गहरी एवं उथली विधि)
- पॉच व्यंजन बनायें, इन विधियों को अपनाते हुये-3.
 - पेय पदार्थ, सूप •
 - नाश्ते के व्यंजन, रायता एवं चटनी •
 - सब्जियॉ, दाले, सलाद •
 - चावल के व्यंजन पुलाव, बिरयानी •
 - मिठाइयॉ, मीठे व्यंजन, आइसक्रीम •
 - केक एवं बिस्कूट
 - केक पर आइसिंग का प्रत्यक्षीकरण
 - भोजन संरक्षण जैम, जेली, अचार, सॉस, सब्जियों को सुखाना
 - विशेष पार्टियों पर आयोजन एवं सज्जा
 - विभिन्न त्योहार एवं जन्मदिन

प्रस्तावित किताबें:–

- फूड साइंस शकुन्तला मेने
 फूड फाउण्डेशन सदाक्शर स्वामी
- 3. फूड साइंस नॉरमन

Paper - V **Elements of Extension Education**

MM - 50

Unit – 1 Introduction of Extension education:

- a) Concept of Education, Non formal, Formal, Informal and Extension Education
- b) Objectives of Extension Education
- c) Function and Scope of Extension Education
- d) Principles of Extension Education
- e) Process of extension education.
- f) Qualities of an Extension worker
- g) Philosophy of extension education

Unit-2 Introduction to Communication

- a. Meaning
- b. Is communication an Art or Science
- c. Elements of Communication and their characters tics- communicator, message, channels, treatment of message, Audience and audience response
- d. Commandments of good communication
- e. Seven C,s of Communication
- f. Objective of communication
- g. Self confidence for effective communication

3 p/w

Unit- 3 Communication Media and Information technology

- a. Folk Media- meaning, Importance and Types
- b. Electronic media- media and advantage
- c. Importance, advantage and disadvantage of Radio
- d. Telecommunication (meaning and use in communication only)- Television, Telephone, mobiles, video conferencing, E- mail, Fax,
- e. Information technology and its use in education, factor effecting selection of technology
- f. Advantages and disadvantages of mechanization of communication

Unit 4 : Communication for Extension :

- Formal and informal communication- their types, advantages and disadvantages (i)
- (ii) Effective writing- objectives, essentials and media of written communication,
- (iii) Art of listening in communication- good listening, principle and guidelines for effective listening
- Effective speaking- principles, guidelines and styles and media for oral communication (iv)
- Unit- 5 Communication of Innovation :
 - a) Concept of Innovation
 - b) Characteristics of Innovation
 - c) Adoption Process
 - d) Factors affecting the adoption of Innovation
 - e) Adopters categories

PRACTICAL

Elements of Extension Education

M.M-30 Internal - 10 External - 20 Time- 3p/w

- (I) Developing skills in puppet as folk media-
 - Preparation of puppets
 - Prepare script for puppet play on any social issue
 - Present puppet show
- (II) Prepare scrap book contains different electronic media
- (III) Writing success stories to present on Radio
- (IV) Visit to training and development organization
- (V) writing report of the same visit

Reference :-

Dhama, O.P. & Bhatnagar, O.P. : Education and Communication for Development, 1987

Dhama, O.P. & Bhatnagar, O.P. : Communication for Development, 1991

Mandal, S. & Ray, G.L., A text Book of Rural Development, 2007,

Ray, G.L., Extension Communication and management, 1999, Nays Prakashan, Calcutta

Reddy, A.A., Extension Education, 1976, Shree laxmi press, Baptla, A.P.

Extension Education in Community Development, Directorate of Extension Education, GOI, New Delhi Supe, S.V. : An Introduction to Extension Education.

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1. शिक्षा का संकल्पना / अवधारणा, औपचारिकेतर शिक्षा, औपचारिक शिक्षा, अनौपचारिक शिक्षा एवं प्रसार शिक्षा

- 2. प्रसार शिक्षा के उद्देश्य
- 3. प्रसार शिक्षा के कार्य एवं क्षेत्र
- 4. प्रसार शिक्षा के सिद्धान्त
- 5. प्रसार शिक्षा की प्रक्रिया
- एक प्रसार कार्यकर्त्ता के गुण
 प्रसार शिक्षा का दर्शन

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- 1. अर्थ
- संचार एक कला और विज्ञान है 2.
- संचार के तत्त्व और उनकी विशेषताएँ संचारक, सन्देश, माध्यम, सन्देश का प्रतिपादन, श्रोता और श्रोता प्रतिक्रिया 3.
- 4. अच्छे संचार का नियोजन
- 5. संचार के सात c_s
- संचार के उद्देश्य

7. प्रभावी संचार के लिए आत्मविश्वास

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- 1. लोक माध्यम– अर्थ, महत्त्व और प्रकार
- 2. इलेक्ट्रॉनिक माध्यम- माध्यम और लाभ
- 3. रेडियो का महत्त्व, लाभ और हानियाँ

MM**&50** 3 P/W

- टेलीसंचार (अर्थ और सिर्फ संचार में प्रयोग) टेलीविजन, टेलीफोन, मोबाईल, विडियो कॉन्फ्रेंसिंग, ई–मेल, फेक्स 4
- 5. सचना प्रौद्योगिकी और इसका शिक्षा में उपयोग, प्रौद्योगिकि के चयन को प्रभावित करने वाले तत्त्व
- संचार की मशीनीकरण के लाभ व हानियाँ 6.

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- 1. औपचारिक और अनौपचारिक संचार इनके प्रकार, लाभ और हानियाँ
- 2. प्रभावी लेखन लिखित संचार के उद्देश्य, अनिवार्यता और माध्यम
- 3. संचार के सुनने की कला अच्छा सुनना, सिद्धान्त और प्रभावी सुनने के लिए दिशा निर्देश
- प्रभावी बोलना मौखिक संचार के सिद्धान्त, दिशा निर्देश, अंदाज और माध्यम

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- नवाचार की अवधारणा
 नवाचार की विशेषताएं
- 3. अंगीकरण प्रक्रिया
- 4. नवाचार के अंगीकरण को प्रभावित करने वाले तत्त्व
- 5. अंगीकर्ता श्रेणियाँ।

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- 1. लोक माध्यम के रूप में कठपुतली में कौशल विकास
 - अ. कटपूतली की तैयारी
 - ब. किसी सामाजिक मुद्दे पर कठपुतली प्ले के लिए स्क्रिप्ट तैयार करना
 - स. कठपुतली शो दिखाना
- विभिन्न इलेक्ट्रॉनिक माध्यमों में स्क्रेप बुक कन्टेन्ट तैयार करना 2.
- रेडियो पर लिखित सफल कहानियाँ सुनाना 3
- प्रशिक्षण एवं विकास संगठन का भ्रमण 4.
- उसी भ्रमण पर रिपोर्ट लिखना 5.

Paper VI APPLIED PHYSICS

MM - 502P/W

Unit – 1 : Current Electricity :

Primary and secondary cells and there, E.M.F. Series and parallel arrangement of cell Ohm:s law, definition of ampere, ohm, watt, kilowatt hour, Parallel and series

Connection of resistances Potential-differences. Direct and alternating currents

Magnetic effects of current, moving coil galvanometer, ammeter, voltmeter, Faraday's law of electromagnetic - induction, electromagnet, Electric bell, transformer, and motor dynamo Chemical Effects:

Flow of current in a solution, Laws of electrolysis electroplating techniques of cleaning of silverware, application of electrolysis in Industry

Unit – 2 : Household Appliance :

Heating device:

Relation between electric energy and heat

Elements used in thermal equipments, Electric Iron, toaster, coffee percolator, heater, cooking ranges, water heater, geyser, electric mattresses and blanket, room heater, central heating

Refrigeration appliances: Refrigerators, Air-coolers, Air-conditioning

Mechanical appliances: Different types of pumps, cycle pumps, stove and booster water pump Other appliances: Fan, washing machine, vacuum cleaner, electric sewing machine

Unit – 3 : Household fitting :

- **Electric lighting:**
- a. Source of light: incandescent lamps, Fluorescent tubes, sodium, and mercury lamps neon sign, lamps with internal reflector
- b. Distribution of electricity in a house, phase, neutral and earth wires, cables fuse, plug switches
- c. Measurement of electric power, watt meter
- d. Effect of electricity on human body Domestic illumination, unit of intensity of illumination and illuminating power, illumination requirements of various rooms. Methods of Internal illumination, Direct and indirect, domestic water-supply for city, for house water tap, Flush latrine
- **Unit 4 :** Modern Physics :

Photoelectric effect: Photocell and their application.

- Discharge of electricity, through gases-Cathode rays, X-rays solid state.
- a. Semi conductors and insulators, Elementary idea of transistors
- b. Television: Persistence of vision, principles of T.V. receiver, color T.V.

Satellites: Uses of satellites in long distance communication T.V., weather forecasting and remote sensing

Unit – 5 : Sound :

Sound, Source of sound of transmission of sound waves

Velocity of sound, frequency, wave length, Reflection, refraction and diffraction

Absorption of sound-elementary ideas of acoustics building, intensity of sound

Ultrasonic applications in diagnosis, ranging and engineering

Musical sound instruments:

- a. Characteristics of sound: Loudness, pitch and quality
- b. Resonance, beats
- c. Musical scale-diatonic and tempered
- d. Musical instruments: Sitar, Harmonium and flute
- e. Human voice, Ultrasonic by bat
- f. Transmission of sound by telephone
- g. Recording and reproduction of sound gramophone, tape recorder, recording and reproduction of sound in motion pictures

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विद्युत धाराः प्राथमिक एवं द्वितीयक सेल व उनका विद्युत वाहक बल, सेंलों की श्रेणी एवं सामान्तर संयोजन, ओम का नियम, परिभाषाएं – एम्पियर, ओम, वाट, किलोवाट घंटा, समान्तर एंव श्रेणी

प्रतिरोधों का संयोजन – संभावित अन्तर, वैकल्पिक धारा, सीधी धारा

धारा का चुम्बकीय प्रभाव, गेलवेनोमीटर, अमीटर, विभवमापी विद्युत चुम्बकीय प्रेरन का नियम, विद्युत चुम्बक, विद्युत घंटी, ट्रांसफार्मर एवं चालक जनित्र

रसायनिक प्रभाव

विलयन में धारा प्रवाह, विद्युत अपघटन का नियम, विद्युत लेपन की तकनीक, चांदी की वस्तुओं की सफाई, विद्युत अपघटन का उद्योगों में उपयोग

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ऊष्मा वाले उपकरण– विद्युत ऊर्जा व ऊष्मा में संबंध, ऊष्मीय यंत्रों में उपयोग होने वाले तथ्य – विद्युत इस्त्री, टोस्टर, कॉफी परक्यूलेटर, हीटर, कुंकीग रेंज, वाटर हीटर, गीजर, विद्युत गद्दा एवं कम्बल, रूम हीटर, सेन्ट्रल हीटीगं प्रशीतन यन्त्रः रेफ्रीजरेटर, एयर–कूलर, एयर–कंडीशनिंग

यात्रिक उपकरण : पम्प के प्रकार, चक्रीय पम्प, स्टाव व बुस्टर, वाटर पम्प

अन्य उपकरण : पंखा, वाशिंग मशीन, वैक्यूम क्लीनर, विद्यूत सिलाई मशीन

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- 1. विद्युत प्रकाशः
 - अ. प्रकाश के स्त्रोत इनकेनडेसेन्ट लेम्प, फ्लोरोसेन्ट ट्यूब, सोडियम एवं मर्करी, लैम्पनियोन साइन, लैम्प विद इन्टरनल रिफलेक्टर
 - ब. घर में विद्युत का वितरण, कला, उदासीन एवं अर्थ तार, केबल फ्यूज
 - स. प्रकाशीय शक्ति का मापन, वॉटमीटर
 - द. मानव शरीर पर प्रकाश का प्रभाव– घरेलु रोशनी, रोशनी की इकाई, ऊर्जा

आन्तरिक रोशनी के प्रकारः प्रत्यक्ष एवं अप्रत्यक्ष, शहरों में घरेलू पानी की आपूर्ति, घर के नल के लिए, शौचालय प्रक्षालन

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- प्रकाश विद्युत प्रभाव : प्रकाश विद्युत सेल एवं उनके अनुप्रयोग विद्युत निरावेशन, गैसो के द्वारा कैथोड रे, एक्सरे सॉलिड स्लेट अ. अर्धचालक एवं कुचालक, ट्रांजिस्टर की आरम्भिक अवधारणा
 - ब. टेलिविजन दृश्य अवस्थिति, टीवी रिसिवर व कलर टीवी के सिद्धान्त
 - सेटेलाइट : लम्बी दुरी संचार में सेटेलाइट का प्रयोग, टीवी, मौसम भविष्यवाणी एवं सुदूर संवेदक

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- 1. ध्वनि, ध्वनि तंरगो का संचरण व ध्वनि स्रोत
- 2. ध्वनि की गति, आवृति, तंरग दुरी, परछाई, अपवर्तन, विवर्तन
- ध्वनि अवशोषण ध्वनिक निर्माण की अवधारणा, ध्वनि की तीव्रता
- 4. पराश्रव्य तंरगों का निदान में अनुप्रयोग, परास एवं तकनीकी संगीत उपकरण / यंत्र
 - अ. ध्वनि की विशषता : प्रबलता, पिच, गुण
 - ब. कम्पन∕गुंज, बीट
 - स. म्यूजिक स्केल, डायटोनिक एवं सयंमीत
 - द. वाद्ययत्र ः सितार, हारमोनियम एवं बासुरी
 - य. मानव ध्वनि : पराध्वनि (चमगादड़)
 - र. टेलिफोन के द्वारा ध्वनि का प्रसार
 - य. ध्वनि का अभिलेकन एवं पुर्नउत्पत्तिः ग्रामोफोन, टेप रिकोर्डर, चल चित्र में ध्वनि का अभिलेखन व पुर्नउत्पत्ति

Paper VII APPLIED CHEMISTRY

MM – 50 2P/W

Unit – 1 : Water – Soft and hard water, methods of removing hardness of water, drinking water and laundry water, estimation of water hardness

- **a.** Lubricants- Properties, classification and uses
- b. Dyes classification, based on application and functional group
- c. Fertilizers and manures : uses

d. Freon Gas Composition and uses

- **Unit 2**: 1. Tarnishing of metals, its Prevention and removal, Metal polishes: Organic coatings paints, pigments, wood polishes, shoe polish
 - 2. Elementary idea of the chemistry of the following:
 - a. Polymers- classification and their uses
 - b. Bleaching powder, plaster of Paris
 - c. Soap, detergent and waxes
- **Unit 3 :** Fuels :

Classification, calorific value Solid fuels – Wood, coal, types and selection

Liquid fuels- Petroleum, fractionation

Gaseous fuels- Bio gas, LPG, oil gas, coal gas.

Producer gas, Water gas

Non conventional fuel-Solar energy

- Unit 4 : Environmental pollution and its effect on human being eg. (C4 H5), Pb, Carbon monoxide and oxides of nitrogen sulpher dioxide, organic and mineral pollution of water, COD and BOD, Abrasives and adhesives
- Unit 5 : Chemotherapy
 - 1. Common drugs and medicines, used at home
 - 2. Narcotics and effects of over drugging L.S.D. Heroine, Brown Sugar
 - 3. Uses and Hazards of:
 - a. Cosmetics
 - b. Food preservatives and their effects on human body
 - c. X-ray and Isotopes eg. Co. 60, I181, p35, A74
 - d. Common insecticides, pesticides, and rodenticider eg., DDT, BHC, Aldrin gamexene, 2no
 - e. Antiseptics and Disinfectants

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- 1. स्नेहकः गुण, वर्गीकरण एवं उपयोग
- 2. कार्य समूह के आधार पर डाई का वर्गीकरण
- 3. उर्वरक एवं खाद के उपयोग
- 4. फ्रियान गैस का संगठन एवं उपयोग

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- 1. धातूओं की मलिनता, बचाव और निराकरणः धातू की चमकः जैविक, लेप, रंजक, लकडी की चमक, जूतो की चमक
- 2. निम्न की रासायनिक अवधारणाएः
 - अ. बहुलक– वर्गीकरण एवं उनका उपयोग
 - ब विरंजक चूर्ण, प्लास्टर ऑफ पेरिस
 - स. साबुन, डिंटरजेंट एवं तैलीय पदार्थ

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- 1. वर्गीकरण, कैलोरी मान
- 2. ठोस ईंधन- लकडी, कोयला प्रकार एवं चयन
- 3. द्रव ईधन पेट्रोलियम, शुद्विकरण
- 4. गैसीय ईधन- बायोगैस, एलपीजी, तेल गैस, कोल गैस
- 5. प्रोड्युसर गैस, जल गैस
- 6. गैर परम्परागत ईधन सौर ऊर्जा

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 वातावरणीय प्रदुषण और मानव जीवन पर इसका प्रभावः (C₄H₅),PB, कार्बनमोनो ऑक्साइड एवं नाइट्रोजन सल्फरडाई आक्सइड, जल में जैविक एवं लवणीय प्रदूषण, COD, BOD अपघर्षक एवं आसंजक

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- 1. सामान्य ड्रग्स और औषधियॉ, उनके घरेलु उपयोग
- 2. नशा और उसकी अधिकता के प्रभावः एलएसडी, हीरोइन ब्राउन शुगर
- 3. उपयोग एवं खतरे,
 - अ. सौदर्य प्रसाधन
 - ब. खाद्य पदार्थों के बचाव के पदार्थ और मानव शरीर पर उनका प्रभाव
 - स. एक्सरे एव समस्थानिक जैसे CO.60, 1181, P³⁵, A74
 - द. सामान्य कीटनाशी, पीडकनाशी एवं कृंतक नाशी जैसे DDT, BHC, एल्ड्रीन, जीमेक्सीन 2No.
 - य. रोगाणुरोधक एवं कीटाणुनाशक

Paper VIII APPLIED Biology

Unit – 1

Harmful pests to man: Outline of life history and control of rice weevil, khapra beetle, cockroach and termites.

Unit – 2

Human genetics: Human chromosomes normal and abnormal karyo types. Heredity and environment relationship as revealed by studies on human twins.

Unit – 3

Elementary idea of heredity human diseases and genetic abnormalities such as haemophilia, colour blindness, phenyl ketonuria, sickle cell anemia, mongolism and leukemia.

Unit – 4

- a) Gardening : Introduction to home gardening.
 - Preparation and requirement of roof and veranda gardening and their management.
- b) Kitchen Garden: Principle for planning of kitchen garden.
 - i. Cultivation of vegetables, e.g. potato, tomato, cauliflower, carrot, cowpea and cucumber.
 - ii. Cultivation of fruit trees for example Papaya, Guava, Lemon, Ber, Pomegranate (Anar).

Unite – 5

Economic Botany: Botanical names, family distribution and plant parts and their uses:

- a. Fibres: cotton, jute and coir.
- b. Beverages: tea, coffee and cocoa.
- c. Spices and condiments: cloves, cardamom, cumin, cinnamon, coriander, fennel, turmeric, pepper, asafoetida.
- d. Oils: coconut, groundnut, mustard, safflower, sunflower.
- e. Adulteration in oil and condiments (spices).

References.

- 1. Tyagi & Kshetrapal: An Introduction to Plant Taxonomy.
- 2. Purohit, S.S.: Home Gardening.
- 3. Bhojwani and Bhatnagar: Embryology of Angiosperm.
- 4. Verma, V: Plant Physiology.
- 5. Vidyarthi, R.D.: A Text Book of Zoology.
- 6. Agarwal, Kotpal and Khaterpal: A Text Book of Zoology (Invertebrate Zoology).
- 7. Tendon and Nigam: A Text Book of Zoology.
- 8. Adrian and Ray: General Genetics, Modern Asia Edition.
- 9. Genetics: A Survey of Principles of Heredity, Winchester, Indian Editien.
- 10. Verma and Agarwal: Cell Biology and Genetics.

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MM**&50 2** P/W

bdlbZ& 1

1. मनुष्य के लिए घातक कीटः जीवन चक्र एवं रोकथाम– राइसवेवील, खपरा बीटल, कॉकरोच, दीमक

bdlbZ& 2

- 1. मानव आनुवांशिकीः मानव गुणसुत्र सामान्य एवं असामान्य केरियोटाइप
 - मानव जुडव पर अध्ययन के आधार पर आनुवंशिकी एवं पर्यावरणीय संबंध

bdlbZ& 3

 मानव में आनुवांशिक रोगों की अवधारणा एवं आनुवांशिक असामान्यताएं जैसे– हीमोफीलीया, रंग बाधिता, फीनाइल कीटोनूरीया, सिकल सेल एनिमिया, मैगोलिस्म और ल्युकेमिंया

bdibZ&4

1. बागवानीः घरेलु बागवानी का परिचय

- अ. छत और बरामदा बागवानी के लिये तैयारी, जरूरत और उसका प्रबंधन
- रसाई बागवानी को बनाने का सिद्धान्त एवं योजना
 - अ. सब्जियों को उगाना– आलु, टमाटर, गौभी, गाजर, मटर, खीरा
- ब. फलदार पेड़ों को उगाना पपीता, अमरूद, नीबू, बेर, अनार

bdłbZ& 5

- 1. आर्थिक वनस्पति विज्ञानः वनस्पति नाम, कुल, वितरण एवं पादप के विभिन्न भागों का उपयोग
 - अ. रेशे, कपास, जूट और कॉइर
 - ब. पेयः चाय, कॉफी एवं कोका
 - स. मसाले और चटनियाः लौंग, इलाइची, जीरा, दालचीनी, धनिया, सौंफ, मिर्च, हींग
 - द. तेल ः नारियल, मूगफंली, सरसों, सोयाबीन, सूरजमुखी
 - य. तेल और मसालें की मिलावट

Paper IX HUMAN PHYSIOLOGY

MM - 50 4P/W

An elementary knowledge of subject is expected

- Unit –1 : 1. Types of tissues
 - 2. The skeletal system
 - a. Classification structure and functions of bones
 - b. The joints-classification, structure of a typical synovial joint
 - 3. The muscular system: types of muscles, structure and functions
- **Unit** –2 : 1. The nervous system:
 - a. Structure and functions of brain and spinal Cord
 - b. Autonomous Nervous system in brief

- 2. The Respiratory system: Structure and functions of Respiratory organs. Mechanism of respiration, External and Internal tissue respiration, vital capacity, Regulation of Breathing
- **Unit** –**3** : The vascular system:
 - a. Composition and function of blood, blood groups, blood transfusion, blood banks, blood clotting
 - b. Structure and functions of heart, blood vessels, blood circulation in the body, blood pressure and pulse rate
- **Unit** –4 : The Digestive systems:

Structure and functions of the digestive organs, mechanism of digestion and absorption of proteins, fats and carbohydrate

- The Excretory System:
- a. Structure and function of excretory organs, composition of Urine
- b. Structure and function of skin, regulation of body temperature
- **Unit –5 :** The Endocrine system:

Endocrine glands of the body, role of hormones and effects of hypo and hyper activity Structure and function of eye Structure and function of ear

REFERENCE

प्रणी कार्यिकी – शास्त्री रस्तोगी पब्लिकेशन जन्तुकर्मिकी

शर्मा मुकुन्दस्वरूपः शरीर प्रदीपिका

A Text book of Medical Physiology: Guyton holt Saunder & Co.

Evelyn Pearce: Anatomy and Physiology for Nurses, Faber & Faher Ltd. London (Hindi Ed. also)

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MM**&50 4** P/W

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- 1. ऊतक के प्रकार
- 2. कंकाल तंत्र
 - अ. अस्थियों का वर्गीकरण, रचना और कार्य
 - ब. संधि वर्गीकरण, विशिष्ट पूर्णचल संधि की रचना
 - पेशीय तंत्र : पेशियों के प्रकार, बनावट और कार्य

3. पेश bdlbZ & 2

- 1. तंत्रिका तंत्र
 - अ. मस्तिष्क और सुषुम्ना नाड़ी की बनावट और कार्य
 - ब. संक्षेप में स्वतत्रं तंत्रिका तंत्र
- श्वसन तंत्रः श्वसन अंगों की रचना और कार्य, श्वसन की क्रियाविधि, बाहरी तथा आन्तरिक श्वसन क्रिया, जीव वायुधारिता, श्वसन क्रिया का नियमन

bdlbZ& 3

संवहनी तंत्रः

अ. रक्त की बनावट और कार्य, रक्त वर्ग, रक्त आधान, रक्त बैंक, रक्त का जमना

- ब. हदय की बनावट और कार्य, रक्त वाहिनियॉ, शरीर में रक्त परिसंचरण, रक्त चाप और नाड़ी गति
- bdlbZ& 4
 - 1. पाचन तंत्र
 - पाचन अंगों की रचना और कार्य, पाचन तंत्र की प्रक्रिया, प्रोटीन, वसा और कार्बोहाइड्रेट का अवशोषण
 - 2. उत्सर्जी तंत्रः
 - अ. उत्सर्जी अंगों की बनावट और कार्य, मूत्र का संघटन
 - ब. त्वचा की बनावट और कार्य, शारीरिक तापक्रम का नियमन

bdłbZ & 5

- 1. अन्तःस्त्रावी तंत्र
 - अ. शरीर की अन्तःस्त्रावी ग्रन्थियॉ, हारमोन की भूमिका, अल्पस्त्राव और अतिस्त्राव के प्रभाव
 - ब. आंख की बनावट और कार्य
 - स. कान की बनावट और कार्य

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- 1. पियर्स : शरीर और शरीर क्रिया विज्ञान
- 2. डॉ. बृन्दा सिंह : मानव शरीर एवं क्रिया विज्ञान

B.Sc. (Home Science) Part II Examination – 2020-2021

Paper- I HD - I

Growth & Development: Prenatal and Infancy

M. M. : 50 3 p/w

- Unit 1
 - 1. Anatomy and physiology of male and female reproductive organs- Ovulation and sperm formation.
 - 2. Fertilization, menarche and menopause.
 - 3. Signs and symptoms of pregnancy.
 - 4. Common ailments during pregnancy and their managements.

- 1. Prenatal period- stages in prenatal development: zygote, embryo and fetus.
- 2. Teretogens: factors affecting prenatal growth and development.
- 3. Disorders in pregnancy: Hypertensive preeclampsia, elcampsia, pernicious vomiting.
- 4. Regular medical checkups: importance and schedule.

Unit – 3

- 1. Care of expectant mother.
- 2. Preparation for confinement and arrival of new born.
- 3. Delivery & birth process.
- 4. Intensive new born care and APGAR test.
- 5. Minor ailments of newborn and their management: colic, jaundice, napkin rash, umbilical infection, infection of eye and breast in new born.

Unit – 4

- 1. Care during puerperium.
- 2. Family planning methods including MTP and sterilization.
- 3. Abortion and miscarriage: symptoms and care, different types of abortion.
- 4. Child at birth: (i) Neonatal physique (ii) Sensory and motor reflexes
- (iii) Sleeping crying and emotional behaviour.

Unit – 5

- 1. Characteristics of human infant: from state of helplessness to gradual control over body and development of understanding of immediate environment.
- 2. Physical development during infancy weight, height, closure of fontanelle and teething.
- 3. Motor control: grasping, holding the head, seating, crawling, creeping and walking.
- 4. Socio emotional development during infancy: development of attachment and sense of security. Separation and stranger anxiety.

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MM**&50** 3 P/W

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- 1. पुरूष एवं स्त्री के प्रजनन अंगो की रचना और प्रजनन की शरीर विज्ञान अण्डोसर्ग और शुक्राणुओं का निर्माण
- 2. नेषेचन, रजोदर्शन, रजोनिवृत्ति
- 3. गर्भाधान के चिन्ह एवं लक्षण
- 4. गर्भावस्था के दौरान सामान्य कठिनाइयाँ व उनकी व्यवस्था

bdłbz & 2

- 1. गर्भकालीन अवस्थाः गर्भकालीन विकास की अवस्थाएँः जाइगोठ, भ्रुण और गर्भस्थ शिशु
- 2. तेरीटोजेन्सः गर्भकालीन विकास एवं वृद्धि को प्रभावित करने वाले तत्वों
- 3. गर्भावस्था में विकारः उच्च रक्तचाप, प्री-एक्लेम्पसिया, एक्लेम्पसिया, सांधतिक उल्टी
- 4. नियमित चिकित्सकीय जॉचः महत्ता एवं अनुसूची

bdlbZ& 3

- 2. गर्भवती स्त्री की देखभाल
- 3. प्रसवता तथा नवजात शिशु के आगमन की तैयारी
- 4. प्रसव और प्रसव की प्रक्रिया
- 5. गहन नवजात शिशु की देखभाल और APGAR परीक्षण
- नवजात शिशु के होने वाले रोग व उनका उपचारः कोलिक, पिलिया, नैपकिन के घाव, नाभिय संक्रमण, नवजात शिशु को आँखों एवं स्तनों में संक्रमण

bdłbz & 4

- 2. नवजात शिशु की देखभाल
- 3. परिवार नियोजन की विधियाँ एमटीपी और बंध्याकरण सहित
- 4. गर्भपात एवं विफल प्रसवः लक्षण एवं देखभाल, गर्भपात के विभिन्न प्रकार
- 5. जन्म के समय बालक
- अ. शारीरिक बनावट
- ब. संवेदी और क्रियात्मक प्रतिक्रिया
 - स. निद्रा, रूपन और सांवेगिक व्यवहार

bdłbZ& 5

- 1. मानव शिशु की विशेषताएं: असहायता की अवस्था में शरीर पर धीरे-धीरे नियंत्रण और तत्काल पयविरण की समझ का विकास
- 2. शैशवावस्था में शारीरिक विकासः वजन, लम्बाई, फोनेटेनल का समापन और दॉत निकलना
- 3. क्रियात्मक नियंत्रणः वस्तु को पकड़ना, सिर को स्थिर रखना, बैठना, सरकना, घुटने के बल रेंगना व चलना
- 4. शैशवावस्था में सामाजिक–संवेगात्मक विकास, लगाव का विकास और सुरक्षा की भावना। जुदाई एवं वियोगज की चिंता

Paper – II H.D. - II

Development Aspects: Infancy to Old Age

M. M. : 50 3 p/w

Unit – 1

- 1. Characteristics of physical and motor development: skeletal growth, growth monitoring, basic motor skills from preschool to late childhood.
- 2. Beginning of language development, sequence of speech development and factors influencing the development of language till late childhood. Relation between cognition and language.

- 3. Emotional development: Characteristics of emotions in childhood. Basic emotions and their developmental changes: fear, anger, jealous, affection and joy.
- 4. Social development, importance of peer group, during childhood. gang age

Unit – 2

- 1. Theory of socio emotional development: Erikson's theory and the eight stages (in brief).
- 2. Cognitive development: introduction to Piaget basic concepts and stages of cognitive development (in brief).
- 3. Development of morality (Kohlberg's stages) development of acquisition of gender identity and sex roles.
- 4. Introduction to Freud's theory of personality structure and stages

Unit - 3 Adolescence.

- 1. Early and Late Adolescence: Pubertal changes and Maturity, Physical and motor gains.
- 2. Development of Self-concept, Self Esteem, Values, Interests.
- 3. Characteristic of social Development, Relations with Peers, Friendship and Heterosexual Relationship.
- 4. Personal Adjustment with self, family and school. Period of storm & stress.
- 5. Juvenile delinquency: Causes and Prevention.

Unit - 4 Adulthood

- 1. Stages and characteristics of Adulthood: Young Adulthood (19-40 Yrs)
- Significance and responsibilities in context of work place and family.
- 2. Middle Adulthood (41 to 60 Years) Menopause and health Issues. Stresses at workplace and family.

Unit – 5 Old Age

- 1) Definition, Physical and intellectual changes.
- 2) Retirement: effect on self, family and society.
- 1. 1) Issues: Old Age homes, Loneliness.
 - 2) Strategies for enhancing the quality of life of People of Age.
 - 3) Death Anxiety, Care for a dieing Person.

Practical (HD)

M.M - 30

Internal – 10

External - 20

1. Observation of a child in Nursery School for his developmental stage in following areas and preparing a report on it

- I. Physical- Height and Weight
- II. Motor skills, Handedness
- III. Emotional Development
- IV. Play Activity
- V. Group Play
- VI. Language
- VII. Social Development
- VIII. Peculiar Behavior
- 2. Preparing interview Schedule for parents (to be used in Child study)
- 3. Planning Activities for preschool Children for all areas of development
 - I. Demonstration by models of Delivery Process
 - II. Demonstration by models of Prenatal Stages
- 4. Preparation of growth Enhancing material for infants

5. Survey of Mother of Infants.

Note: students will go to different nursery schools to observe the child under the guidance of the teacher concerned till a laboratory nursery school is started in the department itself

Examination Scheme: Distribution of marks

- 1. Spotting Identification & Description 5
- 2. Preparing Activity Planning 6
- 3. Preparing Interview Schedule for Parents/Growth enhancing material 6
- 4. Viva 3

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MM**&50** 3 P/W

bdibZ& 1

- शारीरिक और क्रियात्मक विकास की विशेषताएँः कंकाल विकास, विकास मॉनिटरिंग, बुनियादी क्रियात्मक कौशल, पूर्वशालीय बालक से उत्तर बाल्यावस्था तक
- वाणी एवं भाषा का विकास का क्रम और उत्तर बाल्यावस्था तक इन्हे प्रभावित करने वाले तत्व। संज्ञान एवं भाषा में परस्पर सम्बन्ध
- 3. संवेगात्मक विकासः बाल्यावस्था में संवेगों की विशेषताएँः
- मूलभूत संवगों और उनका विकासात्मक परिवर्तनः भय, क्रोध, ईर्ष्या, रनेह, खुशी
- 4. सामाजिक विकास, बाल्यावस्था में मित्र मण्डली की महत्ता, टोली आयु

bdlbZ& 2

- 1. सामाजिक संवेगात्मक विकास के सिद्धान्तः एरिकसन सिद्धान्त और आठ अवस्थाएँ (संक्षेप में)
- 2. संज्ञानात्मक विकासात्मकः पियाजे के प्रमुख विचार से परिचय करवाना और संज्ञानात्मक विकास की अवस्थाएँ (संक्षेप में)
- 3. नैतिकता का विकास : (कॉहलबर्ग की अवस्थाएँ) लिंग पहचान और यौन भूमिका को अर्जित करना
- 4. फ्राइड के सिद्धान्त के व्यक्तित्त्व के ढाचे एवं अवस्थाओं से परिचय

bdlbZ& 3 fd/ligioLFlk

- 1. प्रारंभिक और उत्तर किशोरवस्थाः लैंगिक परिवर्तन एवं परिपक्वता, शारीरिक और क्रियात्मक लाभ
- आत्म प्रत्यय, आत्म मूल्याकन, मूल्य, रूचियों का विकास करना
 सामाजिक विकास की विशेषताएँ, मित्रों से सम्बन्ध
- 4. स्वयं, परिवार और स्कूल के साथ व्यक्तिगत समायोजन तुफान और तनाव की अवस्था
- 5. बाल अपराधः कारण और निवारण

bdibz& 4 ; gloLFik

- 1. युवावरस्था की अवस्थाएँ एवं विशेषताएँ: प्रारम्भिक युवावस्था (19–40 साल)
- कार्य स्थल एवं परिवार के संदर्भ में महत्ता एवं जिम्मेदारियाँ
- मध्य युवावस्था (41–60 साल) रजोनिवृत्ति और स्वास्थ्य के मुद्दे। कार्य स्थल व परिवार मे तनाव 2
- 3. बाल निर्देशन एवे परामर्श की प्रक्रिया

bdlbZ& 5 o) loLFlk

- 1. परिभाषा, शारीरिक एवं बौद्धिक परिवर्तन
- 2. सेवा निवृत्तिः स्वयं, परिवार और समाज पर प्रभाव अ. मुद्देः वृद्धाश्रम, अकेलापन
 - ब. वृद्ध व्यक्तियों की जीवन के स्तर को बढ़ाने हेतु नणनीतियाँ
- 3. मृत्यु की उत्सुकता, मरते हुए व्यक्ति की देखभाल

it; Kaxd ij Kik fodki dsigy**yk% Kokl**Fkkiso) loLFk rd

MM**&30** värfid & 10 **Oká & 20** 2P/W

- 1. निम्न लिखित क्षेत्र के विकासात्मक अवस्थाओं में बालक का नर्सरी स्कूल में निरीक्षण करना और उस पर लेखन तैयार करना अ. शारीरिकः लम्बाई व वजन
 - ब. क्रियात्मक कौशल, हस्तशिल्पता
 - स. संवेगात्मक विकास
 - द. खेल गतिविधि
 - य. समूह में खेल
 - र. भाषा
 - ल. सामाजिक विकास
 - व. अजीब व्यवहार
- 2. अभिभावकों के लिए साक्षात्कार अनुसूची तैयार करना (बाल अध्ययन में काम हेतु)
- 3. विकास के विभिन्न क्षेत्रों में पूर्व शालीय बालकों की गतिविधियों की योजना बनाना
 - अ. मॉडल द्वारा प्रसव प्रक्रिया का प्रदर्शन
 - ब. मॉडल द्वारा गर्भकालीन अवस्थाओं का प्रदर्शन

- शिशु की वृद्धि को बढ़ाने वाली सामग्रियाँ बनाना
 शिशु की माताओं का सर्वेक्षण
 नोट :- अध्यापिका के सरंक्षण में सभी छात्राये बालकों की गतिविधियों के निरक्षण हेतु नर्सरी स्कुलों में जायेगी। परीक्षण स्कीम – मार्क्स का वितरण
 - 1. स्पॉटिंग पहचानना एवं विस्तृत वर्णन करना –5
 - 2. क्रियात्मक योजना बनाना -6
 - 3. अभिभावकों हेतु साक्षात्कार प्रणाली बनाना/वृद्धि दर्शाने हेतु सामग्री तैयार करना 6
 - 4. वाइवा 3

Paper- III **HM - I Principles of Home Management**

M.M. - 50 3P/W

Unit I

- 1. Introduction to Management
 - i. Concept & definition of management
 - ii. Communication in management
 - iii. Managerial function of families & management
- 2. Decision making in management
 - i. Types of steps in decision making
 - ii. Factors affecting in Decision making
- 3. System approach to the study of management
 - i. Definitions and characteristics

Unit 2

- 1. Factors motivating management:
 - a. Values- Classification and hierarchy, sources, origin characteristics, factors influencing values, changes values and their causes

21

- b. Goal-types, Characteristics, factors influencing goals
- c. Standards-conventional and modern, flexible and rigid
- d. Needs and wants
- 2. Resources & their management in the family i. Introduction, definition & usefulness of resources

- ii. Differences among Resources
 - Quantitative resources
 - Qualitative resources
- iii. Classification of resources
 - Human versus Non human resources
 - Economic versus Non economic resources
- iv. Resources classified by their sources
 - Resources from the near & larger environment
 - Resources from the household environment
 - Resources located in the family system
- v. Resources as a system
 - Interrelated demands'
 - Substitution
 - Crucial resources
 - Conversion or creation
- vi. Family resources as a unit
- vii. Guidelines for the use of resources
 - Increase total supply of resources
 - Know alternate uses
 - Consider amounts of resources to invest
 - Increase utility per unit of resources
 - Expand appreciations'
 - Balance choice among resources

Unit 3

- 1. Management of time as a resource
 - Characteristics & nature of time
 - Tools, time pattern & time cost. Norms, peak Loads, work units, work curves, rest periods.
 - Process of managing time
 - Planning, Controlling & evaluating
- 2. Management of money as a resource
 - i. Definition & types of income & their sources
 - a. Money income
 - b. Real income
 - Direct income to include household production, Free goods & services, owned durable goods & social income.
 - Indirect income to include money income such as wages, salaries, interest, profit, rent & fringe benefits.
 - c. Psychic income
 - ii. Expenditure
 - Definition of expenditure
 - Factors affecting expenditure
 - iii. Taxation
 - Meaning objective of taxation
 - Types of taxation, direct & indirect
 - iv. Saving & investments

Unit 4

- 1. Management of energy as a resource
 - Household task and effort
 - Concept of the human cost of work-fatigue- causes, types, prevention
 - Cost of work-Human energy expenditure, oxygen consumption methods of measurement, other measures of cost of work
 - Body mechanics
 - Types of efforts-effects of working heights and storage in relation to anthropometry
- Unit 5 Work Simplification:
 - Work Study techniques
 - Mundel Classes of changes in household activities
 - Factors affecting work-human and environmental
 - a. Human-worker's attitudes knowledge, skill, time, human energy
 - b. Environment-work space, fitness, climate, lighting equipment and service work, worker environment, relationship-co-ordination and fitness
 - Postures -types of postures, maintenance of good postures in household activities
 - Fatigue-types, avoidance of fatigue

iśj III HM-I xg iztiku dsfl)kir

MM**&50 3** P/W

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उप्पण्ण / मार्ग अवधारणा व परिभाषा

- ब. प्रबन्धन में संचार
- स. परिवारों के प्रबन्धकीय कार्य एवं प्रबन्धन
- गृह प्रबन्धन में निर्णय–क्रिया 2.
 - अ. निर्णय–क्रिया के चरणों के प्रकार
 - ब. निर्णय-क्रिया को प्रभावित करने वाले कारक
- 3. प्रबंधन का अध्ययन करने के लिए सिस्टम दृष्टिकोण
- अ. परिभाषॉए व विशेषताए

bdłbZ& 2

- 1. प्रबंधन को प्रेरित करने वाले कारक
 - अ. मूल्य वर्गीकरण और पदानुक्रम, स्त्रोत, उद्गम, विशेषाताएँ, मूल्यों को प्रभावित करने वाले कारक, मूल्यों में बदलाव और उनके कारण
 - ब. लक्ष्य प्रकार, विशेषताऍ, लक्ष्यों को प्रभावित करने वाले कारक स. स्तर परम्परागत व नवीन, परिवर्तनशील व कठोर

 - द. आवश्यकता एवं इच्छा
- 2. संसाधन एवं परिवारों में उनका प्रबन्धन
 - अ. परिचय, परिभाषा, और संसाधनों की उपयोगिता
 - ब. संसाधनों के बीच भेद
 - मात्रात्मक संसाधन
 - गुणात्मक संसाधन
 - स. संसाधनों का वर्गीकरण
 - मानव बनाम गैर मानव संसाधन
 - आर्थिक बनाम गैर–आर्थिक संसाधन
 - द. स्त्रोतों के आधार पर संसाधनों का वर्गीकरण
 - पास और बडे पर्यावरण से मिलने वाले संसाधन
 - घर के वातावरण से मिलने वाले संसाधन
 - परिवार प्रणाली में स्थित संसाधन
 - य एक प्रणाली के रूप में संसाधन
 - पारस्परिक मॉग
 - प्रतिस्थापन
 - महत्वपूर्व संसाधन
 - रूपातंरण या सृजन
 - र एक ईकाई के रूप में पारिवारिक संसाधन
 - ल. संसाधनों के उपयोग के लिए दिशा निर्देश
 - संसाधनों की कुल आपूर्ति बढाएँ
 - वैकल्पिक उपयोग पता करना
 - संसाधनों के निवेश करने की मात्रा का विचार
 - प्रति ईकाई संसाधनों की उपयोगिता बढ़ाना
 - प्रशंसा का विस्तार
 - संसाधनों के मध्य संतुलित चुनाव

bdlbZ& 3

- समय का संसाधन के तौर पर प्रबंधन
 - अ. समय की प्रकृति व गुण
 - ब. समय का मूल्य, स्वरूप एवं साधन। मानदण्ड, चरम भार, कार्य ईकाई, कार्य आलेख, विश्राम काल
 - स. समय प्रबंधन की प्रक्रिया
 - द. योजना, नियंत्रण एवं मूल्यांकन
- मुद्रा का संसाधन के तौर पर प्रबंधन 2.
 - अ. आय–परिभाषा, प्रकार एवं स्त्रोत
 - मुद्रा आय
 - वास्तविक आय प्रत्यक्ष आय में गृह उत्पादन, मुफ्त वस्तु व सेवाएं, अपनी स्थायी वस्तुएं व सामाजिक आय अप्रत्यक्ष आय में मुद्रा आय जैसे मजदूरी, वेतन, ब्याज, मुनाफा, किराया एवं अनुषंगी लाभ
 - मानसिक आय
 - ब. खर्च परिभाषा व खर्च को बढ़ाने–घटाने वाले कारक
 - स. कर निर्धारण अर्थ एवं उद्देश्य। कर निर्धारण के प्रकार–प्रत्यक्ष एवं अप्रत्यक्ष
 - द. बचत एवं विनिवेष

bdlbZ& 4

ऊर्जा का संसाधन के तौर पर प्रबंधन पारिवारिक कार्य एवं उद्यम मानवीय कार्य थकान के मूल्य की धारणा–कारण, प्रकार व निवारण कार्य का मूल्य–मानविक ऊर्जा का व्यय, ऑक्सीजन उपभोग द्वारा नापना, कार्य के मूल्य नापने के अन्य तरीके शरीर यांत्रिकी उद्यम के प्रकार – मानवमिति के अनुसार कार्य स्थल एवं भण्डारण की ऊँचाई का प्रभाव

bdlbZ & 5

कार्य सरलीकरण समय एवं प्रयास अध्ययन की तकनीक गृहकार्यों में मण्डेल के परिवर्तन के वर्ग कार्य को प्रभावित करने वाले कारक – मानवीय एवं वातावरणीय अ. मानव कार्यकर्ता के भाव–ज्ञान, कौशल, समय, मानवीय ऊर्जा ब. वातावरण – कार्य स्थल, अनुकूलता, कार्य स्थल का वातावरण, प्रकाश व्यवस्था, सेवा कार्य, कार्यकर्ता का वातावरण, आपसी संबध – सामंजस्य एवं अनुकूलता शारीरिक मुद्रा – प्रकार, और गृह कार्यों में सही मुद्रा बनाए रखना थकान – प्रकार एवं निवारण के उपाय

Paper- IV Home Management - II Housing and Home Furnishing

M.M. - 50**3P/W**

Unit 1:

- 1. Housing :
 - a. Its functions, importance and types
 - b. Changes needs and housing problem
- 2. Features contributing to livability of house, orientation of accommodation, sanitation, neighborhood, lighting, Plumbing arrangements and practical conveniences

Unit 2

- 1. Land acquisition :
 - a. Types : purchase/inheritance
 - b. Selection of site
 - c. Legal implications
- 2. a. Principles under lying house planningb. Blue prints and floor plans
- 3. House layout (plinth/floor area)- Space distribution with reference to the activities performed viz. Bedroom, living room, kitchen, Verandah, dining room, toilet, storage and staircase etc.

Unit 3:

- 1. Building Components and Building materials :
 - a. Foundation
 - b. Wall's doors and windows
 - c. Roof, floor and other structuresd. Maintenance and repairs
- 2. Housing Finance:
 - a. Cost of building and house
 - b. Owning vs. renting
 - c. Financing agencies
 - d. Legal information

Unit 4:

- 1. Application of elements of art and principles of design in interior and exterior enrichment- Color theories, properties, color schemes, characteristics & effect in interior.
- 2. Furniture : Types, selection, care, use, arrangement and ease of furniture in different rooms

Unit 5:

- Selection, use and care of furnishing material-Texture, Design, Color 1
 - a. Wall and its treatment
 - b. Window and treatment, upholstering
 - c. Other decorative and functional accessories
- 2. Lighting : Its type and use in different rooms for different activities
- 3. Table setting
 - a. Table lines
 - b. Table wares: Flat ware, hollow ware and silver wares
 - c. Rules for table setting Table setting for different occasions
 - d. Table manners and etiquettes

REFERENCE BOOKS

Paulena Nickel & Dorsey, Jean Muir: Management in Family Living Mehta, Kamal: A Text Book of Home Economics Devett & Verma: Modern Economic Theory Varghese, M.A., Ogale, N.N. & Srinivasan, K.: Home Management Gross & Crandle: Home Management डा. कान्ति पाण्डेय, प्रमिला वर्मा : गृह प्रबन्ध सरस्वती वर्मा एवं आशा देशपाण्डे . पारिवारिक वित जी.पी. शैरीः गृह व्यवस्था एवं गृह कला परीख, आशा एवं मेहता, चन्द्रकान्ताः गृह प्रबन्ध

HOME MANAGEMENT (PRACTICAL)

M.M.: 30 Internal: 10 External: 20

- 1. Symbols for drawing floor Plan
- 2. Drawing of floor Plans of a house for different income groups keeping in view the principles, including orientation and zoning. Furniture cutout placement
- 3. Visit to house construction site for knowing about materials used in house construction
- 4. Colour wheel, Value chart and its use, colour planning with reference to possession, season, personality and availability for different rooms
- 5. Models and samples of window treatment

- 6. Varnishing, polishing and finishing of furniture and accessories
- 7. Table setting and napkin folding
- 8. Preparation of a creative article for household decoration
- 9. Picture mounting and framing
- 10. Work study techniques
- 11. Arranging Exhibition of all items made

isj & IV HM - II ,oax`g ifjlTtk

MM**&50** 3 P/W

bdłbZ& 1

- 5 आवास
 - अ. कार्य, महत्व एवं प्रकार
 - ब. बदलती जरूरतें और आवासीय समस्याएं
- आवास को रहवासीय बनाने में योगदान देने वाली विशेषताएँ निवास स्थान का अनुकूलन, मल–मूत्र एवं गन्दे जल का निष्कासन, पास–पडोस, प्रकाश व्यवस्था, भवन में जल–आपूर्ति व्यवस्था और प्राथमिक सुविधाएं

bdlbZ& 2

- 1. भूमि अधिग्रहण
 - अ. प्रकार खरीदा हुआ या पैतृक
 - ब. भूमि खण्ड का चयन
 - स. कानूनी पक्ष
- आवासीय योजना के सिद्धान्त
- अ. नीला नक्शा (ब्लूप्रिंट) व फर्श योजना
- ्रह विन्यास (कुर्सी / फर्श विस्तार)– जगह का विभाजन वहाँ किए जाने वाले कार्यों के आधार पर जैसे शयन कक्ष, रहने का 3. कक्ष, रसोई, बरामदा, भोजन कक्ष, स्नानगृह, शौचालय, भण्डार कक्ष और सीढ़ी आदि

bdlbZ& 3

- 1. भवन निर्माण सामग्री एवं घटक
 - अ. नींव
 - ब. दीवारें, दरवाजे एवं खिड़कियाँ
 - स. छत, फर्श और अन्य निर्माण
 - उ. रख-रखाव एवं मरम्मत
- आवासीय ऋण
 - अ भवन निर्माण की लागत एवं घर
 - ब. निजी व किराए पर उपलब्ध
 - स. ऋण प्रदान करने वाली संस्थाएँ
 - द. कानूनी जानकारी

bdlbZ& 4

कला के तत्वों एवं कला के सिद्धान्तों का भीतरी व बाहरी गृह सज्जा में प्रयोग 1.

- अ. रंगों के सिद्धान्त, गुण, रंग योजना, प्रकृति व रंगों का भीतरी सज्जा में प्रभाव
- फर्नीचर प्रकार, चयन, प्रयोग, रख–रखाव, व्यवस्था व प्रत्येक कमरे की फर्नीचर व्यवस्था

bdlbZ& 5

- परिसज्जा के सामान का चयन, प्रयोग एवं रख–रखाव (बनावट, डिजाइन व रंग) 1.
 - अ. दीवारें व इनकी सज्जा
 - ब. खिडकियाँ सजावट व सामान
 - स. अन्य सजावटी व कार्यात्मक सजावटी सामान
- 2. प्रकाश वयवस्था प्रकार व विभिन्न कमरों में विभिन्न कार्यों के लिए प्रयोग
- मेज सज्जा
 - अ. मेज पोश, मेज रूमाल, टैबल मैट आदि
 - ब. मेज पर खाने के बर्तन प्लेट, तश्तरी, ग्लास, चम्मच, कॉटे आदि
 - स. मेज सज्जा के नियम व विभिन्न अवसरों के लिए मेज सज्जा
 - द. मेज का शिष्टाचार

प्रस्तावित किताबें:–

- 5. डा. कान्ति पाण्डेय, प्रमिला वर्माः गृह प्रबंध
- 6. सरस्वती वर्मा एवं आशा देशपाण्डे : पारिवारिक वित्त
- 7. जी.पी. शैरीः गृह व्यवस्था एवं गृह कला
- 8. परीख, आशा एवं मेहता चन्द्रकान्ताः गृह प्रबंध

it; Kand ij Kik vloki ,oaxg ifji Ttk

MM**&30** vHrfid & 10 0ká & 20

- 1. फर्श योजना के लिए प्रयोग किए जाने वाले प्रतीक
- फर्श योजना के सिद्धान्तों को ध्यान में रखते हुए विभिन्न आय वर्ग के लिए फर्श योजना तैयार करें व फर्नीचर नमूने बनाकर लगाएँ
 - आवास निर्माण स्थल का दौरा कर भवन निर्माण सामग्री एवं तकनीक की जानकारी प्राप्त करें
- 3. रंग चक्र, मूल्य चार्ट व उसका प्रयोगफ। भवन आधिपत्य, मौसम, व्यक्तित्व व कमरों के प्रयोग के आधार पर रंग योजना बनाना 4.
- खिडकी सज्जा के मॉडल व नमूने बनाना। 5
- पालिश, वार्निश व परिष्करण विभिन्न प्रकार के सजावटी सामान व फर्नीचर का 6
- मेज सज्जा व रूमाल सजा 7.
- गृह सज्जा के लिए एक सजावटी चीज का निर्माण 8
- चित्र आंलबन व फ्रेमिंग (मढ़ना) 9.

- 10. कार्य अध्ययन तकनीक
- 11. विद्यार्थियों द्वारा निर्मित सजावटी वस्तुओं की प्रदर्शनी लगाना

Paper- V FOODS AND NUTRITION I Fundamentals of Nutrition Science

M.M. : 50 3P/W

Unit – I :

- 1. Meaning of food, nutrition and nutritional care
- 2. Objectives in the study of Nutrition
- 3. Carbohydrates:
 - a. Composition
 - b. Classification, distribution and characteristics
 - c. Functions
 - d. Dietary allowance and food resources
 - e. Dietary fibers
- 4. Lipids
 - a. Composition, classification and characteristics
 - b. Functions of
 - i. Fats
 - ii. Essential fatty acids
 - iii. Phospholipids
 - iv. Cholesterol
 - c. Dietary allowance
 - d. Food sources
 - e. Dietary fat and health issues obesity, Heart disease

Unit – 2

- Proteins and Amino Acid
 - 1. Composition, structure and classification (in brief)
 - 2. Functions
 - 3. Dietary Protein Requirements and Allowance- Nitrogen Balance, Factors affecting the Protein Requirement
 - 4. Quality of food proteins
 - a. Measurement of protein quality PER, Amino Score (Chemical Score), Biological Value, NPUb. Improving Protein quality of Foods
 - 5. Food Sources
 - 6. Protein deficiency

Unit – 3

- Energy Metabolisms
 - 1. Introduction
 - 2. Measurement : Kilocalories, Joules, Bomb calorimeter, Physiologic fuel Factors, Specific fuel Factors
 - 3. Measurement of Energy Exchange of the Body; Direct and indirect calorimetry, Basal Metabolism test, Factors influencing the BMR
 - 4. Factors influencing the Total Energy, Requirement
 - a. Muscular Activity
 - b. Mental Effort
 - c. Calor genic effect of food
 - d. Maintenance of body Temperature
 - e. Growth
 - 5. Recommended allowances
 - 6. Water

Unit – 4

- 1. Mineral Elements: Basic concept- Distribution and Function, Factors Affecting Absorption and Utilization, Daily Allowance, food Sources, Deficiency and Excess
 - a. Calcium
 - b. Phosphorus
 - c. Iron
 - d. Iodine
 - e. Zinc
 - f. Fluoride
- 2. Electrolyte Balance

Unit – 5

- Vitamins Introduction, Characteristics, Absorption, Storage and transport, functions, daily allowance, food sources, Retention of food values. Effect of deficiency and Excess of :
 - a. Fat Soluble Vitamins A,D,E, & K
 - b. Water soluble vitamins
 - c. Ascorbic Acid
 - d. B-Complex- Thiamin, Riboflavin, Niacin, Vit, B-6, Pantothenic Acid, Biotin, Vit. B-12, folacin

REFERENCE BOOKS

Robinson, C.H.: Normal and Therapeutic Nutrition Davidson and Passmore : Human Nutrition and Dietetics Swaminathan, M : Essentials of food and Nutrition Crause, M.V. : food Nutrition and Diet Theroy Whiteny and Harmition: Understanding Nutrition डॉ सत्येदेव आर्य : आहार पोशाहार डाॅ. सरोजनी आर्य (अनुवादिका) : पोशण के सिद्धान्त

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MM**&50** 3 P/W

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- 1. भोजन का अर्थ, पोषण एवं पोषण सम्बन्धी देखभाल
- 2. पोषण विज्ञान पढने के उद्वेशय
- कार्बोज 3.
 - अ. संगठन
 - ब. वर्गीकरण, वितरण एवं विशेषतायें
 - स कार्य
 - द. दैनिक मात्रा एवं प्राप्ति साधन
 - य. आहारीय रेशे
- लिपिड 4.
 - अ. संगठन, वर्गीकरण एवं विशेषतायें
 - ब. कार्य
 - स. वसा
 - द. आवश्यक वसीय अम्ल
 - य. फॉस्फोलिपिड
 - र. कोलेस्ट्राल
 - ल. दैनिक मात्रा
 - व. प्राप्ति साधन
 - श. आहारीय वसा का स्वास्थ्य पर प्रभाव मोटापा एवं हृदय सम्बन्धी बीमारियॉ

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- 1. संगठन, बनावट, वर्गीकरण (संक्षेप)
- 2. कार्य
- 3. आहारीय प्रोटीन की मात्रा एवं प्रभावित करने वाले कारक, नाइट्रोजन सन्तूलन
- 4. प्रोटीन की गुणवत्ता
 - अ. गुणवत्ता का आकलन PER, अमीनो स्कोर (कैमिकल स्कोर) जैवकीय मूल्य, NPU ब. प्रोटीन की गुणवत्ता को सुधारने हेतु विधियाँ
- 5. प्राप्ति साधन
- प्रोटीन की कमी का प्रभाव 6.

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- 1. प्रस्तावना
- 2. नापनाः किलोकैलोरी, जूल, बॉम्ब कैलोरीमीटर, फिजियोलोजिक फ्सूल फैक्टर (शारिरीक) विशिष्ट गत्यात्मक फैक्टर (स्पेसिफीक फ्युल फैक्टर)
- उर्जा को नापना शरिरीक अदान प्रदान हेतू विधियॉ– प्रत्यक्ष एवं अप्रत्यक्ष्ज कैलोरीमीटर, आधारीय उपापचय परीक्षण एवं इसे प्रभावित करने वाले कारक
- सम्पूर्ण शारिरीक उर्जा की मात्रा को प्रभावित करने वाले कारक 4
 - अ. मानसिक क्षमता
 - ब. भोजन का कैलोरीयुक्त स्त्रोत
 - स. शरीर का तापक्रम का नियन्त्रण
 - द. वृद्धि
 - य. उर्जा की दैनिक मात्रा
 - र. जल

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- 1. खनिज लवणः अवधारणा, वितरण एवं कार्य, उपयोगिता एवं अवशोषण को प्रभावित करने वाले कारक, दैनिक मात्रा, प्राप्ति साधन, कमी एवं अधिकता
 - अप. कैल्शियम
 - ब. फास्फोरस
 - स. आयरन
 - द. आयोडीन
 - य. जिंक
 - र. फ्लोराइड
 - 2. इलेक्ट्रोलाइट सन्तुलन

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- विटामिन प्रस्तावना, विशेषतायें, अवशोषण, संग्रहण एवं वितरण, कार्य, दैनिक मात्रा, प्राप्ति साधन, गृहण करने का मुल्य, कमी एवं अधिकता का प्रभाव
- अ. वार में घुलनशील विटामिन ए, डी, इ, एव के
- ब. जल में घूलनशील विटामिन एस्कार्बिक एसिड एवं बी. कम्पलैक्स थायमिन, राइबोफ्लेविन, नायसिन, विटामिन बी–6, पेन्टोथिनिक एसिड, बायोटिन, विटामिन बी–12, फोलेसिन

प्रस्तावित किताबें:--

- रॉबिन्सन, सी.एस.: नारमल एवं थैराप्यूटिक न्यूट्रिशन
 डेविडसन एवं पासमोरः हयूमन न्यूट्रिशन एवं डायटिक्स
- 3. स्वामीनाथन एमः इसेन्शियल ऑफ फुड एवं न्यूट्रीशन
- 4. क्रॉस, एम.वी.: फूड न्यूट्रिशन एण्ड डॉयट थिरापी

- 5. डॉ. सत्यदेव आर्यः आहार पोषाहार
- डॉ. सरोजनी आर्यः पोषण के सिद्धान्त
- 7. डॉ. वृन्दा सिंहः आहार एव पोषण

Paper- VI FOODS AND NUTRITION II Bio – Chemistry

M.M. : 50 3P/W

Unit – 1

- 1. Importance and scope of bio-chemistry, relevance of study of bio-chemistry for nutrition students
- 2. Carbohydrates Occurrence, composition, classification structures, properties and important bio-chemical reactions of monosaccharides
- 3. Lipids : Occurrence, classification, structures, physical and chemical properties: hydrolysis, saponification. Saponification on reactions of glycerol, Reactions of fats due to unsaturation-hydrogenation, halogenations, Iodine no., rancidity of fats, Acid no. Phosphopids and cholesterol
- Unit 2 Proteins- Amino Acids, peptides and proteins occurrence, structure, classification, Properties and colour reactions. The ninhydrin reaction, biuret reaction, xantho proteic reaction and Millions test, Denaturation of proteins, Nucleic acid-structure of nitrogenous bases, nucleosides DNA and RNA, role of nucleic acids in protein synthesis
- Unit 3: Vitamins classification, Chemistry and physiological functions of :
 - 1. Fat soluble vitamins A, D, E & K
 - 2. Water soluble Vitamins B Complex : Thiamine, riboflavin, niacin, pyridoxine, panthothen C acid, Folic acid, Biotin B-12 and Vitamin-C (Ascorbic acid)
- Unit 4 : Minerals-Specific bio-chemical functions and bio-availability of calcium phosphorus, magnesium, iron, copper, sodium, potassium, iodine, fluorine and zinc
 - a. Enzymes Definition, Chemical nature, classification, factors affecting rate of temperature, pH, enzyme and substrate concentration, Enzyme specificity and inhibition of enzyme activity
 - b. Coenzymes and cofactors- definition and role
- **Unit 5:** Intermediary metabolism

Importance of intermediary metabolism- Metabolism of carbohydrate Glyocolysis, Citric Acid Cycle Gluconeogenesis, Glycogen break down and synthesis (glycogenolysis, glycogenesis) Regulation of blood glucose level-lipid Metabolism-B oxidation of Fatty Acids, Ketogenesis, Cholesterol metabolism, Protein metabolism – Transamination, demination decarboxylation and entry of amino acids into citric acid cycle, urea cycle

REFERENCE BOOKS

West. E.S. and Todd, W.R. : Test book of Bio-chemistry White, A, Handler, P. and Smith, E.L., "Principles of Bio-chemistry Lehnimger, A.L. : Bio-chemistry Dr. Rama Rao : Text book of Bio-chemistry for Medical Students Pike and Brown : Nutrition an Integrated Approach

FOOD AND NUTRITION PRACTICAL (BIO-CHEMISTRY)

M.M- 30 Internal – 10 External - 20 **2p/w**

- 1. Qualitative testing of some foods for adulteration- Lead chromate in haldi powder, Sand in flour, Kreis test for rancidity of oils. Metal in yellow Arhar dal and in yellow sweets, starch in milk, Vanaspati in pure ghee and chalk powder in wheat flour
- 2. Qualitative analysis of mono, di and polysaccharides
- 3. Qualitative analysis of proteins
- 4. Qualitative analysis of fats and oils
- 5. Use and handling of different types of balances
- 6. The determination of pH range using different indicators
- 7. Estimation of lactose in milk
- 8. Estimation of total sugar in honey
- 9. Estimation of Protein in foods by Kjeldhal's method
- 10. Determination of acid value, Saponification value and iodine value of fats
- 11. Moisture content and ash content of food stuff
- 12. Microscopic structure of starch, rice, potato etc.
- 13. Estimation of vitamin C in fruits
- 14. Hemoglobin by Haemoglobino meter
- 15. Paper Chromatography

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- 1. जैव रासायन की महत्ता एवं विस्तार, पोषण विद्यार्थी के लिये जैव रासायनिक की महत्ता
- 2. कार्बोज प्राप्ति क्षेत्र, संगठन, वर्गीकरण, बनावट, सरल शर्कराओं के महत्वपूर्ण जैव रासायनिक गुण एवं प्रतिक्रियायें
- लिपिड प्राप्ति क्षेत्र, वर्गीकरण, बनावट, भौतिक एवं रासायनिक गुण :– जलयीकरण, साबुनीकरण, ग्लिसरॉल की क्रियायें, अंसतृप्ता के कारण वसा की प्रतिक्रियाये – हाइड्रोजिनिकरण, हैलोजिनिकरण, आयोडीन नम्बर, वसा का सड़ना, एसिड नम्बर, फॉस्फोलिपिड एवं कोलेस्ट्राल

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 प्रोटीन, अमीनोअम्ल, प्रोटीन के प्राप्ति क्षेत्र एवं पेप्टाइड बन्ध, बनावट, वर्गीकरण, रासायनिक गुण एवं रंग द्वारा प्रतिक्रियायें– नीनहाइड्रीन प्रतिक्रिया, बाईयूरेट प्रतिक्रिया, जैन्थो प्रोटीक प्रतिक्रिया, तथा मीलियन परीक्षण, प्रोटीन का विकृतीकरण, न्यूक्लिक एसिड – बनावट, नाइट्रोजन युक्त आधार, न्यूक्लियोसाइड डीएनए तथा आरएनए, प्रोटीन के निर्माण में न्यूक्लिक एसिड का योगदान

bdlb2 & 3 विटामीन – वर्गीकरण, रासायनिक एवं जीव रासायनिक कार्य

- 1. वसा में घुलनशील विटामिन ए, डी, ई एवं के
- 2. जल में घूलनशील विटामीन बी कॉम्पलेक्स विटामीनः थायमिन, राइबोफ्लेविन, नायसिन, पीरीडोक्सीन, पेन्टोथिनिक एसिड,
- फॉलिक एसिड, बायोटीन, बी–12 एवं विटामीन सी (एस्कार्बिक एसिड)

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 खनिज लवण – जैव रासायनिक कार्य, शारिरीक उपलब्धता – कैल्शियम, फॉस्फोरस, मैगनिशयम, आयरन, कॉपर,सोडियम, पोटेशियम, आयोडीन, फ्लोरिन एवं जिंक

एन्जाइम – परिभाषा, रासायनिक प्रवृति, वर्गीकरण, प्रभाव करने वाले कारक– तापक्रम, पीएच, एन्जाइम एवं उत्पाद की सान्द्रंता, एन्जाइम की विशिष्टता, एन्जाइम की प्रतिरोधक प्रतिक्रिया

. सहएन्जाइम एवं सहकारक – परिभाषा एवं योगदान

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- महत्ता, कार्बोज का उपापचयन ग्लाइकोलिसिस, सिट्रिक एसिड साइकल, ग्लूकोनियोजिनेसिस, ग्लाइकोजन का टूटना एवं निर्माण (ग्लाइकोजिनोलिसिस, ग्लाइकोजिनेसिस), रक्त में ग्लूकोस का नियन्त्रण, लिपिड का उपापचयन – बी आक्सीकरण वसीय अम्लों का, कीटोजिनेसिस, कोलेस्ट्राल उपापचयन, प्रोटीन का उपापचयन – ट्रान्सएमिनेशन, डी–एमिनेशन, डी–कोर्बोक्सीकरण अमीनोअम्ल का सिट्रिक एसिड साइकल में प्रवेश, यूरिया साइकल
- प्रस्तावित किताबें:–
 - 1. वेस्ट एन्ड टॉड टेक्सबुक ऑफ बायोकेमिस्ट्री
 - 2. लेनीनजर बायोकेमिस्ट्री
 - 3. रामा राव मेडिकल स्टूंडेन्टस बायोकेमिस्ट्री

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MM**&50** 3 P/W

- 2P/W 1. मिलावट परीक्षण के टेस्ट – लेड क्रामेड हल्दी में, आटे में बालू, तेल के सड़ने का क्रीस टेस्ट, मिटेनीलयैलो की मिलावट – अरहर दाल, मिठाइयों में, दूध में स्टार्च की मिलावट, देसी घी में वनस्पति घी, आटे में चाक पाउडर
- 2. मोनो, डाई एवं पौलीसैकराइड का रासायानिक परीक्षण
- 3. प्रोटीन का परीक्षण
- 4. वसा एवं तेलों का परीक्षण
- 5. विभिन्न प्रकार के बैलेन्स की जानकारी एवं उपयोग
- 6. पीएच ज्ञात करना
- 7. दूध में लेस्टोस ज्ञात करना
- प्रोटीन का ज्ञात करना
- 9. एसिड वैल्यू, सपोनिफिकेशन वैल्यू तथा आयोडिन वैल्यू (वसा)
- 10. भोज्य पदार्थों की नयी एवं राख को नापना
- 11. स्टार्च, चावल एवं आलू का माइक्रोस्कोपीय बनावट का अध्ययन
- 12. फलों में विटामिन सी की मात्रा ज्ञात करना
- 13. हिमोग्लोबिनोमीटर द्वारा हीमोग्लोबिन की मात्रा ज्ञात करना
- 14- पेपर क्रोमेटोग्राफी

Paper- VII CLOTHING AND TEXTILE - II Textile Fibers and Fabric Construction

M. M. : 50 3P/W

Unit - I

- Origin manufacture and properties of-
- 1. Natural cellulosic fibers Cotton, linen, jute
- 2. Natural pertain fibers wool, silk
- 3. Natural mineral fibers
- Unit 2: Manmade and synthetic fibers Polyesters, Polyamide, Acrylic fibers, Rayon, origin manufacture, Properties and their importance to consumers
- Unit 3: Yarns Construction and fabric construction
 - 1. (a) (i) Mechanical Spinning
 - (ii) Chemical Spinning

(b) Classification of Yarns

- 2. (a) fabric construction techniques
 - (i) Felting
 - (ii) Braiding
 - (iii) Bonding
 - (iv) Knotting
 - (v) Knitting
 - (vi) Weaving
- 3. Types of weaves, analysis

Unit 4: Fabric Finishes :

- a. Objectives of finishes
- b. Basic finishes- bleaching, sizing, singeing, tentering, beetling, calendaring and mercerization
- c. Texturing Embossing, mélange, Scheinorining napping, flocking, acid and basic finishing

Unit 5: Functional Finishes

- b. Finishing chemicals
- c. Antistatic bacteriostat, moth proofing, Anti shrinking
- d. Flame retardant, water repellency, water proofing, soil and stain resistant, crease resistant
- e. Wash "n" wear, Permanent Press, Fabric softening

REFERENCE BOOKS

Wingatic Iqabel M: Selection of Fabric and Care Joseph, Moyory: Essentials of Textiles Joseph, Moyory: Introductory Textiles Science Dantyagi, Sushila: fundamental of Textiles

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- 1. प्राकृतिक सेल्यूलोज रेशें कपास, लिनन, जूट
- 2. प्राकृतिक प्रोटीन रेशें– ऊन, रेशम
- 3. प्राकृतिक खनिज रेशें

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1. मानवीकृत एवं संशलिष्ट रेशें– पालिस्टर, पालिअमाइड, अक्रेलिक रेशे, रेयॉन – उद्गम, निमार्ण, विशेषताएँ तथा उपभोक्ता के लिए महत्व

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- 1. अ. I यात्रिंक कताई
 - II रासायनिक कताई
 - ब. धागों का वर्गीकरण
- वस्त्र निमार्ण की विधिंया 2.
 - I. फेल्टिंग (नमदा)
 - Ⅱ. ब्रेडिंग
 - Ⅱ. बोंडिग
 - IV. नौटिंग
 - V. निटिंग
 - VI. बुनाई
- बुनाई⁻के प्रकार तथा विश्लेषण 3

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- 1. वस्त्र परिसज्जा
 - परिसज्जा के उद्देश्य अपप.
 - ब. आधारभूत परिसज्जा ब्लीचिंग, साइजिंग, सिंजिंग, टेंटरिंग, बीटलिंग, कैलैंडरिंग तथा मर्सराइजेशन
 - स. टैक्सरिंग, ऐम्बसिंग, मिलांज, शिनोरिंग, नैपिंग, फ्लौकिंग, अम्ल तथा क्षार परिसज्जा

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- 1. परिसज्जा में प्रयोग में लाने जाने वाले रसायन
- १. ऐंटीस्टेटिक, बेक्टीरियोस्टेट, मौथ प्रतिरोधक, सिकुड़न, प्रतिरोधक, परिसज्जाएं
 अग्नि प्रतिरोधक, जल निरोधक, जल अवरोधक, गन्दगी एवं धब्बा प्रतिरोधी, सलवट प्रतिरोधी
- 4. वाशॅ एव वियर, स्थाई प्रेस, वस्त्र मृदुता

Paper – VIII **CLOTHING AND TEXTILE - II Textile Chemistry**

M. M. : 50 2P/W

Unit 1:

- i. History and classification of dyes, Selection of dyes and their application
- ii. Dyeing of fibres, yarns, fabrics and blends
- Identifying dyeing defects, tests to determine colour fastness iii.

Unit 2:

a. Printing styles

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- b. Requisites for printing and preparation of fabric
- c. Block printing, Roller printing, Screen printing, discharge printing
- **d.** Resist printing, photographic and transfer printing

Unit 3:

- a. Effect of water hardness on laundry reagents, principles of laundering,
- b. Laundry equipments-scrubbing board, suction, washer, washing machine etc.
- c. Laundry reagents and their functions. Soaps and detergents, bleaches and optical brighteners, blues and stiffening agents, solvents and absorbents

Unit 4:

- a. Classification of stains
- b. Stain removal- Methods and application of various reagents according to the types of fabric and stain
- c. Care and storage of laundered clothes

Unit 5:

- a. Chemicals used in textile processing and their effect on ecology
- b. Eco friendly processing of textiles and substitutes for harmful chemicals and processes
- c. Application of enzyme in textiles
- d. Environmental protection and ISO series

PRACTICAL CLOTHING AND TEXTILE (TEXTILE AND LAUNDRY)

M. M. :30 Internal : 10 External : 20 3P/W

- 1. Family Wash ;
 - a. Stain removal : Simple home methods and use of chemical stain removers
 - b. Principles and methods of laundering, their applications to various fabrics
 - c. Process in finishing : Ironing process and steam pressing
 - d. Washing of Cotton, Wool Silk and Manmade fabrics
- 2. Fabric Study
 - a. Fibers : Identification- Microscopic, Physical and chemical test
 - b. Fabrics
 - i. Thread Count and balance
 - ii. Weave
 - c. Launderability
 - i. Dimensional Stability
 - ii. Colour Fastness
 - iii. Cleaning Efficiency of Detergents
- 3. Dry cleaning with special references to spotting and clearing
- 4. Dyeing and printing of fibers and using commercial dyes
 - a. Tie and Dye
 - b. Batik
 - c. Block Printing
 - d. Shade dyeing of Cotton and Wool yarn ,indirect mordant and reactive dyes
- 5. Visit to review textile mills and museums in India

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- 1. रजंको का इतिहास तथा वर्गीकरण, रजंको का चुनाव एवं उपयोग
- 2. रेशों, धागों, वस्त्रों तथा मिश्रित वस्त्रों की रंगाई
- 3. रंगाई के दोषों की पहचान, रंग के पक्केपन की जाच

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- छपाई की पद्धतियाँ
- 2. छपाई के लिए उपेक्षित वस्तुएँ तथा वस्त्र की तैयारी
- 3. ब्लाक छपाई, रोलर छपाई, स्क्रीन छपाई, डिस्चार्ज छपाई
- 4. अवरोधक छपाई, फोटोग्राफिक तथा ट्रंस्फर छपाई

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- 1. कठोर जल का धुलाई के अभिकर्मकों पर प्रभाव, धुलाई के सिद्धान्त
- 2. धुलाई के उपकरण, स्क्रबिंग बोर्ड, सक्शन वाशर, वाशिंग मशीन इत्यादि
- धुलाई के अभिकर्मक तथा उनके कार्य, साबुन तथा डिटरजेन्ट, ब्लीच तथा आपटिकल ब्राइटनर, नील तथा कलफ, घोलक एवं अवशोषक पदार्थ

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- 1. धब्बों का वर्गीकरण
- 2. धब्बे छुडाना विभिन्न अभिकर्मको की वस्त्र एवं धब्बों के अनुसार प्रयोग की विधि
- 3. वस्त्रों का रखरखाव एवं संरक्षण

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- 1. वस्त्र प्रौद्योगिकी में प्रयोग में लाये जाने वाले रसायन तथा उनका पर्यावरण पर प्रभाव
- 2. पर्यावरणमित्र वस्त्र प्रोद्योगिकी, हानिकारक रसायनों एवं विधियों का स्यानापन्न
- 3. वस्त्र विज्ञान में एन्जाइमस का उपयोग
- 4. पर्यावरण की सुरक्षा एवं आइ.एस.ओ शृंखला

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- 1. परिवारिक धुलाई
 - अ. धब्बे छुडाना साधारण घरेलु विधि एवं रसायनों द्वारा धब्बे छुडाना
 - ब. धुलाई के सिद्धान्त, विधियों एवं उनका विभिन्न प्रकार के वस्त्रों पर उपयोग
 - स. वस्त्र परिसज्जा प्रेस तथा वाष्प्र प्रेस
 - द. सूती, ऊनी, रेशमी तथा मानवीकृत वस्त्रों की धूलाई
- 2. वस्त्र अध्ययन
 - अ. रेशे : पहचान सूक्ष्मदर्शी, भौतिक तथा रासायनिक
 - ब. वस्त्र
 - I. काउंटं तथा सन्तुलन
 - II. बुनाई की पहचान
 - स. धुलाई
 - I. आकार स्थिरीकरण
 - II. रंग का पक्कापन
 - III. डिटरजेन्ट की धुलाई क्षमता
 - शुष्क धुलाई स्पाटिंग एवं सफाई के सन्दर्भ में
 - वस्त्रों की रंगाई छपाई तथा व्यवसायिक रंजको का प्रयोग
 - अ. बन्धेज

3.

5.

- ब. बाटिक
- स. ब्लाक छपाई
- द. सूती एवं ऊनी धागे की शेड रंगाई, प्रत्यक्ष, मोरडेंट एवं रियेकिटव रजंक द्वारा
- भारत के वस्त्र उद्योग एवं संग्रहालयों का अवलोकन तथा भ्रमण

Paper – IX EXTENSION EDUCATION- I

Teaching and Learning in Extension Education

Unit-1 Rural Sociology

- 4 Sociology and rural sociology
- 5 Interrelationship between rural sociology and extension
- 6 Characteristics of urban and rural people
- 7 Rural and Urban community differences
- 8 Characteristics of Rural Sociology-
- (i) Social stratification- Function, Dysfunction, Basis for stratification and types
- (ii) Value and Value System Characteristics, Types classification and functions
- (iii) Social Mobility- Types and Factor influencing Mobility

9 Major problems in Rural area

Unit : 2 Teaching and Learning Process

- b) Concept of Learning, Elements & Principles involved in Learning
- c) Learning experiences
- d) Types of learning
- e) Adult learning- meaning, assumption, characteristics and conditions
- f) Concept, Definition, Factor Effecting Teaching
- g) Steps in Extension Teaching

Unit-3 Effective Training

- a) Training- definition, Concept of co training, and features
- b) Difference between education and training
- c) Importance and features of training
- d) Need Assessment before training
- e) Process of training
- f) Types and approach to training
- g) Elements of good training
- h) Training methods (elementary idea)
- i) Experiential Learning cycle of Training
- j) Training evaluation

Unit : 4 Teaching Methods

- a) Selection of Appropriate teaching Method,
- 5- Importance and scope of Teaching Methods
- 6- Classification of teaching Methods in Home Science Extension
- 7- Advantage and Limitations of each method
- 8- Factors affecting the Use and Selection of Teaching method
- 9- Relative Effectiveness of teaching methods

Unit : 5 Teaching Aids

a) Meaning and Definition of Teaching aid

M.M. : 50 3P/W

- b) Selection of Audio Visual Aids
- c) Efficient Utilization of Audio Visual Aids
- d) Classification of Teaching aids:
- i) Audio aids ii) Visual Aids

iii) Audio Visual Aids

- c) Advantages and limitation of each type
- d) Cone of Experience

PRACTICAL **Teaching and Learning in Extension Education**

M.M.: 30 Internal-10 External-20 2 p/w

- 1. Preparation and Use of Selected Teaching aids in all areas of Home Science
- 2. Developing skill and use of different training methods- Role play, Demonstration and Panel Discussion
- 3. Practice of problem solving through case study method.

Reference:-

Chakrabarti : Audio Visual Education of India. Oxford Book Co. New Delhi, 1967

Chandra Arivinda : Introduction to Home Science, Metro politan Book Co. Pvt. Ltd. New Delhi, 1978

C.S.Rayudu, Communication, Himalya Publishing House, Mumbai

Dale Edger : Audio Visual Aids, Holt, Rinehart and Winstion, London, 1964

Dhama, O.P. & Bhatnagar, O.P. : Education and Communication for Development, 1987

Devdas, Rajammal : Methods of Teaching Home Science, NCERT, New Delhi, 1978

Devdas, Rajammal P. : Text-Book of Home Science, I.C.A.R. Publication, New Delhi, 1959

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- 1. समाजशास्त्र और ग्रामीण समाजशास्त्र
- ग्रामीण समाजशास्त्र और प्रसार के बीच अन्तः सम्बन्ध 2.
- 3. शहरी और ग्रामीण लोगों की विशेषताएँ
- 4. ग्रामीण और शहरी समुदाय में अन्तर
- ग्रामीण समाजशास्त्र की विशेषताएँ
 - अ. सामाजिक स्तरीकरण कार्य, शिथिलता, स्तरीकरण के लिए आधार और प्रकार
 - ब. मूल्य और मूल्य प्रणाली विशेषताएँ, प्रकार वर्गीकरण और कार्य
 - स. सामाजिकता प्रकार, सामाजिकता को प्रभावित करने वाले तत्त्व
 - द. ग्रामीण क्षेत्र में प्रमुख समस्याएँ

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- 1. अधिगम की अवधारणा, अधिगम में शामिल होने वाले तत्त्व और सिद्धान्त
- 2. अधिगम में अनुभव प्राप्त करना
- अधिगम के प्रकार 3.
- 4. प्रौढ शिक्षा अर्थ, संकल्पना, विशेषताएं और शर्त
- 5. अवधारणा, परिभाषा, शिक्षण को प्रभावित करने वाले तत्त्व
- प्रसार शिक्षण कें चरण 6
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 - 1. प्रशिक्षण परिभाषा, सह प्रशिक्षण की अवधारणा और विशेषताएं
 - 2. शिक्षा और प्रशिक्षण में अन्तर
 - 3. प्रशिक्षण से पहले आकलन
 - 4. प्रशिक्षण की प्रक्रिया
 - 5. प्रशिक्षण के प्रकार व पहुंच
 - 6. अच्छे प्रशिक्षण के तत्त्व
 - प्रशिक्षण विधियां (प्राथमिक विचार) 7.
 - प्रशिक्षण का अनुभावात्मक चक्र 8
 - 9. प्रशिक्षण मूल्यांकन

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- 1. उपयुक्त शिक्षण विधि का चुनाव
- 2. शिक्षण विधियों का महत्त्व और क्षेत्र
- गृह विज्ञान प्रसार में शिक्षण विधियों का वर्गीकरण 3
- प्रत्येक विधि के लाभ व सीमाएं 4.
- शिक्षण विधि के प्रयोग व चयन को प्रभावित करने वाले तत्त्व 5.
- शिक्षण विधियो की सापेक्ष प्रभावशीलता

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- 1. शिक्षण सहायक सामग्री का अर्थ एवं परिभाषा
- 2. श्रव्य दुश्य सामग्री का चयन
- 3. श्रव्य दृश्य सामग्री का कुशल उपयोग
- 4. शिक्षण सहायक सामग्री का वर्गीकरण
 - अ. श्रव्य सामग्री
 - ब. दृश्य सामग्री

MM**&50** 3 P/W

- स. श्रव्य दृश्य सामग्री
- प्रत्येक प्रकार के लाभ व सीमाएं 5.
- अनुभव के शंकु 6.

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- गृह विज्ञान के प्रत्येक क्षेत्र में शिक्षण सहायक सामग्री के चयन की तैयारी व प्रयोग 1
- विभिन्न प्रशिक्षण विधियों का विकासशील कौशल एवं प्रयोग रोल प्ले, प्रदर्शन और पैनल चर्चा 2
- 3 मामले का अध्ययन विधि के द्वारा समस्या समाधान का अभ्यास

(Home Science) Final Examination- 2021-2022

Paper- I **FOODS AND NUTRITION - III** Meal Planning and Diet Therapy

Time : 3 Hrs. M.M.: 50

Unit: 1 Meal Planning and Budgeting:

- Essentials of Meal Planning
- Planning the Food Budget
- Master food plans
- Sample menu for the day's meal
- Factors influencing Food intake and food habits: Physiologic factors that determine food intake Environmental and behavioral factors Influencing food acceptance Nutrition during pregnancy and lactation Physiological and Biochemical changes in pregnancy Nutritional considerations Complication of pregnancy Lactation-Nutritional consideration and diet
 - Nutrition during infancy

Nutritional requirement, Breast feeding, Bottle feeding, Solid foods

Unit: 2 Nutrition for children and teen agers

Diet for per-school Child, School going child and teen agers

- Therapeutic Nutrition:
- 1. Introduction
- 2. Purpose of modified diets
- 3. Tem approach to nutritional care
- 4. Factors of consider in the study of diet therapy
- 5. Effect of illness on food acceptance and utilization
- Unit: 3 Enteral and parenteral Nutrition
 - Therapeutic modifications of the normal diet for consistency, energy, nutrient, bulk etc.
 Parenteral nutrition
 Formula diets (tube-feeding)

 - 4. Obesity-causes, prevention and treatment, caloric diet
 - a. Under weight -causes, dietary modifications
 - b. General Dietary considerations in Gastrointestinal diseases, eating disorders Peptic ulcer-Etiology symptoms & treatment
 - c. Diet in diarrhea and constipation
- Unit: 4 1. Diet in hepatitis and cirrhosis
 - 2. Fevers-classification, metabolism & General dietary considerations, Diet in tuberculosis & typhoid
 - 3. Diabetes Mellitus-Nature, classes, characteristics, metabolism in diabetes, dietary modification
 - 4. Diet in Anemia

Unit: 5 1. Atherosclerosis-Risk, role of diet Hypertension- Prevention: role of diet and dietary modification

- 3. Dietary management of heart diseases, modification of the diet
- 4. Kidney diseases: Glomerulonephritis, nephrotic syndrome and nephrosclerosis
- 5. Gout-nature, symptoms, treatment modification of the diet
 - Purine restricted diet.
- 6. Cancer-Dietary modification

REFERENCE BOOKS

Robinson: Normal and Therapeutic Nutrition

Kinder, F.: Meal Management

Davidson, S. Passmore: Human Nutrition and Dietetics

Swaminathan, M.: Advance Nutrition

Shills, M.E. and Young, V.R.: Modern Nutrition in Health and Disease
PRACTICAL

MEAL PLANNING AND THERAPEUTIC DIET

M.M-25 Internal – 10 External - 15 Time- 2p/w

Note : Stress should also be laid on decoration, presentation and serving of meals

- 1. Use of Nutrition value Tables and/ or Exchange lists for calculation of diets
- 2. Planning (calculate protein and calorie), preparation and serving of a day's meal for
 - a. An adult man and women (moderate worker)
 - Adolescent girl (calculate iron also) b.
 - c. Old age individual
 - d. Packed lunch for a Pre-School Child providing day's 1/3 protein and 1/4 calorie
 - e. Pregnant and lactating mothers (calculate iron and calcium also)
 - f. A low cost meal for a hard worker-
 - g. Adult women, planned with special attention to the inclusion of foods for prevention of dietary deficiency diseases
- 3. Planning, preparation and serving of therapeutic diets for
 - a. Constipationb. Diarrhea

 - c. Peptic ulcer
 - d. Obesity
 - e. Diabetes
 - f. Hypertension
 - g. Fever
- 4. Meals for special occasions- Birthday party, festival celebration or journey
- 5. Diet survey of a family or a particular age group
- 6. Formulating recipes and preparing homemade infant foods

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- 1. आहार नियोजन की प्रमुखता
- 2. खाद्य पदार्थों की बजट योजना
- 3. मास्टर फूड प्लान
- 4. एक दिन की आहार तालिका का सैम्पल मेनू
- भोजन सम्बन्धी आदत तथा गृहण करने की प्रक्रिया को प्रभावित करने वाले कारक–
 - शारिरीक कारक, वातावरण सम्बन्धी कारक, व्यवहारिक कारक

गर्भावस्था तथा दुग्धावस्था के समय का पोषण – गर्भावस्था में शारिरीक एवं जैव रासायनिक परिवर्तन, पोषण सम्बन्धी आवश्यकतायें

गर्भावस्था की जटिलतायें

दुग्धावस्था – पोषण सम्बन्धी आवश्यकतायें स्तनपान, बोतल द्वारा दूध एवं ठोस आहार

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बच्चों एवं युवाओं का पोषण स्कूल जाने से पूर्व बालक का आहार, स्कूल जाने वाले बालक एवं युवाओं की पोषण सम्बन्धी आवश्यकता एवं आहार

- आहारीय चिकित्साः
- 1. प्रस्तावना
- 2. आहारीय परिवर्तन का उद्धेश्य
- पोषण सम्बन्धी देखभाल हेतू निर्मित टीम 3
- 4. आहारीय परिवर्तन से प्रभावित कारक
- बीमारी के प्रभाव से भोजन के उपयोग में बदलाव 5

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- साधारण आहार में तरल, कोमल, उर्जा, पोषक तत्वों एवं रेशों में बदलाव करके भोजन देना
- पेरेन्टरल पोषण 2.
- फॉरमूला डाईट (ट्यूब फीडिंग) 3.
- मोटापा कारण, नियन्त्रण एव आहारीय परिवर्तनए 4.
- 5. आतों से सम्बन्धित बीमारियाँ एवं आहारीय परिवर्तन-
 - पेप्टिक अल्सर – कारण, लक्षण एवं आहारिय सुधार
 - अतिसार एवं कब्ज कारण एवं आहारीय परिवर्तन

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1.

- 1. हीपेटाइटिस एवं सिरोसिस की अवस्था में आहारीय परिवर्तन
- 2. ज्वर वर्गीकरण, उपापचयन एवं आहारीय परिवर्तन टयूबरकुलोसिस एवं टाइफाइड
- 3. मधुमेह प्रकृति, वर्गीकरण, विशेषतायें, मधुमेह की स्थिति में उपापचयन एवं आहारीय परिवर्तन
- अनिमिया की रिश्वति में आहार 4

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- 1. एथिरोस्केरोसिस खतरा, आहार का योगदान एवं परिवर्तन
- हाईपरटेन्शन रोकथाम, आहारीय योगदान एवं परिवर्तन
- 2. हदय सम्बन्धी बीमारियों में आहारीय प्रबन्धन आहार में परिवर्तन
- 3. वृक्क से सम्बन्धित बीमारियॉ– ग्लोमेरूलोनेफराइटिस, नेफ्रोटिक सिन्ड्रोम, नेफ्रोस्किलेरोसिस
 - गाउट प्रकृति, लक्षण एवं आहारीय परिवर्तन प्यूरीन नियन्त्रक आहार
- 5. कैन्सर आहारीय परिवर्तन

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MM**&25** vHrfjd **& 10** 0ká **& 20** 2 P/W

- 1. पोषण तत्वों की गणना तालिका / एक्सचेंज लिस्ट द्वारा
 - एक दिन की आहार तालिक बनाना एवं प्रोटीन एवं कैलोरी की गणना करना
 - अ. व्यस्क महिला एवं पुरूष
 - ब. युवा स्त्री (आयरन की गणना)
 - स. वृद्धावस्था
 - द. स्कूल जाने से पूर्व बालक का टिफिन जिसमें पूरे दिन की प्रोटीन का एक तिहाई भाग, एवं कैलोरी का एक चौथाई भाग
 - य. गर्भेवती स्त्री एवं स्तनपान कराने वाली महिला (आयरन एवं कैल्शियम के साथ)
 - र. मजदूर वर्ग का कम खर्च आहार
 - ल. एक महिला की आहार योजना जो निम्न पोषण के कारण, बीमारियों से ग्रसित हो
 - चिकित्सा द्वारा आहारीय परिवर्तन, आहार की योजना बनाना एवं परोसना
 - अ.कब्ज

2.

- ब. अतिसार
- स. पेप्टिक अल्सर
- द. मोटापा
- य. मध्रमेह
- र. हाइपरटेन्शन
- ल. ज्वर
- विशिष्ट अवसरों पर आहार नियोजन
- जन्मदिन पार्टी, त्योहार अथवा यात्रा से सम्बन्धित
- 4. एक परिवार का आहारीय सर्वेक्षण अथवा किसी आयु वर्ग विशेष का आहारीय सर्वेक्षण
- 5. एक वर्षीय बालक के लिये पारम्परिक आहार एवं विशिष्ट पौष्टिक युक्त व्यंजन तैयार करना

Paper – II FOODS AND NUTRITION - IV Food Science (FN IV)

Time; 3 Hrs. M.M.: 50

Unit: 1

Carbohydrate foods:

- 1. Cereals.
 - a. Structure and composition.
 - b. Processes done before cooking-milling, polishing, parboiling, flaking, parching roasting.
 - c. Various ways of using cereals-whole grain flour coarse fine and refined, convenience cereal food products.
 - d. Selection Storage and care.
- 2. Sugars:
 - a. Various type of sugar products composition, manufacturing process and uses.
 - b. Properties of sugar.
 - c. Sugar Cookery- various behaviour of sugar in concentrated solutions and its uses.
 - d. Storage and care.
- 3. Starchy food:
 - a. Structure of starch cell.
 - b. Changes produced in starch cell during cooking.
 - c. Factors required control in starch cookery.
 - d. Various preparation using starch food.

Unit: 2

Protein foods:

Animal sources.

- a. Milk and Milk Products:
 - i. Kinds, composition, nutritive contribution.
 - ii. Preparation of milk products.
 - iii. Processing techniques-Pasteurization, homogenization.
 - iv. Use of milk in food preparation- effect of heat and acid, various uses.
 - v. Selection of milk and milk products, care of milk in the home.
- b. Egg:
 - i. Structure, composition and nutritive value measures of quality and grading of eggs.
 - ii. Egg cookery factors affecting whipping, quality of eggs and heat coagulation of egg
 - protein, uses of eggs in cookery, methods of cooking eggs and egg dishes.

Unit – 3

- (A) Flesh foods (meat, fish and poultry).
 - i. Kinds, composition and nutritive value, structure of muscle.

- ii. Postmortem changes and ageing of meat, factors affecting tenderness.
- iii. Meat Cookery-change during cooking.
- iv. Curing process.
- v. Selection and storage at home.
- (B) Vegetable sources.
 - Legumes and pulses.
 - 1. Structure, composition, cooking methods, effect of soaking, germination and soda during cooking.
 - 2. Various preparations, incorporation of pulses in high protein vegetables mixes.

Nuts and Oil seeds-Nutritive value and importance.

Unit: 4

Fats and Oils:

- a. Kinds (edible), composition and properties.
- b. Manufacturing Process-separation/extraction, refining process and hydrogenation.
- c. Importance in Cookery.
- d. Changes in fats and oils on heating.
- e. Rancidity of fats.
- f. Selection and care during storage.
- Protective foods-Fruits and vegetable.
 - i. Classification, composition and importance in diet.ii. Pigments present.

 - iii. Cooking of vegetable and changes that take place during cooking: effect of heat and alkali.
 - iv. Selection and storage at home.
- Condiments and spices herbs, colouring and flavouring agents, uses in Indian cookery.

Unit: 5

- 1. Beverages Types, nutritive contribution and preparations.
- 2. Introduction to special foods Novel foods, convenient foods, space foods, uncommon and non
 - conventional foods.
- 3. Food Additives-types and functions.
- 4. Food Safety.
 - a. Food borne infections, Source and Prevention.

REFERENCE BOOKS

Norman, P.N.: Food Science Palmer: Food Theory and Application Charley, H: Food Science Shakuntala Manay: Food Science Marry and Benin: Introductory Food Griswald: The Experimental Study of Food Peckam, G.C.: Foundation of food preparation Meyer, L.H.: Food Chemistry Shadaksha Swamy: Food foundation

PRACTICAL FOODS AND NUTRITION - IV Food Science (FN IV)

3 Pd./W Internal - 10 External - 10 M.M.: 20

- 1. Weights and measures and cooking methods (to be revised)
- 2. Cereal Cookery- various preparation showing
 - A. Dextrinization- chapatti, bread, toast
 - Gelatinization-corn Starch cooking (custard), Kadhi, plain rice B.
 - C. Separation of grains by use of fat and dry heat-field rice, lapsi etc.
 - D. Gluten formation and factors affecting its formation soft puri, crisp puri
- 4. Sugar Cookery
 - a. Preparations showing syrups of various strength
 - b. Preparation in which
 - size of crystal formed is controlled (i)
 - Preparation of bura (ii)
 - Crystal formation of sugar is prevented (iii)
 - c. Some function of sugar are shown
 - (Rawa- Ladoo, Batasha, Syrups, Sugar Candy)
 - 5. Pulses, nuts and oil seeds
 - a. Effect of nature of water (hard and soft), acid and alkali on texture and doneness of pulses
 - b. Ways of making complete protein
 - 6. Milk Cookery- Preparations using milk and milk products Khoya and Paneer
 - 7. Egg Cookery preparations showing functions of Egg in cooking foaming, leavening, coating, binding, flavoring and colouring
 - 8. Cooking of flesh foods various preparations using meat, fish and poultry

- 9. Vegetable Cookery- Effect of acid, alkali, heat and covering on the color and doneness of vegetables
- 10. Sensory evaluation
- 11. Planning and preparing nutrient rich dishes, (one serving) providing- one third of day's requirement of Protein, Calcium, iron, vitamin A, thiamine, Riboflavin, niacin and ascorbic acid, calculate calorie and cost of the above dishes
- 12. Visit to a food processing unit
- 13. Preparation of a Nutrition educational aid

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- कार्बोज खाद्य पदार्थ
 - अ. बनावट एवं संगठन
 - ब. पकाने से पहले की गयी तैयारियाँ मीलिंग, पॉलिशिंग, पॉरबायलिंग, फ्लेकिंग, पॉरचिंग, रोस्टींग
 - स. अनाजों को उपयोग में लाने के तरीके साबुत अनाज आटा, सख्त, बारीक एवं रिफाइन्ड, आसानी से तैयार होने वाले
 - अनाज के विभिन्न प्रकार
 - द. चयन, संग्रहण एवं देखभाल
- 2- शर्करायें
 - अ. विभिन्न प्रकार की शर्करायें– संगठन, तैयार करने की विधि एवं उपयोगिता
 - ब. शर्कराओं के गुण
 - स. शर्करा को पर्काने की विधियाँ विभिन्न प्रकार की सान्द्रता घोल में शर्करा की प्रवत्ति एवं उपयोग
 - द संग्रहण एवं देखभाल
- 3- स्टार्च युक्त खाद्य पदार्थ
 - अ. स्टार्च सेल की बनावट
 - ब. पकाते समय स्टार्च में होने वाले परिवर्तन
 - स.स्टार्च को पकाते समय नियन्त्रण में रखने वाले कारक
 - द. स्टार्च खाद्य पदार्थ को बनाने के विभिन्न तरीके

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- जन्तुओं से प्राप्त
- 1. दूध एवं दुग्ध उत्पाद
 - अ. विभिन्न प्रकार, संगठन एवं पौष्टिक योगदान
 - ब. दुग्ध उत्पाद को बनाने की प्रक्रिया
 - स. तैयार करने की तकनीकें पास्चुरीकरण, होमोजिनीकरण
 - द. पकाने की कला में दूध का प्रयोग ताप एवं एसिड का प्रभाव
 - य. दूध एवं दुग्ध उत्पादों का चयन, घर में दूध की देखभाल
- 2. अन्डा
 - अ. बनावट, संगठन, पौष्टिक योगदान, अन्डे की ग्रेडिंग एव गुण को पहचानना
 - ब. अन्डे को पकाने की कला फेंटते समय प्रभावित करने वाले कारक, अन्डे के गुण, अन्डे की प्रोटीन पर स्कंदन का प्रभाव, पाक कला में अन्डे की उपयोगिता, अन्डे के विभिन्न व्यजनों को तैयार करने की विधियाँ

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- 1. मॉसाहारी खाद्य पदार्थ (मीट, मछली, मुर्गी)
 - अ. विभिन्न प्रकार, संगठन एवं पौष्टिक मूल्य, मॉस की बनावट
 - ब. मॉस को काटने के बाद होने वाले परिवर्तन एवं मॉस की आयु का प्रभाव, मॉस को मुलायम रखने में प्रभावित करने वाले कारक
 - स. मॉस को पकाना पकाते समय होने वाले परिवर्तन
 - द. साफ करने के तरीके
 - य. चयन एवं घर में संग्रहण
- 2. पादप खाद्य पदार्थ फलियॉ एव दालें
 - अ. बनावट, संगठन, पकाने के विभिन्न तरीके, भिगोने का प्रभाव, अंकुरण एवं पकाते समय सोडा का प्रयोग, दालों का विभिन्न प्रकार से बनाना – दालों को सब्जियों के साथ मिश्रित कर प्रयोग में लाना (कम प्रोटीन एवं उच्च प्रोटीन सब्जियों के साथ) ब. सूखे मेवे एवं तेल युक्त बीज – पौष्टिक मूल्य एवं महत्ता

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- 1. वसा एवं तेल
 - अ. विभिन्न प्रकार, संगठन एवं गुण
 - ब. बनाने की प्रक्रिया अलग करना/तेल निकालना
 - स. पाक कला में महत्ता
 - द. चयन एवं संग्रहण करते समय देखभाल
 - रक्षात्मक खाद्य पदार्थ फल एवं सब्जियॉ।
 - अ. वर्गीकरण, संगठन एवं महत्ता
 - ब. वर्णक
 - द. सब्जियों को पकाते समय होने वाले परिवर्तन, ताप एवं क्षार का प्रभाव
 - स. चयन एवं घर में संग्रहण
 - मसाले एवं खुशबुदार मसाले, हर्ब, रंग एवं सुगन्धित ममाले भारतीय पाक कला में मसालों का उपयोग

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- 1. पेय पदार्थ प्रकार, पौष्टिक मूल्य एवं बनाने का तरीका
- विशिष्ट प्रकार के खारद्य पदार्थ नोवेल फूड, आसानी से तैयार भोज्य पदार्थ, स्पेस फूड, असाधारण एवं गैर पारम्परिक भोज्य पदार्थ
- 3. खाद्य योगज प्रकार एवं कार्य
- 4. खाद्य सुरक्षा

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- नाप एवं तोल तथा पाक कला की विधियाँ (पूर्वालोकरन)
 - अनाज का प्रयोग करते हुए बनाने की प्रक्रियायें।
 - अ. डैक्ट्रीनाइजेशन चपाती, ब्रेड, टोस्ट
 - ब. जिलेटीनाइजेशन कोन स्टार्च (कस्टर्ड)
 - स. खाद्यानों का अलग होना वसा का प्रयोग से, ताप से, तल कर, लापसी आदि
 - द. ग्लूटन का बनना तथा इसको प्रभावित करने वाले कारक मुलायम पूरी, सख्त पूरी
- शर्करा शास्त्र कला
 - अ. शर्करा को पकाते समय विभिन्न सान्द्रता के घोल ब. प्रयोगात्मक विधि
 - क्रिस्टल बनने के आकार का नियन्त्र
 - बूरा बनाना •
 - शर्करा का क्रिस्टल बनने से रोकना
 - स. शर्करा का प्रयोग करते हुए बने व्यंजन (रवा, लड्डू, बताशा, सिरप, शुगर केन्डी)
- दालें, सूखे मेवे एवं तेलयुक्त बीज 3.
 - अ. दालों पर खारा एवं मीठे पानी का प्रभाव, प्रक्रिया पर प्रभाव
- ब. सम्पर्ण प्रोटीन युक्त व्यंजन बनाने के तरीके
- 4.
- दूध पाक शास्त्र दूध से बने विभिन्न व्यजन व दुग्ध उत्पाद से बने व्यंजन खोया एवं पनीर का प्रयोग अन्डा पाकशास्त्र अन्डे की पाक कला विधियों का प्रयोग करते हुए विभिन्न व्यंजन फोम द्वारा, लेविनिंग, कोटिंग, बाईडिन्ग, फ्लेवरिंग, 5. रंग का प्रभाव देखते हुए विभिन्न व्यंजन तैयार करना
- मॉसयुक्त भोज्य पदार्थ तैयार करना मॉस मछली एवं मुर्गी का प्रयोग करते हुए तैया व्यंजन 6
- सब्जियों का पाकशास्त्र सब्जियों पर अम्ल एवं क्षार की प्रतिक्रिया, ताप एवं रेंग का पूर्ण रूप् से तैयार सब्जियों पर प्रभाव 7.
- सेन्सरी इवैल्ऐशन 8
- पौष्टिक व्यंजन की योजना एवं बनाने की प्रक्रिया, प्रति दैनिक मात्रा का एक तिहाई भाग जिससे प्राप्त हो प्रोटीन, कैल्शियम, आयरन, 9. विटामिन ए, थायमिन, राइबोफ्लेविन, नायसिन एवं एस्कार्बिक एसिड इत्यादि के तैयार व्यंजन, इनकी कैलोरी एवं मूल्य की मात्रा निकालें
- 10. किसी भी फूड फैक्टरी का क्रियात्मक कार्य देखने की जानकारी लें
- 11. पोषण सम्बन्धी विषय साम्रगी का चयन करते हुए कोई नियुट्रीशन एजुकेशनल एड बनायें।

Paper- III HOME MANAGEMENT - III (H.MGT.III) **Family Economics**

M.M.: 50 Time: 3 Hrs.

Unit : 1 Family Economics

- 1. Human wants : origin characteristics and classification
- 2. Consumer behavior
 - a. Law of Diminishing marginal utilityb. Law of substitution

 - c. Indifference curve
 - d. Consumer surplus
- 3. Markets : Types of Market, types of purchasing
- Unit: 2 1. Family accounting
 - a. Budgeting definitions, importance and steps in planning a budget
 - b. Record Keeping- short and long term methods of account keeping
 - 2 Saving and Investment

 - a. Importance of savingb. Factors determining saving
 - c. Characteristics of investment
 - d. Types of savings and channels of investment
 - e. Institutions of savings
- **Unit : 3** 1. Legal aspects of property ownership (special reference to women)
 - a. Inheritance of property
 - b. Trust and will
 - 2 Tax (A) Definition, Cannons of taxation
 - (B) Classification Proportional and progressive tax, direct and indirect tax, specific and Advance tax
 - (C) Main taxes in India- Income tax, corporation tax, Excise duty, custom duties, wealth tax, gift tax, entertainment tax, agricultural income tax, professional tax
- Unit: 4 Consumer Economics
 - Consumer education: Rights and responsibility 1.
 - 2. Programmes for consumer protection
 - 3. Agencies for consumer protection
 - Standardization 4.

- a. Labelling
- b. Adulteration control
- Sales promotion techniques
- 6. Factors influencing consumer demands
- Customs and tradition, conspicuous, consumption, fashion advertisement, malpractices, price, income and credit opportunities
- Unit : 5 Home maker as an Entrepreneur advantages and additional responsibilities
 - a. Areas of entrepreneurship for a Home scientist, Daycare centers, crèche, child guidance centers, nursery school, resources centers

Nutritional advisor, preservation units, mobile food vans and hot lunch vans Designing and preparing children's garments, boutique

- b. Market research : Process and advantages (in brief)
- c. Arranging for finances Banks and Institutions
- d. Determinants of pricing, common channels of distribution and its selection
- e. Nature of selling and sell positions

REFERENCE BOOKS

Home Economics

5.

Home Management: Gross & Crandle Marketing: M.C. Denial C.

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- 1. मानव आवश्यकताएः उत्पत्ति, विशेषताए और वर्गीकरण
- 2. उपभोक्ता व्यवहार
 - अ. सीमान्त उपयोगिता ह्वास नियम
 - ब. प्रतिस्थापन नियम
 - स. इनडिफरेंस वक्र
 - द. केन्स्यूमर सरफ्ल्स
- 3. बाजारः बाजार के प्रकार, खरिदारी के प्रकार

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1. पारिवारिक

- अ. बजट–परिभाषा, महत्ता एवं बजट योजना में चरण
- ब. लेखा-जोखा रखना लेखा रखने के लघु एवं दीर्घ कालीन तरिके
- 2. बचत एवं निवेश
 - अ. बचत की महत्ता
 - ब. बचत को प्रभावित करने वाले कारक
 - स. निवेश की विशेषताएं
 - द. बचत के प्रकार और निवेश के प्रकार
 - य. बचत के लिए संस्थाएं

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- सम्पति उत्तराधिकारी के कानुनी (महिलाओं के संदर्भ में)
 - अ. सम्पति का हस्तान्तरण
 - ब. ट्रस्ट (न्यास) एवं वसीयत
- 2- टेक्स (कर)
 - अ. परिभाषा कराधान के सिद्धान्त
 - ब. कर वर्गीकरण आंशिक एवं प्रगतिशील कर, प्रत्यक्ष एवं अप्रत्यक्ष कर, विशिष्ट एवं अग्रिम कर
- अारत के प्रमुख कर : आयकर, निगम कर, उत्पाद शुल्क, सीमा शुल्क, स्वास्थ्य कर, उपहार कर, मनोरजन कर, कृषि आयकर, व्यवसायिक कर

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- 1. उपभोक्ता शिक्षा– अधिकार एवं जिम्मेदारियां
- 2. उपभोक्ता सरक्षण के लिये कार्यक्रम
- 3. उपभोक्ता संरक्षण के लिए संस्थाएं
- 4. स्तरीकरण
 - अ. नांमाकित करना
 - ब. मिलावट रोकना
- 5. विक्रय बढाने की तकनीक
- उपभोक्ता मांग को प्रभावित करने वाले कारक–कस्टम एवं परम्परा, विशिष्ट सेवन, फैशन विज्ञापन, कदाचार, मूल्य, आय एवं क्रेडिट अवसर

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- गृह वैज्ञानिक के लिए उद्यमिता के क्षेत्र– डे केयर केन्द्र, क्रेच (बालघर), बाल निर्देशन केन्द्र, नर्सरी स्कूल, स्त्रोत केन्द्र पोषण सलाहकार, खाद्य सरक्षण, मोबाइल खाद्य वैन राज्यों के रापके विजयत राज्या पर राण्या राण्या राण्या के के राज्या
- बच्चों के कपउे डिजाइन करना एवं बनाना, बूटीक
- 2. बाजार सर्वेक्षण प्रक्रिया एवं लाभ (संक्षेप)
- 3. आर्थिक सहायता बैंक एवं संस्था
- 4. मूल्य निर्धारक, वितरण हेतु का चुनाव
- 5. बिक्रि की प्रकृति एवं विक्रय स्तर

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Paper- IV HOME MANAGEMENT- IV (H.MGT.IV) **Household Equipment**

Unit : 1 1. Materials used for household equipment:

- a. Basic materials properties, suitability and maintenance
- b. Metals used for cooking utensils and serving utensils
- Unit: 2 1. Electricity: Generation, transmission, current, wiring the home, circuits, motors, safety devices, electrical accessories
 - 2. Heat: Production and transmission, measurement, control, specific heat and latent heat
- Unit: 3 Principles involved in operation of the following household equipment and selection, use care and maintenance:
 - 1. Small Kitchen tools measuring cups and spoons, Sifters and strainer Beaters and mashers Knives and forks Cutters and Slicers Peelers and graters 2. Pressure cookers, Solar Cooker
 - 3. Kettles and Coffee Percolators
 - **4.** Toasters
 - 5. Ovens and Gas Tandoor
 - 6. Cooking Range
- Unit : 4 Mixers and Blenders

Refrigerator Thermos flask and Ice Boxes

Brooms and Brushers Vacuum Cleaner

Unit : 5 Washing machine

Irons Electric water heaters Room coolers, Fans Room heaters Hair dryer Radio and T.V. Bathroom fixtures and Accessories

PRACTICAL **HOME MANAGEMENT - IV**

Internal Marks: 10 External Marks: 20

- 1. Drawing of sectional elevations, Lighting treatment
- 2. Introduction to concept of Landscaping
- 3. Development of designs and construction of any two
 - a. Cushions, curtains, carpets, Door mats, Rugs, Table mate
 - b. Wall Painting, Pictures form designs
 - c. Crafts out of fiber, Fabric, coir clay metal
- 4 Flower arrangement for different places & occasions
- 5. Floor decoration Different type Alpana, Rangoli
- 6. Meter reading, fixing fuse, gas cylinder fitting, plug & different circuit series and parallel
- 7. Constructional details of Kitchen and Storage units
- Furniture layout of commercial area any two relevant office, shop, clinic, parlour, nursery school 8.
- 9. Developing a project proposal keeping in mind the techno economic feasibility for establishing an enterprise
- 10. Present/ organize /demonstration/seminar on the developed project in the class



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- 1. घरेलू उपकरणों के लिए प्रयोग ली जाने वाली सामग्री
- अ. मूल सामग्री की विशेषताएँ, अनुकूलता व रख–रखाव
 - ब. खाना बनाने व परोसने के लिए प्रयोग होने वाले बतनों की धातू (प्रकार)

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- 1. विद्युत उत्पादन, प्रसारण, विद्युत प्रवाह, घर में बिजली के तार खिंचना, विद्युत परिपथ, मोटर, सुरक्षा साधन, विद्युत सहायक सामग्री ताप (ऊष्मा)– उत्पादन व प्रसारण, माप, नियंत्रण, विशिष्ट ऊष्मा व गुप्त ऊष्मा
- bdlbZ& 3
 - 1. निम्न घरेलू उपकरणों के प्रयोग के सिद्धान्त व इनका चुनाव, प्रयोग विधि व रख-रखाव

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- अ. रसोई में प्रयुक्त सामान्य औजार मापक कप व चम्मच, छलनी व चलनी, अंडा ताडित (एग बीटर) व मैशर (मसलने वाला) विभिन्न प्रकार के – चाकू, छुरी व कॉटे। काटने व फॉक करने में प्रयोग आने वाले उपकरण। छीलने वाला चाकू व कदूकस
- ब. प्रेशर कुकर व सोलर कुकर
- स. बिजली चलित चाय केतली व काफी बनाने की मशीन
- १ण विद्युत टोस्टर
- य. विद्युत ओवन व गैस तंदूर
- र. कुकिंग रेंज

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- 1. मिक्सर व सम्मिश्रक (ब्लेंडर)
- 2. रेफ्रिजरेटर
- 3. थरमस फलास्क व प्रशीतक पेटी (आइस बाक्स),
- झाडु व ब्रश
 वैक्यूम क्लीनर

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- 1. वाशिंग मशीन (वस्त्र धोने की मशीन)
- 2. इस्तरी
- विद्युत जल तापक 3.
- कक्ष शीतलक (रूम कूलर), पंखा 4.
- 5. कक्ष तापक (रूम हीटर)
- 6. बाल सुखाने की मशीन (हेयर ड्रायर)
- रेडियो व टेलीविजन 7.
- रनानगृह में लगने वाली सहायक सामग्री 8.

प्रस्तावित किताबें:--

4. डा. बृन्दा सिंहः गृह प्रबंध एवं आंतरिक सज्जा

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- 1. प्रकाश व्यवस्था
- लैडंसकेपिक के अर्थ से परिचय कराना 2.
- 3. किन्ही भी दो का डिजाइन एवं बनाना
- अ. कुशन, परदें, कालीन, पायदान, रंग, टेबल मेट ब. वॉल पेंटिग, विभिन्न डिजाइन की चित्र स. धागों, कपडों, कॉयर एवं क्ले से कलाकृति बनाना
- विभिन्न स्थानों एवं अवसरों के लिए पूष्प सज्जा 4.
- फर्श सज्जा विभिन्न प्रकार की अल्पना, रंगोली 5.
- मीटर पठन फ्यूज फिक्स करना, गैस सिलेंडर फिटींग, प्लग और विभिन्न सर्किट की श्रेणी बनाना 6.
- रसाईघर और सग्रहण क्षेत्रों का निर्माण 7.
- फर्नीचर ले आउट करना (किन्ही दो का) ऑफिस, दुकान, क्लीनीक, पार्लर, नर्सरी स्कूल 8.
- उद्यमिता विकास के लिए तकनीकी आर्थिक ध्यान में रखते हुए एक प्रोजक्ट बनाना 9.
- 10. पूर्व निर्मित प्रोजक्ट को कक्षा में कार्यक्रम/सेमिनार/डेमोस्ट्रेशन के द्वारा प्रदर्शित करना

Paper- V Human Development –III (HD III) **Marriage and Family**

M.M. - 50Time – 3 Hrs.

Unit 1_Long term goals and motives in life;

- a. Marriage
- b. Singlehood
- c. Co-living-nature
- d. Forms and importance of marriage, mate selection: Self and Arranged, points to keep in mind for mate selection

Unit 2 Adjustment and success in marriage:

- a. Marital adjustment : Meaning, importance and factors influencing it
- b. Interpersonal and intrapersonal adjustment in marriage:
 - 1. Sexual and emotional
 - Work and money 2.
 - In-law relationship 3.
 - Friends 4.
- **Unit 3**_Conflicts in marriage:
 - a. Causes of disharmony in marriage
 - b. Divorce and desertion : consequences and influence
 - c. Widow-hood, Remarriage : Consequences and influence
 - d. Marriage and Family Counselling : Concept, Types and availability of Family courts

Unit 4_Family

- f. Meaning Definitions and Importance of Family
- g. Types of family
- h. Functions of family
- i. Roles : Meaning, definition and Importance of Roles in family

Unit 5

- a. Social change and family Implications for child in context of composition and relationship
- b. Parental Practices : Dimension of control and Responsiveness
- c. Family life cycle : The eight stages and their development tasks
- d. Rights of children, Parental Responsibilities

REFERENCE BOOKS

Dutt: A book of Marriage and Family

D'souza, Alfred: Happiness in Marriage

Nurlock, E.: Development Psychology

Devdas & Jaya: A Text book of Child Development Goode: the Family

Knox Fabif: Exploring Marriage and the Family

Rice, F. Philip: Contemporary Marriage

Kuppu Swamy: Social Change in India

Kapadia: Marriage and Family in India

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- 1. विवाह
- 2. कुॅवारापन
- 3. संह रहने वाली प्रकृति
- 4. विवाह के प्रकार और महत्ता

जीवन साथी का चुनावः स्वय और माता पिता द्वारा तय किया विवाह। जीवन साथी के चयन के लिए बिन्दुओं को मस्तिष्क में रखना

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- 1. वैवाहिक समायोजनः अर्थर महत्ता और इसे प्रभावित करने वाले तत्व
- 2. पारस्परिक और इन्टरार्पर्सनल
 - अ. लैंगिक और संवेगात्मक समायोजन
 - ब. कार्य और आय
 - स. ससूराल में सम्बन्ध
 - द. मित्रों

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- 1. विवाह में असामजस्य के कारण
- 2. तलाक और परित्यागः परिणाम और प्रभाव
- 3. विद्यवापन, पुनः विवाहः परिणाम और प्रभाव
- 4. वैवाहिक और परिवारिक परामर्शः प्रत्यय, प्रकार, पारिवारिक न्यायालय की उपलब्धता

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- 1. अर्थ, परिभाषऍ और परिवार का महत्त्व
- 2. परिवार के प्रकार
- 3. परिवार के कार्य
- 4. भुमिकाः अर्थ, परिभाषा और परिवार में भूमिकाप का महत्त्व

bdlbZ& 5

- 1- सामाजिक परिवर्तन और परिवार की रचना और सम्बन्ध बालक पर निहितार्थ
- 2- माता-पिता की अभिवृतियाँः नियंत्रण और अनुक्रियाशीलता के आयम
- 3- परिवारिक जीवन—चक्र: आठ अवस्थाएँ और उनके विकासात्मक कार्य
- 4- बालकों के अधिकार और माता-पिता की जिम्मेदारियाँ।

Paper- VI HD - IV

Pre-School Children: Education, Guidance & Counseling

M.M. – 50 Time – 3 Hrs.

Unit I

- a. Changing ideas of childhood.
- b. Historical Development of Pre-School Education in west : Brief Mention of Methods and Philosophies of comenius, Roussean, Pestalozzi, Froebal, Montenssori and Dewey.
- c. Pre School Education in India: Brief Mention of Methods and Philosophies of Montenssori, Tagore, Gandli, Giju Bhai bhadaka & Tara bai Modak.

Unit 2

a. Curriculum Models for Pre School:

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- 1. Child Development Model.
- 2. The verbal/cognitive Model
- The Sensory /cognitive Model.
 The Verbal/Didactic Model.
- b. Nursery School Building and Equipment.
- c. Planning a day's activity for a Nursery School and Role of Nursery School Teacher.

Unit 3

- a. Children with Special Need: Definitions, causes & Need for Early Detection and Intervention.
- b. Types of Disabilities: Characteristics.
- 1. Sensory Deficits-visually & Hearing impairment
- 2. Mental Retardation.
- 3. Learning Disabilities.
- 4. Common behavioral Problems of Children. Causes and Prevention.

Unit 4_ Child Guidance and Counseling.

- a. Concept, aims, scope, Principles of guidance & counselling with Reference to Child Development.
- b. Competencies of Child guidance worker & Counselor.
- c. Process of Child Guidance and Counseling.

Unit 5 a. Different Techniques of Guidance and Counseling.

- 1). Behavior Modification.
- 2). Play Therapy
- 3). Case Study

b. Other Counseling.

- 1). Marital Counseling
- 2). Family Counseling
- 3). Adolescent & Vocational Counseling

c. Salient Requirement of Setting of Child Guidance and Child Counseling related to Physical, Financial & Personnel.

REFERENCE

Grewal, J.S.: Early Childhood Education foundation and Practice

Agrawal: Theory and principles of Education philosophical and sociological bases of education

Gedkar, Somaiya: Disabled in India 1983

Groock Shank: Psychology of Exceptional Children and Youth 1955

Dapur, S.: Changing Status of working women in India 1974

Practical (HD)

M.M. – 25 Interval - 10 External - 15

1. Use of basic tests:

- Intelligence test WISC & WPPSI. Baleys Scale of Infant Development. Projective test CAT and TAT
- 2. Preparing One educational Maternal for Children with special need
- 3. Interview Adolescent Children and their parents for
 - a. Sex Differences in socialization
 - b. Effects of family size on Parental Practices
 - c. Effects of Maternal employment
 - d. Sibling relations
- 4. Preparation of report along with reference writing
 - a. Visits to Institution of child Welfare. SOS Village, Orphanage, School for blind deaf and dumb.
 - b. Arranging Video Films, Slide Shows: Preparing a Report of these visits/films
 - c. Story Telling and Conduction of activities for Pre-School Children.
- 5. Presenting a Lecture/Demonstration/Seminar on issues related to guidance & Counselling

Examination Scheme

- 1. Preparation of Education Material for children with special need -4
- 2. Spotting on Basic Tests 4
- 3. Story telling/ conducting Activities for children - 4
- 4. Viva 3

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MM**&50** 3 P/W

- bdłbZ& 1 1. बाल्यावस्था की बदलती विचारधारा
 - पश्चिम में पूर्वशालीय शिक्षा का एतिहासिक विकासः कोमेनियस, रूसो, पेस्टोलॉजी, फ्रॉबल, मान्टेसरी और डिबी की विधियों और 2. सिद्धान्तों का संक्षिप्त उल्लेख

 भारत में पूर्व–शालीय शिक्षाः निम्न की विधियों और सिद्धान्तों का संक्षिप्त उल्लेख। मॉन्टेसरी, टैगोर, गॉधी, धीजू भाई बाडेका और तारा भाई मॉडक

bdłbZ& 2

- 1. पूर्वशाला के पाठ्यक्रम नमूने (मॉडल)
 - अ. बाल विकास मॉडल
 - ब. मौखिक/संज्ञात्मक मॉडल
 - स. संवेदी/संज्ञात्मक मॉडल
 - द. मौखिक / प्रबोधक मॉडल
- 2. नर्स्री स्कूल की इमारत और उपकरण
- 3. नर्सरी स्कूल की एक दिन की गतिविधयों की योजना बनाना और नर्सरी स्कूल के शिक्षक की भूमिका

bdlbZ& 3

- 1. बालक जिन्हें विशेष आवश्यकताः परिभाषा, कारण और प्रारम्भिक पहचान और हस्तक्षेप
- 2. अक्षमताओं के प्रकार विशेषताएँ
 - अ. संवेदात्मक अभाव : अंधे और बहरे बालक
 - ब. मानसिक रूप से पिछड़े बालक/मंद बुद्धि बालक
- स. अधिगम असमर्थता से युक्त बालक
- 2. बालकों में सामान्य व्यवहार सम्बन्धी समस्याएँ, कारण और निवारण

bdlbZ&4 cky& funšku vk§ i jle'kZ

- अभिधारणा, उद्धेश्यों, विस्तार क्षेत्र, निर्देशन एवं परामर्श के सिद्धान्त बाल विकास के सन्दर्भ में
- 2- बाल निर्देशन कार्यकर्ता एवं परामर्शकर्त्ता की क्षमताएँ
- **3-** बाल निर्देशन एवे परामर्श की प्रक्रिया

bdlbZ& 5 funšku vl§ i jle/kZdh fofHUu rdukd

- 1- व्यवहार में बदलाव
- 2- खेल चिकित्सा
- 3- केस अध्ययन
- 4- अन्य परामर्श
 - अ. वैवाहिक परामर्श
 - ब. परिवार परामर्श
 - स. किशोरावस्था और व्यवसायिक परामर्श
- 5- शारीरिक, आर्थिक और कर्मचारी वर्ग से सम्बन्धित बाल निर्देशन और बाल परामर्श क्रेन्द लगाने की मुख्य आवश्यकताएँ

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MM**&25** vHirfjd & 10 0ká & 20 2 P/W

- 1. बेसिक परीक्षिणों का उपयोग
 - अ. बुद्धि परीक्षण WISC & WPPSI
 - ब. शिशु विकास का बेरीज स्केल
 - द. प्रक्षेपी परीक्षण CAT और YSY
- 2. विशेष आवश्यकता वाले बालकों के लिए एक शैक्षिक सामग्री बनाना
- 3. किशोर बालकों व उनके अभिभावकों का साक्षात्कार
 - अ. समाजीकरण में लिंग अन्तर
 - ब. परिवार के आकार का अभिभावक विधियों पर प्रभाव
 - स. माता के रोजगार का प्रभाव
 - द. भाई बहन सम्बन्ध
- 4. रेफरेन्स लिखाई के साथ रिपोट बनाना
 - अ. बाल कल्याण, एस.ओ.एस. गॉव, अनाथाश्रम, अंधे, गूंगे और बहरे बालक की सस्थाओं में भ्रमण ब. विडियो फिल्म, स्लाढ शो की व्यवस्था करनाः इन्ही भ्रमण/फिल्म पर रिपोर्ट तैयार करना
 - स. पूर्व शालीय बालकों को कहानी सुनाना और गतिविधियाँ करवाना
- 5. निर्देशन एवं परामर्श के मुद्दे पर लेक्चर / प्रदर्शन सेमिनार प्रस्तुत करना

Paper- VII CLOTHING AND TEXTILE - III (CI.T.III) Family Clothing and Historic Textiles

Time 3 Hrs M.M. 50

Unit : 1 a. Psychological and Sociological influence of clothes

- b. Design defined and applied to clothing appearance
 - i. Design Structural and decorative
 - ii principles of design-harmony, rhythm, proportion and emphasis
- iii Elements of design-color, line, form, texture and shape
- Unit : 2 a. Selection of suitable fabrics and clothing according to
 - j.) Age ii.) Fashion iii.) Occupation iv) occasion v.) Climate
 - b. Selection and buying of fabrics for various uses in the home
- i) Linenii) Floor Coverings iii) Draperies, Curtains and upholstery **Unit : 3** a. Buying of readymade garments:
- i) Appearance: Size, Design, line and color
 - ii) Fabric: durability, ease of care
 - iii) Workmanship- Cutting, sewing, fitting

- b. Clothing Budget and consumer problems related to textiles
- c. Informative labeling and standardization
- Unit : 4 a. Common fitting, problems and their remedies
 - b. Principle of drafting, commercial paper pattern and draping c. Mending and renovation
 - d. Concept, meaning, nature, need and scope for entrepreneurship
- Unit : 5 Traditional textiles and embroideries of different states of India
 - a. Kashmir Shawls and Carpets
 - b. Punjab-Phulkari
 - c. Bengal-Kanthas, Baluchars, Jamdani
 - d. U.P. Brocades and Chikankari
 - e. Gujarat-Patola, Sind and Kutch embroideryf. Rajasthan-Bandhani

 - g. Andhra Pradesh-Pochampali and Kalamkari
 - h. Karnataka-Kasuti
 - Orissa-Ikat i.

REFERENCE BOOKS

Sherie Doongaji and Roshni, Deshpande: Basic Processes of Clothing Construction Pandit, Savitri; Manual of Children's Clothing Thomson and Rea: Clothing for Children, John Wiley & Sons, N. York Carson: How to Look and Dress, Mcgraw Hill Co., N. York

Erwin: Clothing for Moderns, McGraw Hill Co., N. York

Flugen, J.: Psychology of Clothes

Ryan, M.S.: Clothing Study in Human Behavior

Ryan, M.S.: Individuality in Clothing

PRACTICAL **CLOTHING**

M.M: 30 Internal: 10 External: 20

> MM**&50** 3 P/W

- 1. General Principles for Clothing construction:
 - a. Study of body measurements in relation to height and age
 - b. Taking body measurements for different types of garments
 - c. Importance of drafting and making paper patterns
 - d. Placing and cutting of pattern
 - e. Calculating the amount of material required for different garmentf. Preparation of fabrics, straightening shrinking and pressing
- 2. Drafting, cutting and stitching of the following garments.
 - a. Children-jhabla, jangia, Romper, Baba suit and frock
 - b. Lady's Salwar, Kameej, Saree, Petticoat and Blouse
 - c. Man's/boy's Pajama (plain and Churidar)
- 3. Renovation
- 4. Traditional embroidery on articles-any two
- 5. Knitting- any two of the following to be knitted Baba suit, cardigan, pullover, sock on two or four needles

REFERENCE BOOKS

Doongaji, S. and Deshpandey, R: Basic Process of Clothing Construction Pandit, S.: Manual of Children's Clothing

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bdłbZ& 1

- 1. वस्त्रों का सामाजिक एवं मनोवैज्ञानिक प्रभाव
- 2. डिजाइन की परिभाषा, तथा वस्त्र दिखाव में प्रयुत्तता
 - अ. डिजाइन सरंचनात्मक एवं आलंकारिक
 - ब. डिजाइन के सिद्धान्त अनुरूपता, लय, अनुपात तथा बल
 - स. डिजाइन के तत्व रंग, रेखा, शैली, पोत एवं आकार

bdlbZ& 2

- 1. निम्नलिखित के अनुसार उपयुक्त वस्त्रों का चुनाव
 - अ. आयू
 - ब. फैशन
 - स. व्यवसाय
 - द. अवसर
 - य. मौसम
- 2. घर में प्रयोग में लाये जाने वाले वस्त्रों का चुनाव
 - अ. लिनन
 - ब. फर्श बिछावन
 - स. पर्दे, ड्रेपरी तथा अपहोल्सट्री

bdlbZ& 3

- 1. रेडीमेड वस्त्रों की खरीददारी
 - अ. दिखाव : नाप, डिजाइन, रेखा तथा रंग
 - ब. वस्त्र : मजबूती, आसान रखरखाव
 - स. कर्म कौशल : कटिंग, सिलाई, फिटिंग
- 2. वस्त्र बजट तथा वस्त्रों से सम्बन्धित उपभोक्ताओं की समस्याएं
- 3. सूचनात्मक लेबल तथा मानकीकरण

bdlbZ& 4

- 1. सामान्य फिटिंग समस्याएं तथा उनका समाधान
- ट्रापिटंग के सिद्धान्त : व्यवसायिक पेपर पैटर्न तथा ड्रेपिंग
 मरम्मत तथा नवीनीकरण

4. उद्यमिता की अवधारणा, अर्थ, प्रकृति अवश्यकता एवं अभिप्राय

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- 1. कशमीर : शाल एवं गलीचे
- 2. पंजाब फुलकारी
- 3. बगांल : काथां, बालूचरी, जामदानी
- 4. उत्तर प्रदेश : ब्रोकेड तथा चिकनकारी
- गुजरात : पटोला सिंध एवं कच्छ का कशीदा 5
- 6 राजस्थान : बान्धनी
- 7. आन्ध्रप्रदेश : पोचमपल्ली तथा कलमकारी
- 8. कर्नाटका : कसूती
- 9. ओडिशा : ईकट

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MM**&25** vkirfjd & 10 0ká & 15 2 P/W

- 1. वस्त्र निर्माण के सामान्य सिद्धान्त
 - अ. वजन एवं आयु के अनुरूप शरीर के नाप का अध्ययन
 - ब. विभिन्न वस्त्रों के लिए शरीर का नाप
 - स. डाफिटंग तथा पेपर पैटर्न का महत्व
 - द. पैटर्न का प्रतिष्ठापन तथा कटिंग
 - य. विभिन्न वस्त्रों के लिए कपडे का आकलन
 - र. कपड़े की तैयारी सीधा करना, सिकोड़ना तथा प्रेस करना
- 2. निम्नलिखित वस्त्रों की ड्राफिटंग, कटिंग एवं सिलाई
 - अ. बच्चों के वस्त्र : झबला, जाधिया, रोम्पर, बाबासूट एवं फ्रॉक
 - ब. लेडीज सलवार कमीज, साड़ी पेटीकोट एवं ब्लाउज स. पुरूषों का पायजामा (सादा तथा चूड़ीदार)
- नवनीकरण 3.
- कोई दो परम्परागत कशीदे वस्त्र
- 4. काइ ५१ २२ 5. निटिंग कोई दो रेक्ट प
 - बाबासूट, स्वेटर, पुलोवर, जुराब दो तथा चार सिलाई द्वारा

Paper – VIII **EXTENSION EDUACTION - II Extension Education in Home Science and Rural Development**

M.M.: 50 Time : 3 Hrs.

Unit 1 Community Development

- a. Concept and characteristics of community
- b. Family, Groups, culture and neighborhood concept and characteristics
- c. Social change- Change and progress, Dimensions of social change, factors and direction of social change, acceptance and resistance of social change
- d. Social problems- basic understanding of social problem
- e. Social control- concept and forms of social control
- Community Development Definition, philosophy, principle, and objectives of community f development

Unit 2 Extension System in India

- a. Extension efforts -
 - Before Independence
 - After Independence
- b. Front Line Extension System
- c. Extension system of Ministry of Rural development
- d. Department of science and technology
- Role of nongovernmental organizations

f. Government and non government collaboration

Unit 3 Support Structure and their Function

- a. i.. Panchayat Raj Institution in India
 - ii. Zila Parishad
 - iii. State social welfare board
- b. Rural developmental Programmes, agencies and voluntary organization in rural development-
 - 1. Developmental Programmes for farm sector- FAO, NAREGS, TRYSEM
 - 2. Developmental Programmes for non farm sector- ICDS, SGSY, NIPCCD, WHO, DWACRA,
 - 3. Developmental agencies- RUDA, NABARD, ATMA, CAPART

Unit 4- Extension Program Planning

- a. Meaning, importance and criteria of Extension Program Planning
- b. Principles of Extension Program Planning
- c. Program Planning
- (i) objectives in extension programme- level, determination of need, interest and writing of objectives
- (ii) Steps of programme planning
- (iii) Evaluation- meaning, types, uses and conduction of evaluation

Unit 5 women development

- 1. Problems faced by rural women- education, social problems, gender, female feticide, and economic dependency
- 2. Need and types of women empowerment
- 3. Economic empowerment
 - a. Self help group- meaning, principle and characteristics
 - b. Formation and organization and maintenance of records for self help group
 - c. Entrepreneurship development -
 - (1) Enterprise
 - (2) Steps in setting up a small enterprise
 - (3) process of entrepreneurship development
 - (4) characteristics of entrepreneur
 - (5) misconception about entrepreneurs

Reference :-

Dhama, O.P. & Bhatnagar, O.P. : Education and Communication for Development, 1987

Dhama, O.P. & Bhatnagar, O.P. : Communication for Development, 1991

Mandal, S. & Ray, G.L., A text Book of Rural Development, 2007,

Ray, G.L., Extension Communication and management, 1999, Nays Prakashan, Calcutta

Reddy, A.A., Extension Education, 1976, Shree laxmi press, Baptla, A.P

Extension Education in Community Development, Directorate of Extension Education, GOI, New Delhi

EXTENSION EDUCATION PRACTICAL

M.M : 20 Internal- 10 External 10

- i. Care and Use of Projectors
- ii. Survey of rural community and need assessment
- iii. Develop a rural developmental programme
- iv. Implementation of developed training programme
- v. Evaluation of the implanted programme

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- 1. समुदाय का अर्थ एवं विशेषताएं
- 2. परिवार, समूह, संस्कृति एवं पडौसीः अर्थ एवं विशेषताएं
- 3. सामाजिक परिवर्तनः परिवर्तन एवं विकास, सामाजिक परिवर्तन के आयाम, कारक एवं सामाजिक परिवर्तन की दिशा, स्वीकृति एव रूकावट
- 4. सामाजिक समस्याएं सामाजिक समस्याओं की मूलभूत समझ
- 5. सामाजिक नियत्रणः अर्थ एवं सामाजिक नियत्रण के प्रकार
- सामुदायिक विकासः परिभाषा, दर्शन, सिद्धान्त एवं उद्देश्य

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- 1. प्रसार प्रयासः स्वतन्त्रता पूर्व व स्वतन्त्रता पश्चात
- 2. आमुख पक्ति प्रसार तन्त्र
- 3. ग्रामीण विकास मंत्रालय का प्रसार तन्त्र

- विज्ञान एवं तकनीकी विभाग 4
- गैर सरकारी संस्थाओं की भूमिका
 सरकारी एवं गैर सरकारी की सहभागिता

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- 1. अ. पंचायतीराज, भारतीय संस्थाए ब. जिला परिषद
 - स. राष्ट्रीय समाज कल्याण विभाग
- 2. ग्रामीण विकास कार्यक्रम, ऐजेन्सी एवं स्वयंसेवी संख्थाए
 - अ. कृषि क्षेत्र के लिए विकास कार्यक्रम FAO, नरेगा, ट्राइसम
 - ब. कृषि रहित क्षेत्र के लिए विकास कार्यक्रम ICDS, SGSY, NIPCCED, WHO द्वाकरा
 - स. विकासशील एजेन्सीजः नार्बाड, आत्मा, कर्पाट, रूड़ा

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- 1. अर्थ, महत्त्व एव प्रसार कार्य योजना के मापदण्ड
- 2. प्रसार कार्य योजना के सिद्धान्त
- कार्यक्रम योजना
 - अ. प्रसार कार्यक्रम के उद्देश्य, स्तर, आवश्यकता का निर्धारण, रूचि एवं उद्देश्य लेखन ब. कार्यक्रम योजना के चरण
 - स. मूंल्याकन– अर्थ, प्रकार, उपयोग एवं मूंल्याकन करना

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- 1. ग्रामीण महिला की समस्याएं: शिक्षा, समाजिक समस्याएं, लिंग, कन्या भ्रुण हत्या, आर्थिक निर्भरता
- 2. महिला सशक्तिकरण की आवश्यकता एव प्रसार
- 3. आर्थिक संशक्तिकरण
 - अ. स्वयं सहायता समूहः अर्थ, सिद्धान्त एवं विशेषताएं
 - ब. स्वंय सहायता समूह का गठन, संयोजन एवं साक्ष्यो का रख-रखाव
 - स. उद्यमिता विकास

 - उद्यम
 लघु उद्योग स्थापित करने के चरण
 - 3. संशक्तिकरण विकास की प्रक्रिया
 - 4. उद्यमिता की विशेषताएं
 - 5. उद्यमिता के प्रति भ्रांतियां

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- 1- प्रोजेकटर की देखभाल एवं उपयोग
- ग्रामीण समुदाय एवं आवश्यकता जानने हेतु सर्वेक्षण
 ग्रामीण विकास कार्यक्रम का विकास करना
- 4- विकासशील प्रशिक्षण कार्यक्रम लागू करना
- 5- प्रत्यारोपित कार्यक्रम का मूल्यांकन

Paper-IX FOODS AND NUTRITION - V $(\mathbf{F.N.} - \mathbf{V})$ **Community Nutrition**

M.M.: 50 Time : 3 Hrs.

Unit : I

- 1. The community
 - a. Concept of community
 - b. Concept and scope of community nutrition
- 2. Factors affecting food availability and intake- Agricultural production, population, economic, regional, social, education, distribution, religious and industrialization

Unit : 2

- 1. Food storage
 - a. Methods of storage of food grains
 - b. Agents causing losses of food grains and prevention
 - c. Fumigation of grains
- 2. Food adulteration
 - a. Meaning of food adulteration and food laws
 - b. Common food adulteration and health hazards
 - c. Agencies checking food adulteration

Unit:3

- 1. Nutritional problems of the community causes and incidence of nutritional problems in infancy, per-school children, adolescents, pregnant and lactating mothers and old age
- 2. Nutritional assessment and methods of identification of nutritional problems
 - a. Techniques of dietary surveys, limitations and interpretation of data
 - b. Anthropometric biochemical and clinical techniques, limitation and interpretation

Unit:4

- 1. Nutrition Education
 - a. Meaning of nutrition education and its importance
 - b. Organization of nutrition education programmes for the community, problems encountered in organizing a programme and how to solve them
 - c. Communication methods
 - d. Communication aids
 - e. Evaluation and follow-up

Unit : 5

- 1. Role of various agencies
 - a. National ICMR, ICAR, CSIR, NIN etc.
 - b. International WHO, FAO, UNICEF, CARE, UNESCO etc.
 - c. Voluntary agencies
 - d. 1. Various nutritional; programmers run by the Government, ICDS, applied Nutrition Programme
 2. Food fads and fallacies

REFERENCE BOOKS

Shukla, P.K.: Nutritional Problems of India Gopalan, C: Nutritional problems and programmes in South East Asia Jelliffe: Assessment of Nutritional problems Briggs, G.M. and Clloway, D.H.: Nutrition and Physical Fitness Jelliffe: Assessment of Nutritional status of the community Gopalan, C: Nutrition and health care problem and policies, Nutrition foundation of India Series – I P.A.O Manual of food nutrition policy, 1970 Agarwal, S,N.: Population

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MM**&50** 3 P/W

bdlbZ& 1

- 1. समुदाय
 - अ. समुदाय का प्रत्यय
 - ब. सामुदयिक पोषण का प्रत्यय एवं विषय विस्तार
- खाद्य उपलब्धता एवं ग्रहिता को प्रभावित करने वाले कारक– कृषि उत्पादन, जनसंख्या, आर्थिक, क्षेत्रीय समाजिक, शिक्षा, वितरण, धार्मिक एवं औद्योगिक

bdłbZ& 2

- 1. खाद्यान संग्रहण
 - अ. खाद्यानों के संग्रहण करने की विधियाँ
 - ब. खााद्यानों को नष्ट होने के कारक एवं बचाव
 - स. खाद्यानों का फ्यूमीगेशन
- 2. भोज्य पदार्थं में मिलावट
 - अ. भोजन पदार्थों में मिलावट का अर्थ एवं नियम
 - ब. साधारणः मिलावटी तत्व एव इनका स्वास्थ्य पर प्रभाव
 - स. भोज्य पदार्थों की मिलावट हेतु जॉचने वाली एजेन्सियॉ

bdłbZ& 3

- समुदाय की पोषण सम्बन्धी समस्यायें कारण एवं प्रस्तावित पोषण सम्बन्धी समस्यायें शैशवास्था में, स्कूल से पूर्व बालक में, बच्चों में, युवा वर्ग, गर्भवती, दुध पिलाने वाली महिला एवं वृद्धावस्था में
- 2. पोषण स्तर एवं पोषण सम्बन्धी समस्याओं के जॉचने हेतू विधियॉ—
 - अ. आहारीय सर्वेक्षण की तकनीकें, सीमाएं एवं आकडों का विशलेषण
 - ब. एन्थ्रोपोमेट्रिक जैव रासयनिक एवं लक्षणों को पहचाने की विधियाँ सीमाएँ एवं विशलेषण

bdłbZ& 4

- 1. पोषण सम्बन्धी शिक्षा
 - अ. पोषण शिक्षा का अर्थ एवं इसकी महत्ता
 - ब. पोषण शिक्षा से सम्बन्धित समुदाय के लिये प्रोग्राम बनाना जिसमें उनकी समस्याओं का निदान करने हेतु योजना बनाना
 - स. संचार विधियाँ।
 - द. संचार सम्प्रेक्षण साधन
 - य. प्रोग्राम का मूल्यांकन जारी रखने की प्रक्रिया पर ध्यान देना

bdlbZ& 5

- 1. विभिन्न एजेन्सियों का योगदान
 - अ. राष्ट्रीय स्तर पर ICMR, ICAR, CSIR, NIN आदि
 - ब. अर्न्तराष्ट्रीय स्तर पर WHO, FAO, UNICEF, CARE, UNESCO आदि
 - स. एैच्छिक एजेन्सियॉ
 - द. विभिन्न पोषण सम्बन्धी कार्यक्रम सरकार द्वारा, ICDS, एप्लाईड न्यूट्रीशन प्रोग्राम
- 2. भोजन सम्बन्धी भ्रम एवं भ्रान्तियॉ

B.Sc./B.A. Part I Examination 2020

TEACHING AND EXAMINATION SCHEME

| Subject/Paper | Period/Week | | Exam. Hours | Max Marks | Min.Pass Marks |
|---------------|-------------|---|-------------|-----------|-------------------|
| | L | Р | | | |
| MATHEMATICS | | | | | |
| Paper I | 3 | - | 3 | 75 | |
| Paper II | 3 | - | 3 | 75 | |
| Paper III | 3 | - | 3 | 75 | |

B.Sc./B.A. Part I Examination 2020 Mathematics

PaperI : Algebra and Co-ordinate Geometry of Two Dimensions.PaperII : CalculusPaperIII: Co-ordinate Geometry of three Dimensions and Vector Calculus.

Total Marks: 75

Time: 03:00 Hrs.

Paper I

Algebra and Co-ordinate Geometry of Two Dimensions

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 2 marks.

Section B: Will consist of 10 questions. Each unit will be having two question; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 5 marks.

Section C: Will consist of total 05 questions one from each unit. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 10 marks.

- Unit1: The characteristic equation of a matrix, Eigen values and Eigen vectors, Cayley-Hamilton theorem and its usage in finding the inverse of a matrix. *Rank of Matrix*, Inequalities. Continued fractions.
- Unit 2: Relations between the roots and coefficients of general polynomial equations in one variable, Symmetric functions of roots, Transformation of equations. Descarte's rule of signs. Solution of cubic equations (Cardon's method). Biquadratic equations (Ferrari's Method).
- Unit 3: Infinite series. Convergent series, tests for convergence of a series, comparison test, D'Alembert's Ratio test, Cauchy's root test, Logarithmic Ratio Test. Raabe's test, De Morgen and Bertrand's test, Cauchy's condensation test, Gauss's test. Alternating series, Leibnitz test (Derivation of above tests not required).
- Unit 4 : Polar equation of a conic, polar equations of tangent, normal, asymptotes, chord of contact, auxiliary circle, director circle of a conic and related problems.
- Unit 5 : General equation of second degree. Tracing of conics (Cartesian coordinates).

SUGGESTED BOOKS

M. Ray : A Text Book of Higher Algebra, S.Chand & Co., New Delhi.

J.L. Bansal, S.L. Bhargva, & S.M. Agarwal : Algebra (Hindi Ed.), Jaipur Publishing House, Jaipur.

J.L. Bansal & S.L.Bhargava:2-D Coordinate Geometry (HindiEd)Jaipur Publishing House, Jaipur.

Sharma, C.L. Varshney : Coordinate Geometry, Pragati Prakashan, Meerut.

D.C. Gokhroo, S.R. Saini & J.P.N.Ojha : 2-D Geometry (Hindi Ed.), Navkar Publication, Ajmer.

Paper – II

Calculus

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 2 marks.

Section B: Will consist of 10 questions. Each unit will be having two question; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 5 marks.

Section C: Will consist of total 05 questions one from each unit. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 10 marks.

Total Marks: 75

Time: 03:00 Hrs.

- Unit 1: Polar Co-ordinates. Angle between radius vector and the tangent. Angle between curves in polar form. Length of polar substangent and polar subnormal, Pedal equation of a curve, Derivatives of an arc, curvature, various formulae, Centre of curvature and chord of curvature and related problems.
- Unit2:Partial differentiation, Euler's theorem on homogeneous functions, chain rule of partial differentiation, Maxima and Minima of functions of two independent variables and of three variables connected by a relation, Lagrange's Method of undetermined multipliers.
- Unit 3: Asymptotes, double points, curve tracing, Envelopes and evolutes.
- Unit 4: Theory of Beta and Gamma functions. Rectification. Volume and Surfaces of solids of revolution. Differentiation and integration under the sign of integration.
- Unit 5: Evaluation of double and triple integrals and their applications in finding areas and volumes. Dirichlet's integral. Change of order of integration and changing into polar co-ordinates.

SUGGESTED BOOKS

Gorakh Prasad: A Text Book of Differential Calculus; Pothishala Pvt..Ltd.Allahabad. J.L.Bansal, S.L.Bhargava and S.M.Agarwal : A Text Book of Differential Calculus II (Hindi Ed.) and Integral Calculus, Vol. II (Hindi Ed.); Jaipur Publishing House, Jaipur. D.C. Gokharoo & S.R. Saini : Differential Calculus (Hindi Ed.); Navkar Prakashan, Ajmer. O.P.Tandon, and Sharma, K.C. : Integral Calculus; Jaipur Publishing House, Jaipur. Gupta, Juneja and Tandon : Differential Calculus (English Ed.);Ramesh Book Depot, Jaipur.

Gorakh Prasad : Integral Calculus; Pothishala Pvt.Ltd.Allahabad.

Paper – III

Co-ordinate Geometry of 3-Dimensions and Vector Calculus.

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 2 marks.

Section B: Will consist of 10 questions. Each unit will be having two question; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 5 marks.

Section C: Will consist of total 05 questions one from each unit. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 10 marks.

Total Marks: 75

Time: 03:00 Hrs.

Unit 1 : Sphere, Cone and Cylinder (Rectangular Coordinates only)

Unit 2 : The Central Conicoids (referred to principal axes). Tangents and tangent planes, Polar planes and polar lines, Section with a given centre, Enveloping cone, Enveloping cylinder and related problems.

Unit 3 : Equations of the normal to an ellipsoid, number of normals from a given point to an ellipsoid, Cone through six normals, Conjugate diameter and diametral planes and their properties. Cone as a Central surface. Paraboloids.

Unit 4 : Plane Sections of Conicoids, Umbilics, Generating lines of hyperboloid of one sheet and its properties.

Unit 5 : Vector Calculus : Curl, Gradient and Divergence & Identities involving these operators. Theorems of Stoke, Green and Gauss (Statement, application and verification only).

SUGGESTED BOOKS

Gupta, Juneja : Vector Analysis; Ramesh Book Depot, Jaipur.

D.C. Gokhroo, S.R. Saini, S.S.Bhati : Vector Calculus (Hindi Ed.); Navkar Prakashan, Ajmer. S.L.Bhargava, Banwari Lal : Vector Calculus (Hindi Ed.); Jaipur Publishing House, Jaipur. R.J.T.Bell,: Coordinate Geometry of Three dimensions;Macmillan India Ltd., New Delhi. Vasistha, Agarwal : Analytical Solid Geometry; Pragati Prakashn, Meerut. Gokhroo, Saini & Rathi : Analytical 3-D Geometry (HindiEd);Jaipur Pub. House, Jaipur. J.L.Bansal, S.L. Bhargva & S.M. Agarwal : 3-D Coordinate Geometry II; Jaipur Pub. House, Jaipur.

B.Sc./B.A. Part II Examination 2021

TEACHING AND EXAMINATIION SCHEME

| Subject/Paper | Period/Week | | Exam. Hours | Max Marks | Min.Pass Marks | |
|---------------|-------------|---|----------------|-----------|-------------------|--|
| | L | Р | | | | |
| MATHEMATICS | | | | | _ | |
| Paper I | 3 | - | 3 | 75 | | |
| Paper II | 3 | - | 3 | 75 | 81 | |
| Paper III | 3 | - | 3 | 75 | | |

B.Sc./B.A. Part II Examination – 2021 MATHEMATICS

 Paper
 I
 : Numerical Analysis and Linear Programming.

 Paper
 II
 : Differential Equations.

 Paper
 III
 : Mechanics I (Statics and Dynamics of particle)

Total Marks: 75

Time: 03:00 Hrs.

Paper I Numerical Analysis and Linear Programming

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 2 marks.

Section B: Will consist of 10 questions. Each unit will be having two question; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 5 marks.

Section C: Will consist of total 05 questions one from each unit. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 10 marks.

Unit 1: Difference operators and factorial notation, Differences of polynomial, Newton's formulae for forward and backward interpolations. Divided differences, relation between divided differences and Simple difference. Newton's general interpolation formulae, Lagrange interpolation formula.

Unit 2: Central differences, Gauss, Stirling and Bessel interpolation formulae. Numerical Differentiation. Numerical integration, Trapezoidal, Simpson's and Weddle's rules.

Unit 3: Solution of linear difference equations with constant and variable coefficients. Solution of Algebraic and Transcendental equations, Iterative, Regula Falsi and Newton Raphson methods.

Unit 4: Convex sets and their properties. The simplex technique and its application to simple L.P. problems. The Big M-Method.

Unit 5: Two Phase Method, Revised Simplex Method. Concepts of daulity in linear programming. Framing of dual programming. Elementary theorems of daulity. Integer Programming Problem (IPP).

SUGGESTED BOOKS

D.C. Gokhroo & S.R. Saini : Linear Programming (Hindi Ed.), Navkar Prakashan, Ajmer.
Mittal, Sethi : Linear Programming, Pragati Prakashan, Meerut
Goyal, Mittal : Numerical Analysis, Prograti Prakashan, Meerut
J.L.Bansal,S.L. Bhargava & S.M. Agarwal : Numerical Analysis (Hindi Ed.); Jaipur
Publishing House, Jaipur
H.C. Saxena : Numerical Analysis; S.Chand & Co., New Delhi
D.C. Gokhroo : Numerical Analysis (Hindi Ed.);Navkar Prakashan, Ajmer
S.L. Bhargava, K.C. Sharma & S.S. Bhati : Linear programming (Hindi Ed.); Jaipur
Publishing House, Jaipur

Total Marks: 75

Time: 03:00 Hrs.

Paper II

Differential Equations

Note: Each theory paper is divided in three parts i.e. Section -A, Section -B and Section -C

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 2 marks.

Section B: Will consist of 10 questions. Each unit will be having two question; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 5 marks.

Section C: Will consist of total 05 questions one from each unit. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 10 marks.

Unit 1: Exact and reducible to exact differential equations of first order and first degree. First order higher degree differential equations solvable for x,y,p. Clairaut's form and singular solutions.

Unit 2: Linear differential equations with constant coefficients, Homogeneous linear differential equations with variable coefficients. Simultaneous differential equations, Total differential equations of the form Pdx + Qdy + Rdz = 0, by method of inspection and method for homogeneous equations.

Unit 3: Linear differential equations of second order of the form $\frac{d^2 y}{dx^2} + P \frac{dy}{dx} + Qy = R.$

Exact Linear differential equations of nth order. Exact Non-Linear differential equations.

Differential equations of the various forms e.g., (i) $\frac{d^2 y}{dx^2} = f(y)$ (ii) Equations not

containing y directly (iii) Equations not containing x directly and other forms. Method of variation of parameters to the solution of second order linear differential equations.

Unit 4: Series solutions of Second Order Linear differential equations, Power series method, Bessel and Legendre equations. Partial differential equations of the first order. Lagrange's solution. Some special types of equations which can be solved easily by methods other than the general method. Charpit (general) method of solution.

Unit 5: Partial differential equations of second and higher order. Classification of linear partial differential equations of second order. Homogeneous and non-homogeneous equations with constant coefficients. Partial differential equations reducible to equations with constant coefficients. Monge's method of integrating Rr + Ss + Tt = V.

SUGGESTED BOOKS

Sharma, Gupta : Differential Equations; Krishna Prakashan, Meerut Ray, Chaturvedi : Differential equations; Kedar Nath, Ram Nath & co., Agra. J.L.Bansal, H.S.Dhami : Differential equations (Vol. II); Jaipur Publishing House, Jaipur D.C.Gokhroo, S.R. Saini & R.K.Kumbhat : Differential equations (Hindi Ed.); Navkar Prakashan, Ajmer

Gokhroo, Saini, Oza : Partial differential equations; Jaipur Publishing House, Jaipur.

Total Marks: 75

Time: 03:00 Hrs.

Paper III Mechanics – I

(Statics and Dynamics of a Particle)

Note: Each theory paper is divided in three parts i.e. Section -A, Section -B and Section -C

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 2 marks.

Section B: Will consist of 10 questions. Each unit will be having two question; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 5 marks.

Section C: Will consist of total 05 questions one from each unit. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 10 marks.

Unit 1: Resultant and equilibrium of coplanar forces acting on a rigid body. Friction.

Unit 2: Stable and Unstable equilibrium. Forces in three dimensions, Poinsot's central axis, Wrenches.

Unit 3: Virtual work and common catenary.

Unit 4: Velocities and accelerations along radial and transverse directions and along tangential and normal directions. Simple harmonic motion and motion under inverse square law.

Unit 5: Motion on smooth and rough plane curves, circular and cycloidal motions. Central forces and central orbits (excluding planetary motion).

SUGGESTED BOOKS

S.L. Ioney : Statics

R.S. Verma : A Text Book on Statics; S. Chand & Co., New Delhi.

S.L. Loney : Dynamics of a particle & Rigid bodies.

M.Ray : A Text book on Dynamics; S. Chand & Co., New Delhi

D.C.Gokhroo, S.R. Saini & G.R.Yadav : Higher Dynamics II (Hindi Ed.); Navkar Prakashan, Ajmer

S.L. Bhargava & S.M.Agarwal : Dynamics (Hindi Ed.); Jaipur Publishing House, Jaipur

S.L. Bhargava, S.M.Agarwal & V.G. Gupta : Statics (Hindi Ed.); Jaipur Publishing House, Jaipur

Gokhroo : Statics (Hindi Ed.); Navkar Prakashan, Ajmer.

B.Sc./B.A. Part III Examination 2022

| Subject/Paper | Period/Week | | Exam. Hours | Max Marks | Min.Pass Marks | |
|---------------|-------------|---|-------------|-----------|-------------------|--|
| | L | Р | | | | |
| MATHEMATICS | | | | | | |
| Paper I | 3 | - | 3 | 75 | | |
| Paper II | 3 | - | 3 | 75 | 81 | |
| Paper III | 3 | - | 3 | 75 | | |

TEACHING AND EXAMINATIION SCHEME

B.Sc./B.A. Part III Examination 2022 MATHEMATICS

Paper I: Abstract AlgebraPaper II: Analysis and Laplace TransformsPaper III: Mechanics II (Dynamics of Rigid Bodies and Hydrostatics)

Total Marks: 75

Time: 03:00 Hrs.

Paper I Abstract Algebra

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 2 marks.

Section B: Will consist of 10 questions. Each unit will be having two question; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 5 marks.

Section C: Will consist of total 05 questions one from each unit. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 10 marks.

Unit 1: Definition and example of groups. General properties of groups, Order of an element of a group. Permutations : Even and Odd permutations. Groups of permutations. Cyclic group, Isomorphism, Isomorphism of cyclic groups, Cayley's theorem.

Unit 2: Subgroups, Cosets, Lagrange's theorem, Product Theorem of subgroups, Conjugate elements, conjugate complexes, Centre of a group, Normaliser of an element and of a complex. Normal subgroups, quotient Groups, Commutator subgroup of a group. Homomorphism, Fundamental theorem of homomorphism.

Unit 3: Definition and kinds of rings, Integral domain, Division ring, Field, Subring of a ring, Subfield of a field. Characteristic of a ring and field.

Unit 4: Ideals of a ring, Quotient rings, Prime fields, Prime ideals, Field of quotients of an integral domain, Definition and examples of a vector space, subspace of a vector space, Linear combination and linear space, Linear dependence and independence of vectors. Direct product of vector spaces and internal direct sums of subspaces.

Unit 5: Bases and dimension of a finitely generated spaces, Quotient space, Isomorphism, Linear transformation (Homomorphism), Rank and nullity of linear transformation.

SUGGESTED BOOKS

G.C. Sharma: Modern Algebra; Ram Prasad & Sons, Agra.
J.L. Bansal & S.L. Bhargava : Abstract Algebra (Hindi Ed.); Jaipur Publishing House, Jaipur.
R.S. Agarwal. : Text Book on Modern Algebra; S. Chand & Co., New Delhi.
D.C. Gokhroo & S.R.Saini : Abstract Algebra (Hindi Ed.); Jaipur Publishing House, Jaipur.

Total Marks: 75

Time: 03:00 Hrs.

Paper – II

Analysis and Laplace Transforms

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 2 marks.

Section B: Will consist of 10 questions. Each unit will be having two question; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 5 marks.

Section C: Will consist of total 05 questions one from each unit. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 10 marks.

Unit 1 : Dedekinds theory of real numbers. Linear sets. Upper and Lower bounds, Limiting points, Weierstrass's theorem. Derived sets, Enumerable Sets, Open and Closed sets.

Unit 2 : Theory of Riemann integration, Darboux theorem. Fundamental theorem of integral calculus, Mean value theorem of integral calculus.

Unit 3 : Functions, Limits, and continuity. Differentiability, Concept of an analytic function, Cartesian and Polar form of Cauchy-Riemann equations. Harmonic function, Conjugate function, Laplace's differential equations, Orthogonal system, Construction of analytic functions. Power Series: Absolute convergence of power series, circle and radius of convergence of power series, sum function of a power series.

Unit 4: Basic definition and Properties of complex integration Complex integration as the sum of two line integrals, Inequality for complex integrals. Curves in complex plane, Cauchy-Goursat theorem, Connected regions, Indefinite integral (or Anti Derivative). Derivative of Single-valued functions F(z). Cauchy's integral formula, Extension of Cauchy's integral formula to multiconnected, regions, Cauchy's integral formula for the derivative of an analytic function, Successive derivative of an analytic function, Morera's Theorem. Liouville's Theorem, Poisson's integral formula.

Unit 5: Laplace Transforms and Inverse Laplace Transforms. Laplace transforms of derivatives and integrals. Shifting theorems. Convolution theorem. Applications of Laplace Transform to the solution of differential equations.

SUGGESTED BOOKS

Shanti Narayan: Real Analysis; S.Chand & Co., New Delhi.

G.N.Purohit: Real Analysis; Jaipur Publishing House, Jaipur.

S.L. Bhargava, S.P. Goyal: Real Analysis (Hindi Ed.); Jaipur Publishing House, Jaipur.

D.C. Gokhroo, S.R. Saini, J.P.N. Ojha: Real Analysis (Hindi Ed.); Jaipur Publishing House, Jaipur.

Shanti Narayan: Theory of Functions of a Complex Variable; S.Chand & Co., New Delhi. K.P.Gupta : Complex Analysis; Pragati Prakashan; Meerut

D.C. Gokhroo, S.R. Saini & G.R. Yadav: Complex Analysis (Hindi Ed.); Navkar Publication, Ajmer

G.N. Purohit: Complex Analysis; Jaipur Publishing House, Jaipur.

S. Ponnusamy: Foundations of Complex Analysis, Narosa Publishing House, Bombay, New Delhi.

V. Karunakaran: Complex Analysis, Narosa Publishing House. Bombay, New

Delhi (2002). N.Levinson and R.M. Redheffer: Complex Variables, Tata McGraw-Hill Publ. Co. Ltd., New Delhi (1980). Total Marks: 75 Tim

Time: 03:00 Hrs.

Paper III

Mechanics – II

(Dynamics of Rigid Bodies and Hydrostatics)

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 2 marks.

Section B: Will consist of 10 questions. Each unit will be having two question; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 5 marks.

Section C: Will consist of total 05 questions one from each unit. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 10 marks.

Unit 1: Moments and Products of inertia. D'Alembert's principle, the general equations of motion of a rigid body, Motion of the center of inertia and motion relative to the center of inertia. Motion about a fixed axis under finite forces.

Unit 2: The compound Pendulum. Reaction of the Axis of rotation. Motion of a rigid body in two dimension under finite forces.

Unit 3: Fluids and Fluid Pressure, homogeneous and heterogeneous fluids, Surface of equal pressure, fluid at rest under action of gravity, Fluid pressure on Plane surfaces.

Unit 4: Centre of pressure, resultant pressure on curved surfaces.

Unit 5: Equilibrium of floating bodies, Centre of buoyancy, Surface of buoyancy. Stability of equilibrium of floating bodies, Meta Centre.

SUGGESTED BOOKS

S.L. Loney : Rigid Body Dynamics; Cambridge Univ. Press.

P.P.Gupta : Rigid Body Dynamics, Vol.I; Krishna Prakashan, Mandir; Meerut

J.L.Bansal: Rigid Body Dynamics; Jaipur Publishing House, Jaipur.

B.N.Prasad: Hydrostatics; Krishna Prakashan, Mandir; Meerut

S.M. Mathur : A Text Book of Hydrostatics; Ramesh Book Depot, jaipur.

Sharma, D.C. Gokhroo, S.R. Saini, S.M.Agarwal.: Elements of Hydrostatics; Jaipur Publishing House, Jaipur.

TEACHING & EXAMINATION SCHEME For the Examination – 2020 **PHYSICS**

B.Sc. Part – I

THEORY

| | | | Total : | | 225 |
|---------|-----------|------------------|----------|-------|-------|
| PRACTIC | AL | | 6 | 6 5 | |
| Phy.103 | Paper III | Electromagnetics | 2 | 3 | 50 |
| Phy.102 | Paper II | Optics | 2 | 3 | 50 |
| Phy.101 | Paper I | Mechanics | 2 | 3 | 50 |
| | | | | | 150 |
| | | | (45mts.) | Hours | Marks |
| | | | Pd/W | Exam. | Max. |

B. Sc. Part I

Paper I: Mechanics

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

Unit-1

Frames of Reference: Inertial frames, Galilean transformations, Noninertial frames, fictitious forces, Displacement, Velocity and acceleration in rotating coordinate systems and their transformations, Coriolis force, Focault's pendulum, Motion relative to earth. Centre of Mass, collision of particles in laboratory and C.M. frame.

UNIT-2

Special Theory of Relativity: Invariance of c, Michelson-Morley Experiment, Lorentz transformations, addition of velocities, time dilation and length contraction, conservation of momentum in collision at relativistic speeds and variation of mass with velocity, relativistic energy, mass-energy equivalence, work and energy, transformation equations for momentum, energy and rate of change of momentum.

UNIT-3

Oscillations: Qualitative idea of oscillations in an arbitrary potential well, General differential equation for the harmonic motion, mass on a spring, oscillation of two masses connected by a spring, reduced mass, coupled oscillations, normal modes, normal coordinates of two linear coupled oscillators, damped harmonic motion, Forced oscillations and resonances, Resonance width and quality factor.

UNIT-4

Waves: General differential equation of one dimensional wave motion and its solution, plane progressive harmonic wave, differential calculus methods for speed of transverse waves on a uniform string and for that of longitudinal waves in a fluid, energy density and energy transmission in waves, superposition of waves, group and phase velocity.

Fourier series, Fourier analysis of square and saw-tooth waves.

Acoustics: Acoustic impedance of a medium, principle of a Sonar system

UNIT-5

Rigid Body Dynamics: Equation of motion of a rotating body, angular momentum of a rigid body, inertial coefficient and idea of principal axes, case of *j* not parallel to ω , kinetic energy of rotation.

Elasticity : Young modulus, Bulk modulus and modulus of rigidity, Poisson ratio, relation between elastic constants, Theory of bending of a beam and torsion of a cylinder, experimental determination of Y by loading a beam in the middle and of η by static and dynamic methods, Searle's two bar experiment.

Books suggested:

Berkeley: Physics Course, Vol. I, Mechanics, Tata McGraw Hill, New Delhi.

Berkeley: Physics Course, Vol. III, Waves and Oscillations, McGraw Hill, New Delhi.

A. P. French: Physics of Vibration and Waves.

Alonso and Finn: Fundamental University Physics, Vol. I, Mechanics.

R. S. Gambhir: Mechanics, CBS Publishers.

J.C. Upadhyaya: Mechanics, Ram Prasad & Sons, Agra.

PAPER II: OPTICS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

UNIT-1

Geometrical Optics: Axial, Lateral and angular magnifications and their inter-relationship, Abbe's Sine condition for spherical surfaces, Aplanatic points for a spherical refracting surface.

Focal length of two thin lenses separated by a distance, Cardinal points of a co-axial lens system, properties of cardinal points, construction of image using cardinal points, Newton's formula and other relations for a lens system using cardinal points, Ramsden's and Huygen's eye pieces, their cardinal points, and relative merits.

Spherical Aberration in lenses and methods to minimize it.

Chromatic Aberration in lenses, Achromatism for two thin lenses in contact and separated by a distance.

UNIT-2

Interference: Division of Amplitude-Interference exhibited by thin film, Production of colours in thin films, Wedge-shaped film, Newton's rings and determination of wavelength and refractive index of a liquid by Newton's rings.

Michelson Interferometer: Measurement of wavelength and difference between two close wavelengths.

Fabry-Perot interferometer: Intensity Distribution, Co-efficient of sharpness and half width, measurement of wavelength.

UNIT-3

Lasers: Population inversion, laser as source of coherent radiation, Basic principles of He-Ne Laser and Ruby Laser.

Diffraction: Fresnel's class of diffractions, Zone Plate, Phase reversal Plate, Cylindrical wave front and its effect at an external point and geometrical construction, diffraction at a straight edge; thin wire, rectangular slit and circular aperture.

Unit-4

Fraunhofer class of diffraction: Amplitude and phase due to a number of SH Motions acting on a particle simultaneously, Diffraction at two slits and intensity distribution, Diffraction at N slits.

Plane Transmission Grating: Theory and formation of spectra, width of principal maxima, absent spectra, overlapping of spectral lines, number of spectra, measurement of wave-length of light, Rayleigh's criterion, Resolving Power of a Prism, Telescope, Microscope and plane transmission grating.

UNIT-5

Polarization: Double refraction, production of plane polarized light by double refraction, Nicol Prism, Double refraction in uniaxial crystals, Huygen's explanation of Double Refraction, Plane, circular and elliptically polarized light, Half-wave and quarter-wave plates, production and detection of plane, circularly and elliptically polarized light by Nicol Prism and Quarter-wave plate.

Rotatory Polarization, Fresnel's explanation, specific rotation, half shade and Biquartz Polarimeter, determination of specific rotation and strength of sugar solution.

Books suggested:

Jenkins and White: Optics, McGraw Hill.

Ghatak A.K.: Optics, Tata McGraw Hill.

Khandelwal D.P.: Optics and Atomic Physics, Shivlal Agarwal & Co.

Subramanayam and Brijlal: A text book of Optics, S. Chand, New Delhi.

PAPER III: ELECTROMAGNETICS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

UNIT-1

Vector Analysis: Scalar and Vector fields, partial differentiation of vector, gradient of a scalar field, line and surface integral of vector field, flux of a vector field, divergence of vector field and its physical significance, curl of vector field and its physical significance. Gauss law in integral and differential form, Gauss divergence theorem, Stokes theorem and Green's theorem, Laplace equation in Cartesian, cylindrical and spherical polar coordinates (without derivation).

Unit II:

Electrostatics: Potential and field due to a quadrupole and an arbitrary charge distribution, concept of multipoles, Electrostatic energy of a uniformly charged sphere. Classical radius of an electron.

Conductors in an electric field, uniqueness theorem, method of electric images and its application for system of point charge near a grounded conducting plane, Poisson's and Laplace equation in Cartesian coordinate Solution of Laplace equation in Cartesian coordinates, potential at a point inside a rectangular box.

Unit III:

Electric field in matter : Atomic and molecular dipoles, polarizability, permanent dipole moment, Dielectrics, boundary condition for electrostatic field at dielectric surface, polarization Vector, electric displacement vector, electrostatic energy of a charge distribution in dielectrics. Lorentz local field and Clausius-Mossotti equation.

Magnetic field in matter : Magnetization Vector, uniform magnetization and surface current, non-uniform magnetization, B,M,H Vectors and their inter-relations, Bohr magneton, orbital magnetic moment and angular momentum, Gyromagnetic ratio, Magnetic Susceptibility.

Unit IV:

Electromagnetic Induction, Faraday's laws of Electromagnetic induction, integral and differential form, Relation between self and mutual inductance, measurement of self-inductance by (a) Rayleigh method (b) Anderson Bridg, Energy stored in magnetic field.

Transient response: Charge and discharge of condenser through resistance, determination of high resistance by method of leakage, growth and decay of current in LR circuit; significance of operator j and its uses in A.C. circuits. series and parallel LCR circuit, phasor diagram, Resonance and Quality factor, Sharpness of resonance.

Unit V:

Charge particle in electromagnetic field: equation of motion for charged particle, moving charge in electric field, in uniform magnetic field, charged particles in parallel electric and magnetic field, charged particles in cross electric and magnetic field.

Principle construction and working of ballistic galvanometer, determination of constant of ballistic galvanometer using steady deflection method, determination of mutual inductance using B.G., determination of magnetic field using search coil and B.G.

Books suggested:

Berkeley: Physics Course, Vol. II: Electricity and Magnetism, Tata McGraw Hill.

Laud, B.B.: Electro-magnetics, Wiley Eastern.

Ahmed and Lal: Electricity, Magnetism and Electronics.

D.C. Tayal: Electricity and Magnetism, Himalaya Publishing House

A.S. Mahajan A.A. Rangwala: Electricity and Magnetism, Tata McGraw Hill.

Griffiths: Introduction to Electrodynamics, PHI.

Experiments for Practical Work

- 1. Study of bending of a beam and determination of Young's modulus.
- 2. Modulus of rigidity by statical method using horizontal apparatus.
- 3. Modulus of rigidity by statical method using vertical apparatus.
- 4. Modulus of rigidity by dynamical method using Hollow Maxwell needle.
- 5. Modulus of rigidity by dynamical method using Solid Maxwell needle.
- 6. Elastic constants by Searle's method.
- 7. Determination of focal length of combination of two lenses separated by finite distance using Nodal slide assembly and also locate the cardinal points.
- 8. Formation of spectrum, prism spectrometer and determination of dispersive power of the material of a prism.
- 9. Determination of wavelength of monochromatic light (Sodium/ Laser) by Newton's rings.
- 10. Determination of wavelength of light by plane transmission grating.
- 11. Specific rotation by polarimeter.
- 12. Low resistance by Carey Foster Bridge.
- 13. Variation of magnetic field along the axis of circular Coil.
- 14. Study of rise and decay in CR Circuit.
- 15. Study of electro-magnetic induction and verification of Faraday's Laws.
- 16. Determine the thermodynamic constant $\gamma = C_p / C_v$ using Clement and Desormes method.
- 17. Verification of Rutherford and Soddy's law of radioactive disintegration using dices and statistical Board.
- 18. Determination of surface tension of water by Jagger's method.
- 19. To determine the polarizing angle for the glass prism surface and to determine the refractive index of material of prism using Brewster's law.
- 20. Wavelength of light by biprism.
- 21. Resolving power of telescope.
- 22. Resolving power of a plane transmission grating.
- 23. To determine the Poisson's ratio of a rubber tube.

Note: - New experiments may be added on availability of equipments.

TEACHING & EXAMINATION SCHEME For the Examination – 2020 PHYSICS

B.Sc. Part II

| | | Diociruitii | | | |
|-----------|-----------|---|------------------|----------------|----------------------|
| THEORY | | | Pd/W (45mts.) | Exam. Hours | Max. Marks 150 |
| Phy.201 | Paper I | Statistical and Thermal Physics | 2 | 3 | 50 |
| Phy.202 | Paper II | Quantum Mechanics and Spectroscopy | 2 | 3 | 50 |
| Phy.203 | Paper III | (A) Electronics (Except for those who opt Electronics as a subject) Or | | | |
| | Paper III | (B) Computer Systems and Networking (For the students who have offered Electronics as an Optional subject) | 2 | 3 | 50 |
| PRACTICAL | | , j, | 6 | 5 | 75 |
| | | Total | | | 225 |

B. SC. PART-II

PAPER I: STATISTICAL AND THERMAL PHYSICS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.
Unit-1:

Statistical Method: Particle States, distribution of particles in two particle states, Probability of a given distribution, distribution corresponding to maximum probability, relative probability curve with increasing number of particles, binomial distribution, Standard deviation, micro-states and macro-states of a system, principle of equal 'a priori' probabilities, equilibrium state, fluctuations, reversibility and irreversibility, States of a particle inside a box, number of accessible states between an infinitesimally small energy interval, momentum interval, phase space, statistical weight of a configuration of a macro-state, indistinguishable and distinguishable particles, entropy and principle of increase of entropy, statistical ensemble, time and ensemble averages; Thermal interaction between two systems, zeroth law of thermodynamics, concept of temperature.

UNIT-2:

Canonical ensemble, Boltzmann canonical distribution, partition function, a two state system, paramagnetic susceptibility, heat capacity, Boltzmann formula for entropy, average energy and fluctuations, free energy, adiabatic interaction, enthalpy, general interaction, Gibbs free energy, first law of thermodynamics, phase transitions, Clausius-Clapeyron equation.

Ideal Classical Gas, Maxwell velocity and speed distributions, partition function, entropy (Sackur-Tetrode relation), Gibbs paradox; equation of state, ideal gas temperature scale, Vander-Waal's equation of state; heat capacities of monatomic and diatomic gases, ortho and para hydrogen.

UNIT-3:

Systems with variable Energy and Particle Number: Chemical potentials, grand canonical distribution, Partition function, number fluctuations, grand potential, equation of state of an ideal classical gas, Saha's ionization formula, Maxwell-Boltzmann, Fermi-Dirac and Bose-Einstein Statistics, Fermi gas at OK temperature; thermionic emission, strongly degenerate boson gas; Bose-Einstein Condensation, liquid helium.

UNIT-4:

Macroscopic Thermodynamics: Second law of thermodynamics; Carnot cycle, Carnot theorem, thermodynamic temperature scale and its identity with perfect gas temperature scale, entropy change in isothermal, and adiabatic expansions of an ideal gas; Thermodynamic potentials, Maxwell's equations C_p - C_v , C_p/C_v , Black body radiation, energy density and pressure, Stefan-Boltzmann law, Wien's displacement law, Planck's law.

UNIT-5:

Temperature changes in Joule and Joule-Thomson expansions, Regenerative cooling, adiabatic demagnetization and production of low temperatures, third law of thermodynamics, negative temperatures.

Transport Phenomena: Mean free path, collision cross-sections, mean free time, viscosity, thermal conductivity and self-diffusion.

Books suggested:

- 1. Reif: Statistical Physics, Berkeley, Vol. 5, McGraw Hill.
- 2. Mandl : Statistical Physics, ELBS and Wiley.
- 3. Reif : Fundamentals of Statistical and Thermal Physics, McGraw Hill.
- 4. C. Kittel and H. Kroemer : Thermal Physics, CSS.
- 5. W.G.V. Rosser: An Introduction to Statistical Physics, Elis Horwood.
- 6. Lokanathan and Gambhir: Statistical and Thermal Physics, Prentice Hall.

PAPER II: QUANTUM MECHANICS AND SPECTROSCOPY

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

UNIT-1:

Development of quantum theory: Blackbody radiation and their characteristics, failure of classical physics to explain spectral distribution of blackbody radiation, Planck's quantum Hypothesis, Average energy of Planck oscillator, Planck's radiation formula, Wien's law, Rayleigh-Jean's Law, Stefan-Boltzmann's Law; Failure of classical physics to explain photo-electric effect and Compton effect, photons as carrier of energy and momentum of electro-magnetic waves.

UNIT-2:

Wave Mechanics and Schrödinger equation: Phase velocity and group velocity of waves, wave particle duality; De Broglie Hypothesis; De Broglie group and phase velocity, wave packet, Heisenberg uncertainty principle, Statement and its equation from wave-packet in space and time; Application of uncertainty principle such as (i) Non-existence of electron in nucleus, (ii) Ground state of H-atom, (iii) Natural line width of spectral lines, X-ray microscope, Particles passing through (a) single slit and (b) double slit and observed on screen behind, explanation of distribution in terms of probability amplitude and interference of probability amplitude.

Postulates of Quantum Mechanics: Wave functions, Schrödinger superposition principle, operators in Quantum mechanics, Hermitian operators, expectation values, Interpretation of wavefunction, symmetric and anti-symmetric wave functions, concept of parity; Probability density, Schrödinger equation, Schrödinger equation for free particle; Arguments in favour of this equation.

UNIT-3:

Application of Schrödinger equation: Schrödinger equation for particle moving in potential field, Time dependent and time independent Schrödinger equation, Stationary states, Orthogonality of wave functions, Probability current density, Ehrenfest Theorem, Simple solution of Schrodinger equation (Restricted to one dimensional case), Particle in one dimensional infinite well, Particle in one dimensional finite well (one or both sides of well may be non-rigid), Calculation of reflection and transmission coefficient for potential step and potential barrier.

UNIT-4:

Atomic Spectroscopy: Orbital angular momentum, electron spin and Stern Gerlac experiment, Total angular momentum, Spinorbit interaction, Vector model of atom and quantum numbers associated with atom, L-S coupling and j-j coupling, Statement of Hund's Rule and Lande Interval Rule (without derivation), Fine structure of spectral lines, spectral terms up to two valence electron system, Pauli's exclusion principle.

UNIT-5:

Atom in magnetic field: Magnetic moment of atom, contribution from orbital and spin angular momentum, gyro-magnetic ratio; Interaction energy of atom in magnetic field, splitting of energy levels, using good quantum numbers in Normal Zeeman effect, Anomalous Zeeman effect and Paschen-Back effect, Selection rules for dipole transitions.

Molecular spectroscopy: qualitative features of molecular spectra, rigid rotator, rotational and vibrational energy levels of diatomic molecules, rotational-vibrational spectra.

Books suggested:

- 1. Semat: Atomic Physics
- 2. Alonso and Finn: Fundamental University Physics, Vol. III.
- 3. Beiser: Concepts in Modern Physcis
- 4. Waghmare: Quantum Mechanics
- 5. Wehr, Richards, Adair: Physics of the Atom, Narosa.

PAPER III (A): ELECTRONICS

(Except for those students who opt Electronics as a subject)

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

Unit-1:

Intrinsic and extrinsic semi-conductors, Fermi levels, mass-action law; carrier injection, recombination, diffusion and diffusion length, drift and diffusion currents, continuity equation; p-n junction, potential barrier, biasing, current-voltage relation, space charge and diffusion capacitances; varactor diode; Zener diode; tunnel diode; photovoltaic effect, solar cell.

Power supplies: Full wave and half wave rectifiers; ripple factor, voltage regulation; filters; Zener regulation.

UNIT-2:

Network theorems – Thevenin, Norton, Maximum power transfer and Miller theorems.

Dipolar junction transistors, Ebers-Moll equations; CB, CE and CC configurations, BJT characteristics; biasing and thermal stabilization, self bias; hybrid parameters of a two port network; small signal hybrid equivalent model of a BJT at low frequencies, current, voltage and power gains; input and output impedances; high frequency hybrid pi model, short circuit current gain, f_{β} and f_{α} ; current gain with resistive load.

UNIT-3:

Field effect transistors, JFET, MOSEET, construction and characteristics; FETs as voltage Controlled Devices, small signal model.

Large signal amplifiers, class A, B and C operations and efficiencies; distortions; determination of second harmonic distortion; push-pull amplifiers; impedance matching.

UNIT-4:

Negative Feedback: Current and voltage negative feedbacks; effect on stability, input and output impedances, distortion, frequency response; emitter follower.

Oscillators: Positive feedback, Barkhausen criterion; RC phaseshift oscillator; Hartley and Colpitts oscillators, UJT and sweep generators using UJT; Transistor as a switch and Astable multivibrator.

UNIT-5:

Operational amplifiers, inverting and non-inverting; differential amplifiers, CMRR; measurement of OP AMP parameters; use of OP AMPs as adder, in analog integration and differentiation. Digital circuits: Laws of Boolean algebra and De-Morgan's theorem, realization of Boolean Expression using logic gates

Books suggested:

- 1. J. Millman and CC Halkias: Integrated Electronics: Analog and Digital Circuits and Systems, Tata McGraw Hill.
- 2. Mottertshead: Electronic Devices and Circuits An Introduction, Prentice Hall India.
- 3. Bhargava, Kurukshetra & Gupta , "Basic Electronics and Linear Circuits", Tata McGraw-Hill Publishing LTD.
- 4. V.K. Mehta, "Principles of Electronics", S. Chand and Company LTD.

PAPER III (B): COMPUTER SYSTEMS AND NETWORKING

(For the students who have offered Electronics as an Optional subject)

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

Unit-1

Introduction to computers: Development of computers with electronic devices, brief history of computers, computer generations, IC technology, LSI and VLSI, classification of computer applications of computers, basic computers, organization, basic processor architecture, types of processors, memory, primary memory, cache, RAM and ROM, secondary memory, HDD, CD drive, Pen drive, Power supply, input and output devices, keyboard, pointing device, optical devices, monitor, projector, printers, plotter (only definitions and functions of the devices).

UNIT-2

System software: Operating system, need of OS, functions of OS, different types of OS, batch processing OS, multi programming OS, single user OS and multi user OS, time sharing OS, OS for Personal Computer, DOS, Windows OS, features of Windows OS, Unix OS, Open source OS Linux. Low level languages: machine language, Assembly language, assembler, high level languages, features of high level languages, interpreters and compilers.

UNIT-3

Application software: Program development in high level languages, algorithm and flow chart, execution of user application programs. Software packages: MS Office package, word processing, MS Word, preparing and printing documents in MS Word, MS Excel; using formulas and functions, plotting graphs, Power point presentation. Computer graphics, graphic software packages, Origin software package, plotting graphs in Origin.

UNIT-4

Basic Network Functions: Overview, evolution of computer networks, elements of LAN and WAN, Network architecture, ISO-OSI architecture, hardware elements: modems, multiplexers, concentrators, transmission media, twisted pair, coaxial cable, optical fibre, LAN topologies: bus, ring and star.

UNIT-5

Network interconnection issues: Internetworking bridges, routers, communication methods, store and forward techniques, circuit switching, packet switching, introduction to TCP/IP protocol family, issues related to network reliability and security.

Books suggested:

A. Mottershed: Electronic Devices and Circuits, PHI.

V. Rajaraman: Fundamentals of Computers, PHI.

Martin, J.: Networks and Distributed Processing, PHI.

R. Thareja: Fundamentals of Computers, Oxford Press.

PRACTICALS

- 1. Determination of temperature coefficient of platinum resistance thermometer using Carey Foster Bridge.
- 2. Determine thermal conductivity of a bad conductor by Lee's method.
- 3. Determination of Ballistic Constant of a Ballistic galvanometer using condenser.
- 4. Determination of Ballistic Constant of a Ballistic galvanometer by steady deflection method.
- 5. Determination of high resistance by method of leakage.
- 6. e/m by Thomson's method.
- 7. Measurement of inductance of coil by Anderson's bridge.
- 8. Measurement of capacitance and dielectric constant of a liquid and gas by De-Sauty Bridge.
- 9. Study of Gaussian distribution using statistical board.
- 10. Determination of mutual inductance of a coil.
- 11. Experimental verification of the first law of thermodynamics by discharging the condenser.
- 12. To determine the energy Band gap in a semiconductor using junction diode.
- 13. Study of the characteristics of a given transistor (PNP/NPN) in common emitter configuration and find the value of parameter of given transistor.
- 14. Study of the characteristics of a given transistor (PNP/NPN) in common base configuration and find the value of parameter of given transistor.
- 15. Study the characteristics of rectifier junction diode and Zener diode.
- 16. Study of dependence of velocity of wave propagation on line parameters using torsional wave apparatus.
- 17. Study of variation of reflection coefficient on nature of termination using torsional wave apparatus.
- 18. Study of variation of total thermal radiation with temperature.
- 19. Plot thermo emf versus temperature and find the neutral temperature and temperature of inversion.
- 20. Determination of Self Inductance of a Coil using Ballistic galvanometer.
- 21. To study the electromagnetic damping of a compound pendulum.
- 22. Study of phase relationship of RL Circuit.

Note: - New experiments may be added on availability of equipments.

TEACHING & EXAMINATION SCHEME For the Examination – 2020 PHYSICS

B.Sc. PART-III

THEORY

| | | | Pd/W (45mts.) | Exam. Hours | Max. Marks 150 |
|---------|-----------|-----------------------------------|------------------|----------------|----------------------|
| Phy.301 | Paper I | Solid State Physics | 2 | 3 | 50 |
| Phy.302 | Paper II | Nuclear Physics | 2 | 3 | 50 |
| Phy.303 | Paper III | Relativity and Electrodynamics | 2 | 3 | 50 |
| PRACTIC | AL | | 6 | 5 | 75 |
| | | | тот | AL: | 225 |

B. Sc. Part-III

PAPER I : SOLID STATE PHYSICS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

UNIT-1:

Crystal structure : Different terms of crystal structure, Fundamental types of lattices, Two and three dimensional lattice types; Seven system of crystals, Characteristics of sc, bcc, fcc, hcp; Miller indices, orientation of planes in cubic lattices; Distribution of Atoms in atomic planes of cubic lattices. Distance between successive planes; Von-Laue's equations of diffraction of X-rays, Bragg's Law, scattering from

lattice of point-atoms. Scattering factor. Geometrical Scattering factor for sc, bcc, fcc. Reciprocal lattice and its properties.

Unit-2 :

Crystal binding and lattice vibrations : Inter-atomic forces of solids. Crystal of inert gases, cohesive energy and bulk modulus. Ionic crystals, Madelung energy and bulk modulus. Covalent crystals. Hydrogen bonded crystals, Atomic radii. Concept of phonons Vibration of monatomic lattices, lattice with two atoms per primitive cell. Local phonon modes. Density of states in one dimension, three dimensions, lattice heat capacity for Einstein model, Debye model.

UNIT-3 :

Free Electron theory of metals : Free electron model, Density of states of electron gas, Fermi-Dirac distribution function, effect of temperature on Fermi-Dirac distribution function, Fermi energy at absolute zero temperature and low temperature. Electron heat capacity. Thermionic emission. Boltzmann transport equation, Sommerfeld theory of electrical conductivity, Thermal conductivity, Wiedmann-Franz Law. Hall effect.

UNIT-4 :

Band theory : Formation of bands and origin of energy gap, Bloch theorem, Kronig Penney model, crystal momentum and velocity of an electron. Effective mass of electrons. Electrons and holes. Number of states in a band, insulator, semi-conductor and metal. Construction of Brillouin Zones and Fermi-surfaces. Fermi levels in intrinsic, n- type and p- type semi-conductors, Mass action Law. The static dielectric constants of solids. Local electric field at an atom.

UNIT-5 :

Magnetism : Diamagnetism and Larmor precession, classical theory of diamagnetism, Para-magnetism and its classical theory, free electron theory. Molecular theory of ferromagnetism.

Experimental Survey of Superconductivity : Zero resistance, persistent currents, effect of magnetic fields, flux exclusion, Intermediate state, Entropy effect, frequency effects, Gyromagnetic ratio, Isotope effect. Occurrence of superconductivity. Thermoelectric effects, thermal conductivity. High temperature oxide, superconductors and their properties. BCS theory (elementary idea without mathematical derivation), Magnetic levitation.

Books suggested :

Kittel : Introduction to Solid State Physics, Wiley Eastern.

A.J. Dekker : Solid State Physics, McMillian India.

L. Azaroff : Theory of Solids.

Paper II: NUCLEAR PHYSICS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

Unit I:

Rutherford alpha scattering experiment, scattering formula and experimental verification of scattering formula. nuclear charge, Chadwick's determination of nuclear charge, theories of nuclear composition, nuclear mass, Determination of size of nucleus using Mesonic X ray method, Measurement of potential radius from life time of alpha emitters and scattering of fast neutron. nuclear spin, Determination of nuclear spin from hyperfine splitting of the atomic energy, parity, method of parity investigation, nuclear magnetic moment and electrical moment, relation between quadrupole moment and nuclear spin.

Unit II:

Mass defect, binding energy and packing fraction of nucleus. Liquid drop model of Nucleus, magic number and evidence of it, WEIZSACHER's Semi Empirical Mass formula, Predication of stability against beta-decay for members of an isobaric family.

Types of nuclear reactions, The balance of Mass and energy in nuclear reactions, conservation law in nuclear reactions, Q equation. Solution of the Q equations, concept of centre of mass in nuclear reaction, proton-proton collision and neutron-nucleus collision in CM frame.

Unit III:

The law of radioactive decay, statistical nature of radioactivity. Radioactive growth and decay. Ideal equilibrium, transient equilibrium and secular equilibrium, Radioactive series, Fundamental law of radioactivity, induced radioactivity, radioactivity dating.

Alpha decay: Disintegration Energy, Range of alpha particles, Geiger Nuttal's Law, spectrum and fine structure. alpha particles paradox, Barrier penetration, Beta Decay, disintegration energy of Beta Decay, principle, working and uses of beta ray spectrometer.

Unit IV:

Nuclear Energy: Nuclear induced fission, energy released in fission of U^{235} , Fission chain reaction, stability limits against spontaneous fission, Energetic of Symmetric fission, Neutron cycle in a thermal reactor. Four factor formula. Elementary idea of nuclear reactors, types of nuclear reactor, nuclear reactor in India. Nuclear fusion, fusion in stars, carbon and pp cycle, problems of controlled fusion, fissile and fertile materials and their characteristics.

Unit V:

Gas filled ionisation detectors, Detailed description, principle working and uses of (i) proportional counter (ii) Geiger-Muller Counter, dead time, recovery time and paralysis time, principle of acceleration, classification of accelerators, electrostatic accelerators, linear accelerators, cyclotron, synchrocyclotron, betatron.

Properties of elementary particles, Classification of elementary particles, quantum number of elementary particles, conservation laws, experimental evidence of violation of parity conservation in Beta Decay, C.P.T. theorem, types of cosmic rays and properties of primary cosmic rays.

Books suggested:

Alonso & Finn: Fundamental University Physics – Vol. III, Addision Wesley.

S.N. Ghoshal: Atomic & Nuclear Physics – Vol. II, S. Chand, New Delhi. Satyapraksh: Nuclear Physics, Pragati Prkashan Meerut

R. R. Roy and B. P. Nigam, Nuclear Physics, New Age Int.(P) Ltd D.C. Tayal: Nuclear Physics, Himalaya Publishing House

PAPER III: RELATIVITY AND ELECTRODYNAMICS

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

Unit-1

Electromagnetic Waves: Displacement current, Maxwell's equations, Electromagnetic wave equation, Poynting theorem, Plane Electromagnetic waves in free space, wave impedance of free space, Propagation of plane Electromagnetic waves in non-conducting and conducting media, Skin depth, propagation of Electromagnetic waves in ionized gases, Polarization of Electromagnetic waves.

UNIT-2

Reflection and Refraction of Electromagnetic waves: Boundary conditions at the surface of discontinuity, reflection and refraction of Electromagnetic waves at the interface of non-conducting media, Fresnel's equations and their experimental verification, reflection and transmission coefficients, Brewster's Law and degree of polarization, total internal reflection, phase difference between parallel and perpendicular components and polarization of the reflected wave, reflection from a conducting plane.

UNIT-3

Interaction of Electromagnetic waves with matter: Normal and anomalous dispersion of light, empirical relations, Lorentz theory of dispersion of gases, experimental demonstration of anomalous dispersion in gases, scattering of electromagnetic waves and scattering parameters, Thomson, resonant and Rayleigh's scattering crosssection, polarization of scattered light, coherent and incoherent scattered light, dispersion in liquids and solids, Claussius Mossotti equation and Lorentz-Lorentz formula.

UNIT-4

Relativistic Mechanics: Coordinate transformation, contravariant and covariant vectors, tensors of second and higher rank, addition, subtraction, contraction, outer and inner product of tensors, covariance of tensor equations, Minkowski space, geometrical interpretation of Lorentz transformation, space like and time like intervals, four vectors, four dimensional gradient, divergence and curl operators, four-velocity, four-acceleration, four-momentum, four-force, relativistic classification of particles.

Unit-5

Relativistic Electrodynamics : Invariance of charge, transformation of surface charge density, transformation of volume-charge density and current density, Equation of continuity in the covariant form, Scalar and vector potentials, Transformation of Electromagnetic potentials, Lorentz condition and its covariant form, Electromagnetic field tensor, Covariance of Maxwell's equations, Transformation of Electro-Magnetic fields, Lorentz-force in a covariant form, Electromagnetic field due to a moving charge.

Books suggested:

- S.P. Puri: Electrodynamics, Tata McGraw Hill
- J.D. Jackson: Classical Electro-dynamics, John Wisely, New York
- B.B. Laud: Electromagnetic, John Wisely, New York
- E.C. Jordan: Electromagnetic waves, PHI, New Delhi
- D. J. Griffiths: Introduction to Electrodynamics, PHI

Practicals of B.Sc. III Year Physics

Note: These Practicals are divided into two sections, Lab. A & Lab. B.

- 1. Lab. A is for all students.
- 2. Lab. B is for all the students except those who offer Electronics as an optional subject.

Examination Scheme for Laboratory Work:

- 1. Students with Electronics shall be examined in any two experiments from Lab. A.
- 2. Students with Combinations not involving Electronics shall be examined in one experiment of Lab. A and one experiment from Lab. B

LAB. A: PHYSICS PRACTICALS

- 1. Determination of Planck's constant using solar cell/ LED.
- 2. Verification of Stefan's Law (Black Body method).
- 3. Study of characteristics of a GM counter and verification of inverse square law for the same strength of a radioactive source.
- 4. e/m measurement by Helical Method.
- 5. Measurement of magnetic field using Ballistic galvanometer and search coil.
- 6. Measurement of electric charge by Millikan's oil drop method.
- 7. To study hysteresis loss of transformer by B-H curve using CRO.
- 8. Verification of Cauchy's formula.
- 9. Study of Lissajous patterns.
- 10. Determination of separation of plates of Etalon using spectrometer.
- 11. Determination of Dead Time of GM counter.
- 12. Determination of difference in wavelength of the two line of Sodium light.
- 13. Determination of refractive index of ordinary and extra ordinary light using Babinet compensator.
- 14. Determination of Band Gap of a semi conductor using four probe method.
- 15. To verify Fresnel's formula for the reflection of light.
- 16. Determination of coefficient of rigidity as a function of temperature using torsional oscillator (resonance method).
- 17. Determination of dielectric constant of solids and liquids.
- 18. Determination of velocity of sound in air.
- 19. Verification of Malus law

LAB. B: ELECTRONICS

- 1. Study of ripple factor for shunt capacitor, series inductor, L-section and π section filters using full wave rectifier circuit.
- 2. Study of frequency response of single stage transistor amplifier (variation of gain with frequency).
- 3. Study the characteristics of field effect transistor (FET).
- 4. Study the negative feedback effect on voltage gain, and input and output impedances of the amplifier.
- 5. Study of operational amplifier (OP-AMP).
- 6. Study of RC circuits as integrating and differentiating systems with Square input.
- 7. Study of series and parallel LCR resonance circuit.
- 8. Design and Voltage study of AND, OR, NOT, NAND and NOR gates circuits using diodes and transistors.
- 9. Design and study of RC phase shift oscillator.
- 10. Study of Nano TiO₂ Solar Cell.
- 11. Study of Hybrid Solar and wind energy.
- 12. Transient Analysis of C-R and L-R circuit.
- 13. Determination of parameter of transformer.

Note: - New experiments may be added on availability of equipments.

B.Sc./B.A. Part I Examination 2020

TEACHING AND EXAMINATION SCHEME

| Subject/Paper | Period/Week | | Exam. Hours | Max Marks | Min.Pass Marks |
|---------------|-------------|---|-------------|-----------|-------------------|
| | L | Р | | | |
| Paper I | 2 | - | 3 | 50 | |
| Paper II | 2 | - | 3 | 50 | 54 |
| Paper III | 2 | - | 3 | 50 | |
| PRACTICALS | - | 6 | 4 | 75 | 27 |

STATISTICS

B.Sc. /B.A. Part I Examination 2020 Statistics

PaperI : Statistical MethodsPaperII : Elements of ProbabilityPaperIII: Applied StatisticsPractical

Paper I

Statistical Methods

Time- Three Hours

Maximum Marks – 50

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C.

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 1 mark.

Section B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 3.5 marks.

Section – C: Will consist of total 05 questions one from each unit. The paper setter will set one question from each Unit and Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 7.5 marks.

Unit 1: Definition, Importance, Scope, Limitations, distrust and functions of statistics, Planning of a statistical enquiry, sources of data, classification and tabulation of statistical data.

Unit 2: Diagrammatic and graphical representation of statistical data, graphs of frequency distribution, histogram, frequency polygon and ogives.

Unit 3: Measures of central tendency: Mean, Median and Mode, requisites of an ideal average, their merits and demerits, dispersion and its various measures.

Unit 4: Moments, raw moments, central moments and interrelationship between them, skewness and its various measures. Kurtosis and its measures.

Unit 5: Theory of attributes, class frequency and their order, consistency of data, incomplete data, association and independence of attributes, coefficient of association.

SUGGESTED BOOKS

Gupta, S.C. and Kapoor, V.K.: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, Delhi.

Gupta, S.P.: Statistical Methods, Sultan Chand & Sons, Delhi.

Paper II

Elements of Probability

Time- Three Hours

Maximum Marks – 50

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C.

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 1 mark.

Section B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 3.5 marks.

Section – C: Will consist of total 05 questions one from each unit. The paper setter will set one question from each Unit and Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 7.5 marks.

Unit 1: Random experiment. Sample space, events. Union and interaction of events, mutually exclusive, exhaustive, independent and equally likely events. Classical and Statistical definitions of probability and simple problems. Axiomatic approach to probability. Addition law of probability for two or more events.

Unit 2: Conditional probability. Multiplication law of probability, Statistical independence of events. Bayes theorem and its simple applications.

Unit 3: Random Variable: Discrete and continuous random variables. Probability mass and density functions, joint, marginal and conditional probability function. Distribution functions.

Unit 4: Mathematical Expectation: Definition of expectation, Addition and Multiplication laws of expectation. Moments and product moments in terms of expectation, variance and covariance for the linear combination of random variables Elementary idea of conditional expectation. Schwartz's inequality.

Unit 5: Moments generating and Cumulant generating functions with properties. Joint Moment generating function. Characteristic function with properties (without proof).

SUGGESTED BOOKS

Gupta, S.C. and Kapoor, V.K. Fundamentals of Mathematical Statistics, Sultan Chand & Sons, Delhi.

Kapoor, J.N. and Saxena, H.C.: Mathematical Statistics, S.Chand & Co., Delhi

Goon, A.M., Gupta M.K., Dass Gupta.: Fundamentals of Statistics, Vol. 1, World Press, Calcutta, 1991.

Gokharoo, D.C. and Saini, S.R.: Mathematical Statistics (Hindi ed.), Navkar Prakashan, Ajmer.

Bhargava, S.L. and Agarwal, S.M., Mathematical Statistics (Hindi Ed.), Jaipur Publishing House, Jaipur.

David, R.: Elementary Probability, Oxford Press

Bhat, B.R., Srivenkatramana, T. and Rao, Madhava K.S. (1977): A Beginner's Text, Vol, II, New Age International (P) Ltd., 1996.

Paper III

Applied Statistics

Time- Three Hours

Maximum Marks – 50

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C.

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 1 mark.

Section B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 3.5 marks.

Section – C: Will consist of total 05 questions one from each unit. The paper setter will set one question from each Unit and Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 7.5 marks.

Unit 1: Statistical Organizations in India: C.S.O., N.S.S.O., their functions and publications, agricultural Statistics, area and yield statistics, trade statistics.

Unit 2: Index Number: Various types of index numbers, construction of index number of prices, fixed base and chain base methods, uses and limitations of these methods.

Unit 3: Essential requisites of an ideal index number, cost of living index number and its construction, the notions of splicing, base shifting and deflating.

Unit 4: Population Statistics, its nature, vital statistics, measures of mortality and fertility.

Unit 5: The growth of population and its measurements, life table, its construction and uses. Indian census, its organization and features.

SUGGESTED BOOKS

Gupta, S.C. and Kapoor, V.K.: Fundamentals of Applied Statistics

Goon, A.M. and others: Fundamentals of Statistics, Vol. II, World Press, Calcutta.

Gupta, B.N.: Statistics: Theory and Practice, Sahitya Bhawan, Agra (The Chapter on Indian Statistics)

Agarwal, B.L. Basic Statistics, Wiley Eastern Ltd.,

PRACTICAL

The students will be asked to attempt three exercises out of five exercises. The distribution of marks will be as follows:

| | Regular Students | Ex-Students |
|-----------------------------------|------------------|-------------|
| (a) Three Practical exercise | 45 Marks | 45 Marks |
| (b) Practical record work | 10 Marks | - |
| (c) Viva-Voce | 20 Marks | 20 Marks |
| Total | 75 Marks | 65 Marks* |
| *To be converted out of 75 marks. | | |

The following topics are prescribed for practical works:

- 1. Presentation of raw data.
- 2. Graphical representation by (i) Histogram (ii) Frequency Polygon (iii) Frequency curve and (iv) Ogives.
- 3. Diagrammatic representation by (i) Bars (ii) Pie-diagram.
- 4. Measures of central tendency: Mean, Median and Mode.
- 5. Measures of dispersion: (i) Range (ii) Inter-quartile range (iii) Mean deviation (iv) Variance and Standard deviation (v) Coefficient of variation.
- 6. Moments and various measures of skewness and kurtosis.
- 7. Exercises on determination of class frequencies, consistency of data and association of attributes.
- 8. Computations of death rates, birth rates, reproduction rates and construction of life tables.
- 9. Exercises on various types of index numbers.

B.Sc./B.A. Part II Examination 2020

TEACHING AND EXAMINATION SCHEME

| Subject/Paper | Period/Week | | Exam. Hours | Max Marks | Min.Pass Marks |
|---------------|-------------|---|----------------|-----------|-------------------|
| | L | Р | | | |
| STATISTICS | | | | | |
| Paper I | 2 | - | 3 | 50 | 54 |
| Paper II | 2 | - | 3 | 50 | J |
| Paper III | 2 | - | 3 | 50 | |
| PRACTICALS | - | 6 | 4 | 75 | 27 |

B.Sc./B.A. Part II Examination 2020 Statistics

PaperI: Probability and Probability DistributionsPaperII: Correlation and Numerical MethodsPaperIII: Sampling TechniquesPractical

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C.

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 1 mark.

Section B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 3.5 marks.

Section – C: Will consist of total 05 questions one from each unit. The paper setter will set one question from each Unit and Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 7.5 marks. Total Marks: 50

Paper I Probability and Probability Distributions

Unit 1: Discrete probability distributions and their properties: Bernoulli, Binomial, Poisson, negative bionomial, geometric, hypergeometric, multinomial and discrete uniform distributions.

Unit 2: Continuous probability distributions and their properties: Uniform, Normal, Exponential, Beta type I and type II, Gamma and Cauchy distributions.

Unit 3: Distributions of functions of random variables, cumulative distribution, function techniques, distribution of sum, difference, product and quotient of two random variables, the moment generating functions and transformation techniques (Chapter V of Mood, Graybill and Boes Book).

Unit 4: Concepts of conditional expectations, the conditional variance, the joint moment generating function and moments, the bi-variate normal distribution and its properties.

Unit 5: Stochastic convergence: Chebyshev's inequality and its generalized form, weak and strong law of large numbers, simple form of central limit theorem.

BOOKS SUGGESTED:

Mood, A.M., Graybill, F.A. and Boes, D.C. Introduction to the Theory of Statistics (Third edition), Mc-Graw-Hill.

Hogg, R.V. and Graig, A.T.: Mathematical Statistics, Amerind

Gupta, S.C. and Kapoor; V.K. ; Fundamentals of Mathematical Statistics, Sultan Chand and Sons, Delhi.

Paper II

Correlation and Numerical Methods

Unit 1: Method of least squares, its application in fitting of straightline, Second degree parabola, logarithmic and exponential curves. The bi-variate data marginal and conditional frequency distribution, covariance, variance of a linear function of variates.

Unit 2: Correlation and regression, the rank correlation, intraclass correlation, the correlation ratio, probable error.

Unit 3: Multivariate data, concept of multiple correlation and regression, partial correlations, multiple regression equation (for three variables).

Unit 4 : Time series and its components, method of moving average and curve fitting for determining trend, determination of seasonal indices. Link relative method.

Unit 5: Statistical applications of numerical methods: Methods of intra and extra polations due to Newton, Lagrange and Gauss. Divided differences and Newton's formula. Numerical Integrations: Trapezodial and Simpson's formulae.

BOOKS SUGGESTED

Gupta, S.C. and Kapoor, V.K. Fundamentals of Mathematical Statistics, Sultan Chand and Sons, Delhi.

Kapoor, J.N. and Saxena H.C.: Mathematical Statistics, S.Chand and Co., Delhi.

Scarborough, J.B.: Numerical Mathematical Analysis, Oxford and IBH.

Paper III

Sampling Techniques

Unit 1: Sampling surveys vs. complete enumeration, random and purposive sampling. Methods of drawing random sample, the principal steps in sample surveys, sampling and non sampling errors.

Unit 2: Simple random sampling with and without replacement, stratified random sampling, comparison of stratified sampling with SRSWOR.

Unit 3: Ratio and regression methods of estimation, estimation of population mean and total in large sample size. Comparison with simple estimator.

Unit 4: Systematic Sampling: unbiased estimator, variance of the estimator (including in terms of intra class correlation coefficient), Comparison with SRS, elementary idea of estimation of variance". Cluster Sampling with equal cluster size: Unbiased estimator, variance of the estimator / (including in terms of intra class correlation coefficient), estimation of variance.

Unit 5: Two stages sampling in case of equal cluster size at both the stages. Two phase sampling: ratio and regression estimation.

BOOKS SUGGESTED

Cochran, W.G.: Sampling Technique, John Wiley Publication, New York. Sukhatme, P.V. and others: Sample Surveys and its application, ISAS, Delhi – 12.

PRACTICAL

The students will be asked to attempt three exercises out of five exercises. The distribution of marks will be as follows:

| | Regular Students | Ex-Students |
|-----------------------------------|------------------|-------------|
| (a) Three Practical exercise | 45 Marks | 45 Marks |
| (b) Practical record work | 10 Marks | - |
| (c) Viva-Voce | 20 Marks | 20 Marks |
| Total | 75 Marks | 65 Marks* |
| *To be converted out of 75 marks. | | |

The following topics are prescribed for practical works:

- 1. Computation of co-efficient of (i) Simple correlation (ii) Rank correlation.
- 2. Preparation of correlation table from ungrouped data.
- 3. Determination of regression lines from (i) Ungrouped data (ii) Correlation table.
- 4. Fitting of linear regression in case of three variables, computation of partial and multiple correlations coefficient for three variables.
- 5. Fitting of (i) Straight line (ii) Second degree parabola (iii) Exponential curve by least square method.
- 6. Fitting of distributions (i) Binomial (ii) Poisson (iii) Normal distributions and testing of goodness of fit.
- 7. Moving average method for determining trend, seasonal indices.
- 8. Practical on Numerical methods (Covered in Paper II).
- 9. Practical on sampling techniques (Covered in Paper III).

B.Sc. Part I Examination, 2020 ZOOLOGY

| THEORY | | | Max Marke: 150 |
|-------------|------|--------------------------------|--|
| | | | (Min. Pass Marks: 54) |
| Paper I | : | Animal Diversity and Evolution | 50 |
| Paper II | : | Biology of Non chordates | 50 |
| Paper III | : | Cell Biology and Genetics | 50 |
| PRACTICA | LS : | | Max. Marks: 75 (Min Pass Marks: 27) |
| Duration of | eacl | n theory paper | 3 hours |
| Duration of | prac | tical examination | 5 hours |

Note: Each theory paper is divided in three parts i.e. Section-A, Section –B and Section – C.

Section-A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry of 1 mark.

Section –B: Will consist of 10 questions. Each unit will be having two questions; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question carries 3.5 Marks.

Section-C: will consist of total 05 questions. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question carries 7.5 Marks.

PAPER I Animal Diversity and Evolution

Functional morphology of the types included with special emphasis on the adaptations to their modes of life and environment. General characters and classifications of all invertebrate phyla up to class with examples emphasizing their biodiversity, economic importance and conservation measures where required.

Unit 1: General principles of taxonomy, concept of the five-kingdom, Concept of Protozoa, Metazoa and Levels of organization. Basis of classification of non-chordata: Symmetry, coelom, segmentation and embryogeny, Characters and Classification of Protozoa and Porifera upto classes with examples.

Unit 2: Salient features and classification of Coelenterata, Ctenophora, Platyhelminthes,

Aschelminthes, Annelida, Arthropoda, Mollusca and Echinodermata with their suitable examples.

- Unit 3: Origin of Life, Miller's experiment, Lamarckism and Darwinism, Natural Selection, genetic basis of evolution, speciation, Evidences of organic evolution.
- Unit 4: Variations, Isolation and Adaptations, Geological time scale and animal distribution in different era.
- Unit 5: Principal zoogeographical regions of the world with special reference to their mammalian fauna, Factors affecting the large scale animal distribution, Origin and evolution of man.

PAPER II Biology of Nonchordates

Unit 1: *Euglena:* Ultrastructure of flagellum and flagellar movement, osmoregulation and behaviour, reproduction.

Paramecium: Locomotion, nutrition, osmoregulation and reproduction. *Sycon:* Cellular organization, canal system, reproduction and development.

Unit 2: *Obelia:* Structure of polyp and medusa, sense organs and reproductive systems, life cycle.

Fasciola: Digestive, excretory and reproductive systems, developmental stages and life cycle.

Taenia: Structure of body wall, excretory and nervous systems, reproduction and developmental stages in life cycle.

Unit 3: *Nereis:* Parapodial locomotion, digestive, blood vascular, excretory, nervous and reproductive systems, development and metamorphosis.

Hirudinaria: Digestive, haemocoelomic, excretory, nervous and reproductive systems, sense organs.

- Unit 4: *Palaemon:* Appendages, Digestive, respiratory, blood vascular, excretory, nervous, sense organs and reproductive systems. *Pila:* Digestive, respiratory, blood vascular, nervous and reproductive systems, sense organs
- Unit 5: *Lamellidens*: Digestive, respiratory, blood–vascular, excretory and nervous systems, sense organs, reproduction and development. *Asterias*: Water – vascular system, digestive, circulating and nervous systems, sense organs, reproduction, life history and regeneration.

PAPER III

Cell Biology and Genetics

- Unit 1: Characteristics of prokaryotic and eukaryotic cells, Characteristics of cell membrane molecules, fluid-mosaic models of Singer and Nicolson, passive and active transport, Structures and functions of endoplasmic reticulum, ribosome, Golgi complex, lysosome, mitochondria, centriole, microtubules and nucleus.
- Unit 2: Structure of Chromatin and Chromosomes, semiconservative mechanism of replication, elementary idea about topoisomerases, replication forks, leading and lagging strands, RNA primers and Okazaki fragments, RNA structure and types, mechanism of transcription, Genetic Code and protein synthesis.
- Unit 3: Interphase nucleus and cell-cycle including regulation.

Mitosis: Phases and process of mitosis, structure and function of spindle apparatus, Theories of cytokinese.

Meiosis: Phases and process of meiosis, synaptonemal complex, formation and fate of chiasmata recombination and significance of crossing over.

- Unit 4: Mendelism: Brief history of genetics and Mendel's work: Mendelian laws, their significance and current status, linked gene inheritance.
 Chromosomal aberration: Structural translocation, inversion, deletion and duplication; Numerical haploidy, diploidy, polyploidy, aneuploidy, euploidy, polysomy and genetic implications.
- Unit 5: Genetic interaction: supplementary genes, complementary genes, duplicate genes, multiple gene interaction, ABO blood groups and their genotypes, Multiple alleles.

PRACTICALS

1. Demonstration of dissection:

Palaemon: Study of appendages, general anatomy, digestive and nervous systems *Pila*: General anatomy and nervous system

Lamellidens / Unio: General anatomy and nervous system

- Permanent preparations of the following: Protozoa: *Paramecium Porifera*: Sponge spicules, fibres and gemmules Coelenterata: *Obelia* colony, *Obelia* medusa Annelida: *Nereis* parapodia Arthropoda: *Palaemon*: Statocyst and hastate plate along with comb plates, *Cyclops* and *Daphnia* Mollusca: *Pila*: Gill lamella, radula and L. S. Osphradium, *Lamellidens*: Gill-lamella
- 3. Identification, systematic position up to order and general study of the following animal forms, microscopic slides / museum specimens:

Protozoa: Amoeba, Entamoeba, Euglena, Noctiluca, Trypanosoma, Trichomonas, Foraminifera (Oozes), Opalina, Balantidium, Nyctotherus, Paramecium, Paramecium binary fission and conjugation and, Vorticella [Whole mounts].

Porifera: Leucosolenia, Grantia, Scypha, Hyalonema, Euplectella, Spongilla and Euspongia

Coelenterata: Obelia (colony and medusa), Physalia, Porpita, Aurelia, Rhizostoma, Alcyonium, Corallium, Gorgonia, Tubipora, Pennatulla and Madrepora

Ctenophora: Beroe

Platyhelminthes: Dugesia, Fasciola and Taenia

Nematoda: Ascaris, Ancylostoma, Dracunculus, Wuchereria, Trichinella, Schistosoma and Enterobius

Annelida: *Nereis*, Phase Heteronereis, *Aphrodite, Arenicola, Pheretima, Pontobdella, Branchellion* and *Hirudinaria*

Onychophora: Peripatus

Arthropoda : Limulus, Araneus, Palamnaeus, Apus, Lepas, Balanus, Sacculina, Palaemon, Lobster, Eupagurus, Carcinus, Lepisma, Odontotermes, Pediculus, Schistocerca, Papilio, Bombyx, Xenopsylla, Apis, Julus and Scolopendra

Mollusca: *Chiton, Dentalium, Patella, Pila, Turbinella, Aplysia,* Slug, Snail, *Mytilus, Ostrea* (pearl oyster), *Lamellidens, Teredo, Nautilus, Sepia, Octopus*

Enchinodermata: Pentaceros, Asterias, Ophiothrix, Echinus, Holothuria and Antedon

4. Study of sections, developmental stages and isolated structures from microscopic slides

Porifera: L. S. and T. S. of Scypha / Grantia

Coelenterata: Hydra, Sections of Hydra, Developmental stages of Aurelia

Platyhelminthes: Transverse sections of *Dugesia, Fasciola* and *Taenia*, mature and gravid proglottids of *Taenia*, developmental stages of *Fasciola* and *Taenia* Annelida: Transverse sections of *Nereis* and *Hirudinaria*, Trochophore larva of Nereis, Parapodium of *Nereis* and *Heteronereis*

Arthropoda: Crustacean larvae (*Nauplius, Zoea, Megalopa* and *Mysis*), mosquito larva & pupa

Mollusca: Transverse sections of *Lamellidens* and Glochidium larva Echinodermata:

Pedicellariae of Star fish

- 5. Experimental Zoology:
 - Test for Protein : Biuret (i)
 - (ii) Test for Lipids : Sudan IV
 - (iii) Test for Carbohydrates : Benedict's

- Maximum Marks: 75
- (iv) Demonstration of catalase enzyme activity in Minimum Pass Marks: 27 animal tissue
- (v) Living study of *Paramecium*
- (vi) Temporary acetocarmine squash preparations and study of chromosomes

Each regular student is required to keep a record of practical work done by him/her duly checked by the teachers which will be submitted at the time of practical examinations.

Distribution of Marks:

| | <u>Re</u> | <u>egular</u> | <u>Ex.</u> |
|---|-----------|---------------|------------|
| Diagrammatic presentation of dissection | | 20 | 20 |
| Permanent preparation | | 08 | 10 |
| Spots (seven) | | 21 | 21 |
| Experimental Zoology | | 06 | 09 |
| Viva-voce | | 10 | 15 |
| Practical Record | | 10 | |
| | | | |
| | Total | 75 | 75 |

Recommended Books (All latest editions)

- 1. Prasad, Beni: Pila, Lucknow Publishing House, Lucknow.
- Bhatia, M. L.: Hirudinaria, Lucknow Publishing House, Lucknow. 2.
- De Robertis, E. D. P. and De Robertis, E. M. F.: Cell and Molecular Biology, Halt 3. Saunder, Tokyo, Japan.
- 4. Gardner, E. J.: Principles of Genetics, John Wiley & Sons, New York.
- Kotpal, R. L. : Invertebrates, Rastogi Publications, Meerut. 5.
- Nigam, H. C. : A University Course in Invertebrate Zoology, Vol. I, Mc Milan, London. 6.
- Prasad, S. N.: Text Book of Invertebrate Zoology, Kitab Mahal, Allahabad. 7.
- 8. Patwardhan, S. S. : *Palaemon*, Lucknow Publishing House, Lucknow.
- Reese, A. M. : Outlines of Economic Zoology, Blackiston Co., Philadelphia, U.S.A. 9.

- 10. Vishwa Nath : A Text Book of Zoology, Vol. I, Invertebrate, S. Chand & Co., New Delhi.
- 11. Rastogi, Veerbala : Invertebrate Zoology, Kedar Nath Ram Nath, Delhi.
- 12. Jordan, E. L. and P. S. Verma: *Invertebrate Zoology*, S. Chand & Co. Ltd., Ram Nagar, New Delhi.
- 13. Alberts, B. et.al. The Cell (Garland).
- 14. Lodish, H., et.al. Molecular Cell Biology (Freeman).
- 15. Gupta, P. K., Genetics, Rastogi Publications, Meerut.
- 16. Rastogi, Veer Bala, Cell Biology, Kedar Nath Ram Nath, Delhi.

B.Sc. Part II Examination, 2020 ZOOLOGY

There shall be three written papers of three hours duration each.

| Theory | | | Max. Marks: 150 (Min. Pass Marks; 54) |
|----------------------------|-----------------|--|--|
| Paper I Paper II | : | Chordate Structure and function | 50 50 |
| Paper III | : | Immunology, Microbiology and Biotechnology | 50 |
| Practical | : | | 75 |
| | | | (Min. Pass Marks; 27) |
| Duration of Duration of | f The f prac | ory examination tical examination | 3 hours 5 hours |

Note: Each theory paper is divided in three parts i.e. Section-A, Section –B and Section –C.

Section-A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry of 1 mark.

Section –B: Will consist of 10 questions. Each unit will be having two questions; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question carries 3.5 Marks.

Section-C: will consist of total 05 questions. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question carries 7.5 Marks.

<u>PAPER I</u>

Chordate Structure and Function

- Unit 1: Classification and characters of phylum Chordata (excluding extinct forms) up to orders, Comparisons of habit, habitat, external features and anatomy of *Balanoglossus, Herdmania* and *Branchiostoma* (excluding development).
- Unit 2: Ascidian tadpole larva and its Metamorphosis, Affinities of Hemichordate, Urochordate and Cephalochordates, Habit, Habitat and salient features of Petromyzon, Ammocoete larva.
- Unit 3: Integument including structure and development of placoid scales, feathers and hairs, Jaw suspensorium, limbs and girdles of *Rana, Uromastix, Columba* and *Oryctolagus*.
- Unit 4: Heart and aortic arches, respiratory system and alimentary canal of *Scoliodon, Rana, Uromastix, Columba* and *Oryctolagus*.
- Unit 5: Brain, urinogenital system (*Scoliodon, Rana, Uromastix, Columba* and *Oryctolagus*), Identification of poisonous and non poisonous snakes. Biting mechanism in snakes, flight adaptations in birds. Adaptations in aquatic mammals.

PAPER II

Developmental Biology

- Unit 1: Formation of egg and sperm, vitellogenesis and fertilization. Types of eggs and sperms, parthenogenesis, regeneration.
- Unit 2: Planes and patterns of cleavage in chordates, significance of cleavage and blastulation, Morphogenetic cell movement, Fate maps and significance of gastrulation.
- Unit 3: Development of *Branchiostoma* (*Amphioxus*) up to gastrulation; chick egg and its development up to the formation of primitive streak, Extra embryonic membranes of chick, development of placenta in rabbit, types and functions of placenta in mammals.
- Unit 4: Various types of stem cells and their applications (with special reference to embryonic stem cells),Cloning of animals: nuclear embryonic transfer

technique, nuclear transfer technique; Identical, Siemese and fraternal twins and Artificial insemination.

Unit 5: Organogenesis of alimentary canal, eye, kidney, gonads and brain in mammal.

PAPER III

Immunology, Microbiology and Biotechnology

- Unit 1: Types of immunity (innate and acquired, humoral and cell mediated), Antigen: Antigenicity of molecules, haptens, Antibody: Structure and functions of each class of immunoglobulins (IgG, IgM, IgD, IgA and IgE), antigen – antibody reactions.
- Unit 2: Theory of spontaneous generation; Germ theory of fermentation and diseases: Works of Louis Pasteur, John Tyndal, Rober-Koch and Jenner, Bacteria: Cell membrane, patterns of arrangement; structure of capsule and cell envelops; organization of cytoplasmic membrane of Gram - negative and Gram - positive strains, Genetic material of bacteria: (i) Chromosome (ii) Plasmids.
- Unit 3: Asexual and sexual reproduction in Bacteria ,Culture of Bacteria: Carbon and energy source, Nitrogen and minerals and Organic growth factors, Effect of environmental factors on bacterial culture: Temperature, hydrogen ion concentration; Medical importance of Gram-negative and Gram-positive bacteria.
- Unit 4: Recombinant DNA technology: Introduction and principles, restriction endonucleases, cloning vehicles (plasmids, bacteriophages); methods of gene transfer and applications.
- Unit 5: Environmental Biotechnology (outline idea only): Metal and petroleum recovery, pest control, waste-water treatment, Food, Drink and Dairy Biotechnology (outline idea only): Fermented food production: dairy products, alcoholic beverages and vinegar: microbial spoilage and food preservation.

Practical

- 1. Study of microbes in food material (like curd, etc.)
- 2. Bacteria culture
- 3. Demonstraton of dissection:

Scoliodon : General anatomy, alimentary canal, afferent and efferent blood vessels, urinogenital system, brain and cranial nerves – V, VII, IX and X only and internal ear *Labeo / Wallago*, Brain V, VII, IX and X Cranial nerves, afferent and efferent blood vessels, air sacs, and internal ear.

- *Rattus:* General anatomy, digestive, blood vascular and urinogenital systems 4. OSTEOLOGY
 - Articulated and disarticulated skeleton of Rana, Varanus, Gallus and Oryctolagus
- 5. PERMANENT PREPARATIONS Scoliodon: Placoid scales, Ampulla of Lorenzini.

 Identification, systematic position and comments of the following animals: Cephalochordata: *Amphioxus,* Hemichordata: *Balanoglossus* Urochordata: *Salpa, Doliolum* and *Herdmania* Cyclostomata: Petromyzon and Myxine Pisces: Zygaena, Scoliodon, Pristis, Torpedo, Trygon, Protopterus, Labeo, Heteropneustis (Saccobranchus), Belone, Exocoetus, Anabas and Echeneis Amphibia: Necturus, Amphiuma, Amblystoma, Axolotal Iarva, Hyla, Uraeotyphlus Reptilia: Trionyx, Chelone, Varanus, Uromastix, Ophiosaurus, Naja, Bungarus, Echis, Hydrophis, Eryx, Ptyas, Crocodilus and Gavialis Aves: Columba, Pavo, Choriotis, Francolinus, Streptopelia

Mammalia: *Meriones, Funambulus, Rattus, Hemiechinus, Suncus, Ptecopus, Presbytis* and *Macaca*

7. Microscopic Study

Hemichordata: Section through proboscis and branchiogenital region *Branch stoma:* T.S. oral hood, pharynx, gonads, intestine and caudal region *Scoliodon*: T.S. gill and scroll valve

Rana: T.S. through various organs, T.S. and L.S. of developmental stages Reptilia: V.S. skin of lizard

Aves: V.S. skin, different types of feathers

Chick embryology: Whole mounts of embryos of 18, 24, 33, 48 and 72 hours Mammalia: T.S. through various organs

Note: Each regular student is required to keep a record of practical work done by him/her duly checked by the teacher which will be submitted at the time of practical examination.

Distribution of Marks

Maximum Marks: 75 Minimum Pass Marks: 27

| | | <u>Regular</u> | <u>Ex.</u> |
|--|-------|----------------|------------|
| Diagrammatic presentation of a major dissection | | | |
| | | 15 | 20 |
| Diagrammatic presentation of a minor dissection Permanent preparation (one)/Study of microbes | | 06 | 11 |
| in food material (like curd, etc.)/Bacteria culture | | 10 | 10 |
| Spots (eight) | | 24 | 24 |
| Viva-voce | | 10 | 10 |
| Practical record | | 10 | |
| | Total | 75 | 75 |

List of Recommended Books

- 1. Arey, L.B. : Developmental Anatomy, Asia Publishing House, Mumbai
- 2. Chopra, V.L. : Genetic Engineering and Biotechnology, Oxford & I.B.H., New Delhi
- 3. Das, S.M. : The Indian Zoological Memoirs, Herdmania, Lucknow Publishing House, Lucknow
- 4. Jorden, E.L. and Verma, P.S.: Chordate Zoology and Animal Physiology, S. Chand & Co., N. Delhi
- 5. Kotpal, R.L. : Chordate Zoology, Rastogi Publication, Meerut
- 6. Dalela, R.C. : A Text Book of Chordate Zoology, Jai Prakash Nath Publication, Meerut
- 7. Bhatia, A., Jain, N. and Kohli, N.S.: An outline of Biotechnology, Ramesh Book Depot, Jaipur
- 8. Balinsky : Introduction to Embryology (CBS College Publishers)
- 9. Kuby : Immunology (W.H. Freeman)
- 10. R.A. Meyers (Ed.) : Molecular Biology and Biotechnology (VCH Publishers)
- 11. Jain, P.C. : Text Book of Embryology, Vishal Publication, Jalandhar
- 12. Srivastava, M.D.L. : An Introduction to Comparative Anatomy of Vertebrates, Pothishala Ltd., Allahabad
- 13. Thillayampalam, E.M. : Scoliodon, Lucknow Publishing House, Lucknow
- 14. Weichart, G.K. : Anatomy of the Chrodates, McGraw Hill, New York
- 15. Lewis, C.D. and Lewin, R., Biology of Gene, McGraw Hill, Toppan Co. Ltd.
- 16. Winchester, Genetics, Oxford IBH Publications
- 17. Agarwal, R.A., Srivastava, Anil Kumar and Kaushal Kumar: Animal Physiology and Biochemistry, S. Chand & Co. Ltd., New Delhi.
B.Sc. Part III Examination, 2020

ZOOLOGY

| Theory | | | Max Marks. 150 (Min.Pass Marks;54) |
|-------------|---------|------------------------------------|---------------------------------------|
| Paper I | : | Animal Physiology and Biochemistry | 50 |
| Paper II | : | Ecology and Behaviour | 50 |
| Paper III | : | Applied Zoology | 50 |
| Practicals | : | | 75 |
| | | | (Min.Pass Marks;27) |
| Duration of | each t | heory paper | 3 hours |
| Duration of | practio | cal examination | 5 hours |

Note: Each theory paper is divided in three parts i.e. Section-A, Section –B and Section –C.

Section-A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry of 1 mark.

Section –B: Will consist of 10 questions. Each unit will be having two questions; students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question carries 3.5 Marks.

Section-C: will consist of total 05 questions. Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question carries 7.5 Marks.

PAPER I

Animal Physiology and Biochemistry

Unit 1 : Digestion; digestive enzymes, process of digestion, digestion of protein, carbohydrate and lipid

Blood : Composition and functions, Blood groups, Rh factor and their significance, blood clotting mechanism, blood pressure and cardiac cycle, respiratory pigments, cardiac muscle activity.

- Unit 2 : Muscle : Structure of various types of muscles and mechanism of muscle contraction Excretion : Structure of kidney, types of nephron, mechanism of urine formation and its eliminationand arginine, ornithin cycle.
- Unit 3 : Respiration : Structure of lung, mechanism of respiration, respiratory pigment, exchange and transport of oxygen and carbon dioxide.
 Nervous System : Structure of neuron and its classification, Nerve impulse, impulse conduction and reflex action.
- Unit 4 : Endocrine glands : Structure and functions of various endocrine glands, diseases caused by hormonal deficiency ; Mechanism of hormone action.
- Unit 5 : Structure of Protein and Carbohydrates; oxidation of glucose through glycolysis, Krebs cycle and oxidative phosphorylation, deamination, transamination and decarboxylation.

PAPER II

Ecology and Behaviour

- Unit 1 : Introduction of ecology, definition, history, sub division and scope of ecology.
 Envirnmental factors; physical factors- soil, water, air and temperature. Biotic factors- interspecific and intraspecific relations, neutralism, mutualism, commensalism, antibiosis, parasitism, predation, competition. Concept of limiting factors, Liebig's law of minimum, Shelfords law of tolerance, combined concept of limiting factors.
- Unit 2 : Population and community ecology, measurement of population density. Factors affecting population growth, growth factors, dispersal, characteristic of community, concept of ecosystem and niches.
 Food chain, food web, Ecological pyramid. Energy flow in an ecosystem, biogeochemical cycles of CO₂, N₂, O₂, S and P. Prospects and stratigies of sustainable development.
- Unit 3 : Brief introduction to the major ecosystem of the world and ecological succession, conservation of natural resources; Ecology in relation to Thar desert.
 Brief account of environmental pollution, global warming and its impact upon Human race.

- Unit 4 : General survey of various types of animal behaviour; Methods of studying animal behaviour, Role of hormones and pheromones in behaviour, Biological rhythms.
- Unit 5 : Learning and Memory Conditioning, Habituation, Insight learning, Association learning, Reasoning and Communication; Wildlife of Rajasthan and its conservation.

PAPER III Applied Zoology

- Unit 1 : Poultry keeping Types of poultry breeds, poultry housing, farm and farm management, system of poultry farming; Grading, handling and marketing of eggs. Poultry diseases and Vermiculture; Methodology and products.
- Unit 2 : Sericulture : Different kinds of silk producing insects in India and its potentialities. Host plants of silk insects. Grainage, rearing and life cycle. Breeding and various diseases of silkworm. Reeling and fibre technology. Economics of sericulture.
- Unit 3 : Apiculture : Different kinds of honey bees found in India and, their identification. Identification of Queen, worker and drone. Importance of keeping bees in artificial hives and different kinds of hives. Care and management of bee colonies. Bee enemies and their control. Extraction and processing of honey from the comb. Utility and economics of production of honey. Honey bees and pollination strategy in agricultural crops.
- Unit 4 : Pest Management : Insect pests of important crops (cotton, Rice, sugar cane & pulses), insect pest of veterinary and medical importance, pest outbreaks and assessment of losses caused by the insect pests on crops; population dynamics of insect pests; Principles of Biological, mechanical and cultural methods of pest control. Integrated Pest Management (IPM). Principles of pest control by pesticides.

Important vertebrate pests; birds and mammals with special reference to rodents and their management.

Unit 5 : General principles of aquaculture; transportation of fish seed and brooders. Induced Breeding, Composite fish culture, Lay out of fish farm and its management, Byproducts of fishing industry; Prawn culture; Management of water bodies for aquaculture.

Practicals

- 1. Haemoglobin estimation of mammalian blood
- 2. Preparation of heamin crystals
- 3. Osmotic effect of R.B.C.
- 4. Preparation of mammalian blood film and identification of different types of blood cells
- 5. Determination of blood groups and Rh-factor
- 6. To determine the rate of oxygen consumption of rat
- 7. Analysis of urine for sugar, protein and pH
- 8. Estimation of E.S.R.
- 9. Demonstration of amylase activity
- 10. Estimation of packed cell volume [PCV]
- 11. Demonstration of working of pH meter
- 12. Demonstration of working of colorimeter
- 13. Measurement of blood pressure
- 14. Study of different spraying and dusting equipment
- 15. Use of pesticides and precautionary measures
- 16. Measurement of temperature and relative humidity
- 17. Estimation of soil moisture
- 18. Estimation of water holding capacity of different soils
- 19. Ecosystem study : Aquarium
- 20. Pond water study to identify zoo-planktons and their permanent preparations
- 21. Permanent preparation of any two stored grain pests. Two parasitic insects and termites
- 22. Honey bee : Permanent preparation of pollen basket and mouth parts
- 23. Permanent preparation of mouth parts of butterfly, moth, mosquito and cockroach
- 24. Project report based upon study of local fauna
- 25. Demonstration of dissection of nervous system of cockroach

Distribution of Marks

Maximum Marks : 75 Minimum Pass Marks : 27

| | | <u>Regular</u> | <u>Ex.</u> |
|---|-------|----------------|------------|
| Physiology Experiment | | 12 | 15 |
| Ecology Experiment | | 12 | 15 |
| Spots (six) | | 12 | 18 |
| Diagrammatic presentation of dissection | | 07 | 10 |
| Project report on local fauna | | 07 | |
| Permanent preparation | | 05 | 07 |
| Viva-voce | | 10 | 10 |
| Record | | 10 | |
| | Total | 75 | 75 |

List of Recommended Books:

- 1. Srivastava, H.S. : Elements of Biochemistry, Rastogi Publications, Meerut
- 2. Goel, K.A. and Shastry, K.B. : Animal Physiology, Rastogi Publication, Meerut
- 3. Dalela, R.C. : Animal Physiology, S. Chand & Co. Ltd., New Delhi
- 4. Agarwal, R.A., Srivastava, Anil Kumar and Kaushal Kumar : Animal Physiology and Biochemistry, S. Chand & Co. Ltd., New Delhi
- 5. Kulshrestha, V.V. : Experimental Physiology, Vikas Publishing House, New Delhi
- 6. Samasiviah, I. et.al. : Text Book of Animal Physiology and Ecology, S. Chand & Co. Ltd., New Delhi
- 7. Verma, P.S., Tyagi, B.S. and Agarwal, V.K. : Animal Physiology, S. Chand & Co. Ltd., New Delhi
- 8. Hoar, S. : General and Comparative Physiology, Prentice Hall of India Pvt. Ltd.
- 9. Wood, D.W. : Principles of Animal Physiology
- 10. Prosser, C.B. : Comparative Animal Physiology, Satish Book Enterprise
- 11. Eckert, Animal Physiology. (W.H. Freeman)
- 12. Parihar, R.P. : Fish Biology and Indian Fisheries, Central Publication House, Allahabad
- 13. Kovaleve, P.A., Silkworm Breeding Stocks, Central Silk Board, Marine Drive, Mumbai
- 14. Roger, A. Morse, The ABC and XYZ of Bee Culture, A.I. Root & Co., Medina, Ohio 44256.
- 15. Metcalf C.L. and W.P. Flint, Destructive and Useful Insects, Tata McGraw Hill Publishing Co. Ltd., New Delhi 110 051
- 16. Bomford, Mason and Swash, Hutchinson's Clinical Methods, Beilliers Tindal, ELBS edition
- 17. Gorbman, A., Dickhoff, W.W., Vigna, S.R., Clark, N.B. and Ralph, C.L. Comparative Endocrinology, John Wiley & Sons Inc., New York
- 18. Beauchamp, T.L. and J.F. Chidress. Principles of Biomedical ethics. Oxford University Press.
- 19. Nayar, B.V., Pest Management and Pesticides Indian Scenario, Namratha Publications, Madras
- 20. Odum : Ecology (Amerind)
- 21. Odum : Fundamentals of Ecology (W.B. Saunders)
- 22. Ricklefy : Ecology (W.H. Freeman)
- 23. Turk and Turk : Environmental Science (W.B. Saunders)
- 24. Dobzhansky, Ayala & Valentine : Evolution (W.H. Freeman)
- 25. Dobzhansky : Genetics and Origin of species (Columbia University Press)
- 26. Major : Population, Species & Evolution
- 27. White : Animal Cytology & Evolution.

B.A. / B. Sc. / B.Com Part – I - 2020 – 21

ENVIRONMENTAL STUDIES AND KHEL DARSHAN

Teaching : 3 periods / week in Annual System Maximum Marks : 100 Examination duration : 2 hours Objective type multiple choice question papers, 1 mark for each right answer, 20 questions from each Unit.

Unit I : Multidisciplinary Nature of Environmental Studies : Definition, scope and importance; Human Population and Environment; Environment and Human Health; Legal Issues and Environment : Environment Protection Act; Environmental Ethics : Issues and possible solutions.

Unit II : Natural Resources : Renewable and Non-Renewable : Forest Resources - Use and over exploitation, deforestation, introduction to afforestation activities in India.

Water Resources - Use and over utilization of surface and ground water; floods and droughts

Mineral Resources - Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

Food Resources - World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems.

Energy Resources - Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

Land Resources - Land as a resource, degradation, man induced landslides, soil erosion and desertification.

Unit III : Ecosystems : Concept of an ecosystem, Structure and function of ecosystem, Producers, consumers and decomposers; abiotic factors; food chain and web; ecological pyramids; energy flow.

Pollution – Definition, causes, effects and management strategies for (i) Air Pollution,

(ii) Water Pollution, (iii) Soil Pollution, (iv) Noise Pollution, (v) Thermal Pollution, (vi) Nuclear hazards.

Solid waste management - Causes, effects and management strategies for urban and industrial wastes.

Unit IV : Biodiversity and its conservation : Introduction, definition, levels (genetic, species and ecological), Importance of biodiversity; Status – Global, National and Local; Threats to biodiversity – habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India.

Unit V : Sports for human welfare : Sports in relation to Philosophy; Sports and health fitness; Social values for sports and sportspersons, Role of sports in personality development; Sports as recreation. India's policies for Sports : Central and State Governments; introduction to sports support facilities in India. History and Traditional Sports of India – Kabaddi, Kho-Kho, Mallakhamb, Jallikattu.

Recommended readings :

- 1. Environmental Studies, R. B. Singh, D. K. Tharur and J. P. S. Chouhan, Publishers Ramesh Book depot, Jaipur/New Delhi.
- 2. A Text Book of Environmental Sciences. Vidya Thakur, Scientific Publisher, Jodhpur/New Delhi.
- 3. 'Paryavaran Adhadhyan'. Manoj Kumar Yadav and Aupama Yadav, Astha Publications, Jaipur.
- 4. Environmental Awareness and Protection. DBN Murthy. Deep n Deep Publ. N. Delhi.
- 5. Khel Manovigyan (Sports Psychology), Dr. Hosiyar Singh.
- 6. Saririk Shiksha Tatha Khel Krira Me Prabandhan Sidhant by, Dr. M. L. Kamlesh.

SYLLABUS

CHEMISTRY

Under Choice Based Credit System (CBCS)

M.Sc. (FINAL) EXAMINATION- 2020 -21

JAI NARAIN VYAS UNIVERSITY

JODHPUR

M.Sc. Chemistry

(CBCS)

Second Year (2020-21)

(Two Semesters each of 15 weeks)

III SEMESTER:

| III SEMESTER: | | | | | |
|------------------------------|----------------------|----------------|-----|-------|-------|
| 1. THEORY PAPERS | Pds/Wk | No. of Credits | CCA | ESE | Total |
| CH 301 Group Theory & | 6 | 4 | 30 | 70 | 100 |
| Inorganic Spectroscopy | | | C | | |
| CH 302 Application of | 6 | 4 | 30 | 70 | 100 |
| Spectroscopy | | | | | |
| Elective Paper I | 6 | 4 | 30 | 70 | 100 |
| (303A-I/303B-I/303C-I/303 | D- | | | | |
| I) | · · · · | 0, | | | |
| Elective Paper II | 6 | 4 | 30 | 70 | 100 |
| (304A-II/304B-II/304C- | | | | | |
| II/304D-II) | | | | | |
| Grand Total | | | | Marks | 400 |
| A student will opt for any o | one of the four elec | tive groups. | | | |
| Elective Group A C. | No 303A-I /304A-I | П | | | |
| Elective Group B C. | No 303B-I /304B-I | I | | | |
| Elective Group C C. | No 303C-I/304C-I | I | | | |

Elective Group D C. No 303D-I/304D-II

PRACTICALS:

Practicals

24 pds./week

375 pds./semester

There will be 4 Labs. Namely Lab. 1, Lab. 2, Lab. 3 and Lab.4. Students will be divided into four groups. <u>Each group of students will work for 7 weeks for two</u> Lab Courses in one semester.

- CH -305 : Lab. Course 1 (Inorganic)
- CH -306 : Lab. Course 2 (Analytical)
- CH -307 : Lab. Course 3 (Organic)
- CH -308: Lab. Course 4 (Physical)

PRACTICALS EXAMINATION SCHEME

| Lab Course | Pds/Wk | No. of Credits | CCA | ESE | Total |
|-----------------------------|--------|----------------|-----|-------|-------|
| Lab Course 1 / Lab Course 3 | 24 | 4 | 30 | 70 | 100 |
| Lab Course 2 / Lab Course 4 | 24 | 4 | 30 | 70 | 100 |
| Grand Total | | | | Marks | 200 |
| Total marks of III Semester | | | | | 600 |

IV SEMESTER:

| 1. THEORY PAPERS | Pds/Wk | No. of Credits | CCA | ESE | Total |
|--------------------------|--------|----------------|-----|-------|-------|
| CH 401 Solid State | 6 | 4 | 30 | 70 | 100 |
| Chemistry | | | | | |
| CH 402 Bio Chemistry | 6 | 4 | 30 | 70 | 100 |
| Elective Paper I | 6 | 4 | 30 | 70 | 100 |
| (403A-III/403B-III/403C- | | | | | |
| III/403D-III) | | | | | |
| Elective Paper II | 6 | 4 | 30 | 70 | 100 |
| (404A-IV/404B-IV/404C- | | | | | |
| IV/404D-IV) | | | | | |
| Grand Total | | | | Marks | 400 |

(<u>A student who had opted group in III Semester will continue with the same group in</u> the IV Semester.)

There will be 4 Labs. Namely Lab. 1, Lab. 2, Lab. 3 and Lab.4. Students will be

divided into four groups. Each group of students will work for 7 weeks for two

Lab Courses in one semester.

- CH -405 : Lab. Course 1 (Inorganic)
- CH -406 : Lab. Course 2 (Analytical)
- CH -407 : Lab. Course 3 (Organic)
- CH -408: Lab. Course 4 (Physical)

| Lab. Course | Pds/Wk | No. of Credits | CCA | ESE | Total |
|-----------------------------|----------|-----------------|----------|--------------|------------|
| Lab Course 1 / Lab Course 3 | 24 | 4 | 30 | 70 | 100 |
| Lab Course 2 / Lab Course 4 | 24 | 4 | 30 | 70 | 100 |
| Total | | | | Marks | 200 |
| Total marks of IV Semester | | | | | 600 |
| SK-CH for III Semester | 4pd/week | (For students | of Chem | istry Depart | ment only) |
| SK-CH for IV Semester | 4pd/week | (For students | of Other | Department | only) |
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M.Sc Chemistry

II YEAR-2020-21

SEMESTER III

There will be two compulsory papers and two elective papers.

A student has to take any one of the four elective groups. (<u>The group a student</u> chooses this Semester, they would have to continue with the same group in the IV Semester.)

LIST OF TWO COMPULSORY PAPERS:

<u>Compulsory Paper-I</u> CH 301 GROUP THEORY & INORGANIC SPECTROSCOPY <u>Compulsory Paper-II</u> CH-302 APPLICATIONS OF SPECTROSCOPY

List of Elective Groups in M.Sc. III Semster:

<u>GROUP A</u>

CH 303A-I: ORGANOTRANSITION METAL CHEMISTRY. CH 304A-II: NANOSCIENCE AND NANOTECHNOLOGY

<u>GROUP B</u>

CH 303B-I: PHOTOCHEMISTRY CH 304B-II: ORGANIC SYNTEHSIS-I

<u>GROUP C</u>

CH 303C-I: BIOINORGANIC AND SUPRAMOLECULAR CHEMISTRY CH 304C-II: HETEROCYCLIC CHEMISTRY GROUP D CH 303D-I: NUCLEAR AND RADIOCHEMISTRY CH 304D-II: MEDICINAL & PHARMACEUTICAL CHEMISTRY

Compulsory Paper-I

CH-301: GROUP THEORY & INORGANIC SPECTROSCOPY

Unit I

Molecular Symmetry and Group theory (A) : Symmetry elements and operation. Symmetry classification of group, relation between orders of a finite group and its sub groups. Conjugacy relation and classes. Schonfiles symbols, representation of groups by matrices (representation for the Cn,Cnv, Cnh, Dnh etc. groups to be worked out explicitly types of Matrices, Matrix Multiplications, Transformations of Matrices,). Characters of representations.

Unit II

Molecular symmetry and group theory (B) : The great orthogonality theorm and its importance, character table and its constructions, use in spectroscopy. Mulliken Symbols for Irreducible representations areas of character tables, reduction formula and its application, unit vector transformation, direct product.

Unit III

Orbital symmetries and overlap, hybridization in linear trigonal planar, tetrahedral square planar, square pyramidal and trigonal pyramidal molecules. symmetry and hybridization in Buta-1,3-diene and benzene.

Vibrational Spectroscopy: Symmetry and shapes of AB₂ AB₃AB₄ AB₅& AB₆ mode of bonding of ambidentate ligands, ethylenediamine and di ketonato complexes, applications of Resonance . Raman Spectroscopy particularly for the study of activesites of metalloproteins.

Unit IV

Electron Spin Resonance Spectroscopy: Hyperfine coupling, spin polarization for atoms and transition metal ion, spen-orbit- coupling and significance of g-tensors, Applications to transition metal complexes (having one unpaired electron) including biological systems and to inorganic free radicals such as PH₄, F₂ and [BH₃].

Unit V

Nuclear Magnetic Resonance of Paramagnetic substances in solution. The contact and pseudo contact shifts, factors affecting nuclear relaxation, some applications including biochemical systems, an overview of NMR of metal nuclides with emphasis on195pt and 119sn NMR. Mossbauer Spectroscopy: Basic principles, spectral display applications of the technique of the studies of (1) bonding and structures of Fe^{2+} and Fe^{3+} compounds including those of intermediate spin, (2) Sn^{2+} and Sn^{4+} compounds nature of M-L bond, coordination number, structure and (3) detection of oxidation state and in equivalent MB atoms.

Books Suggested:

- 1. Chemical Applications of Group Theory. F.A. Cotton
- 2. Physical Methods in Chemistry, R.S.Drago, Saunders College.
- 3. NMR, NQR, EPR and Mossbauer Spectroscopy in Inorganic Chemistry, R.V.Parish, Ellis Harwood.
- 4. Structural Methods in Inorganic Chemistry, E.A.V. Ebsworth, D.W.H. Rankin and S. Cradock, ELBS.
- 5. Infrared and Raman Spectra: Inorganic and Coordination Compounds, K. Nakamoto, Wiley.
- 6. Progress in Inorganic Chemistry vol., 8 ed., F.A. Cotton, vol., 15, ed. S.J. Lippard, Wiley.



Compulsory Paper-II

CH-302: APPLICATIONS OF SPECTROSCOPY

UNIT I

Ultraviolet and Visible Spectroscopy

Various electronic transitions (185-800 nm), Instrumentation, Beer-Lambert law, effect of solvent on electronic transitions, ultraviolet bands for carbonyl compounds, unsaturated carbonyl compounds, dienes, conjugated polyenes. Fieser-Woodward rules for conjugated dienes and carbonyl compounds, ultraviolet spectra of aromatic and heterocyclic compounds. Steric effect in biphenyls.

UNIT II

Infrared Spectroscopy

General introduction, Instrumentation and sample handling, Characteristic vibrational frequencies of alkanes, alkenes, alkynes, aromatic compounds, alcohols, ethers, phenols and amines. Detailed study of vibrational frequencies of carbonyl compounds (ketones, aldehydes, esters, amides, acids, anhydrides, lactones, lactames and conjugated carbonyl compounds). Effect of hydrogen bonding and solvent effect on vibrational frequencies, overtones, combination bands and Fermi resonance. FT IR. IR, of gaseous, solids and polymeric materials..

Optical Rotatory Dispersion (ORD) and Circular Dichroism (CD): Definition, deduction of absolute configuration, octant rule for ketones.

UNIT III

Nuclear Magnetic Resonance Spectroscopy

General introduction and definition, chemical shift, spin-spin interaction, shielding mechanism, mechanism of measurement, chemical shift values and correlation for protons bonded to carbon (aliphatic, olefinic, aldehydic and aromatic) and other nuclei (alcohols, phenols, enols, carboxylic acids, amines & amides), chemical exchange, effect of deuteration, complex spin-spin interaction between two, three, four and five nuclei (first order spectra), virtual coupling. Stereochemistry, hindered rotation, Karplus curve-variation of coupling constant with dihedral angle. Simplification

of complex spectra-nuclear magnetic double resonance, contact shift reagents, solvent effects. Fourier transform technique, nuclear Overhauser effect (NOE). Resonance of other nuclei-F, P.

UNIT IV

Carbon-13 NMR Spectroscopy

General considerations, chemical shift (aliphatic, olefinic, alkyne, aromatic, heteroaromatic and carbonyl carbon), coupling constants.

Two dimension NMR spectroscopy – COSY, NOESY, DEPT, INEPT, APT and INADEQUATE techniques. Instrumentation of H^1 and C^{13} NMR and sample handling.

UNIT V

Mass Spectrometry

Introduction, ion production – El, Cl, FD and FAB, factors affecting fragmentative, ion analysis, Instrumentation and sample handling. Mass spectral framentation of organic compounds, common functional groups, molecular ion peak, metastable peak, McLafferty rearrangement. Nitrogen rule. High resolution mass spectrometery. Examples of mass spectral fragmentation of organic compounds with respect to their structure determination.

Books Suggested:

- 1. NMR, NQR, EPR and Mossbauer Spectroscopy in Inorganic Chemistry, R.V. Parish, Ellis Horwood.
- 2. Practical NMR Spectroscopy, M.L. Martin, J.J. Delpeuch and G.J. Martin, Heyden.
- Spectrometric Identification of Organic Compounds, R.M. Silverstein, G.C. Bassler and T.C. Morrill, John Wiley.
- 3. Introduction to NMR Spectyroscopy, R.J. Abraham, J. Fisher and P. Loftus, Wiley.
- 4. Application of Spectroscopy of Organic Compounds, J.R. dyer, Prentice Hall.
- 5. Spectroscopic Methods in Organic Chemistry, D.H. Williams, I. Fleming, Tata McGraw-Hill.

6. Spectroscopy, P. S. Kalsi New Age Publishers

Group A

Elective Paper-I

CH-303A-I: ORGANOTRANSITION METAL CHEMISTRY

UNIT I

Organotransition metal compounds : Definition, Classification and nomenclature of organotransition metal compounds. Comparison of bonding between metal carbonyls and Organotransition metal compounds. Organometallic compounds of inner transition elements

UNIT II

Alkyls and Aryls of Transition Metals: Types, methods of synthesis, thermal stability and decomposition pathways.

UNIT III

Transition Metal π -Complexes

Transition metal π -complexes with unsaturated organic molecules, alkenes, cyclopentadienyls and arenas, methods of synthesis, properties, nature of bonding and structural features.

UNIT IV

Homogeneous Catalysis

Homogeneous catalytic hydrogenation of Alkenes, Zeigler Natta polymerization of olefins, Isomerisation of Alkenes, Hydroformylation, Dimerisation and polymerization of Alkenes and Alkynes.

UNIT V

Organocopper in Organic Synthesis : Conjugated additions, halogen substitution, alkylation of epoxides, alkylation of allylacetates, ketones from acid chlorides.

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Books Suggested:

- Principles and Application of Organotransition Metal Chemistry, J.P. Collman, L.S. Hegsdus, J.R. Norton and R.G. Finke, University Science Books.
- 2. The Organomettalic Chemistry of the Transition Metals, R.H. Crabtree, John, Wiley.
- 3. Metallo-organic Chemistry, A.J. pearson, Wiley.
- 4. Organometallic Chemistry, R.C. Mehrotra and A. Singh, New Age International.

Group A

Elective Paper-II

CH-304A-II: NANOSCIENCE & NANOTECHNOLOGY

Unit I Introduction and Preparation: Introduction to Nano Scale and Nanomaterials, Unique properties of Nanomaterials; Optical, Magnetic, electrical, thermal and chemical properties of Nanomaterials. Bonding, self-assembly, catalysis.

Synthesis of nanomaterial: Chemical Approaches: Chemical reduction; sonochemical synthesis; Sol-Gel Synthesis; Self assembly. Physical Approaches: Aerosol spray; Chemical vapour deposition(CVD) and lithography.

Unit II Nanostructured materials: Classification of nano materials based on dimension and configuration, Nanorods, Nanotubes and Nonofibres, wells & wires. Semiconductors quantum dots.

Inorganic nano materials: Metal/Oxide nanoparticles (NPs).

Organic nano materials- Polymer NPs

Carbon nano materials: Graphenes, Fullerenes, Carbon Nano tubes (CNTs)- Single walled carbon nanotubes (SWNTs), Multiwalled Carbon nanotubes (MWNTs)

Unit III Characterization techniques for Nanomaterials-I:

Electron Microscopy: Scanning electron microscopy (SEM), Transmission electron microscopy (TEM), Scanning Probe Microscopy- Atomic force Microscopy (AFM)

Unit IV Characterization techniques for Nanomaterials-II

Particle size Analyser (Dynamic light scattering), X-ray Differaction (XRD), Auger Emission Spectroscopy, Electron Spectroscopy for Chemical analysis (ESCA)

Unit V Application of Nanomaterials and Nanotechnology:

Impact of Nanotechnology in various fields. Pharmaceutical-Advance durg delivery system, Medical & Health diagnosis through biosensors. Environment-water purification and air pollution control. Consumer goods-cosmetics and sports goods, Defence- Light Military platform and soldier protection.

Books Recommended:

- 1. Essentials in Nanoscience and Nanotechnology, N. Kumar & S. Kumbhat ; John Wiley & Sons.
- Concise Concepts of Nanoscience & Nanomaterials, N. Kumar & S. Kumbhat ; Scientific Publishers.
- 3. Charles P. Poole, Jr. and Frank J.Owens ;Introduction to Nanotechnology, , Wiley, 2003
- G. Cao, Nanostructures and Nanomaterials: Synthesis, Properties and Applications, ICP, London, 2004.
- C.M. Niemeyer and C.A. Mirkin, Nanobiotechnology, Concepts, Applications and perspectives, WILEY-VCH, Verlag Gmb H&Co, 2004.
- 6. G.M.Chow and K.E.Gonslaves ;Nanotechnology Molecularly Designed Materials, (American chemical society)
- 7. K.P.Jain, Physics of semiconductor Nanostructures: Narosa Publishers, 1997
- S.P. Gaponenko, Optical Properties of semiconductor nanocrystals, Cambridge University Press, 1980.
- 9. G. Cao, Nanostructures & Nanomaterials: Synthesis, Properties & Applications, Imperial College Press, 2004.
- 10. T.Pradeep, "Nano: The essentials, Tata Mc Graw Hill, New Delhi, 2007.
- 11. Willard, "Instrumental Methods of Analysis", 2000.

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Group B

Elective Paper-I

CH-303B-I: PHOTOCHEMISTRY

UNIT I

Solar radiation spectrum, Insolation;Photochemical Reactions: Interaction of electromagnetic radiations with matter, types of excitations, fate of excited molecules, quantum yield, transfer of excitation; Properties of excited states: Structure, dipole moment, acid-base strengths, Reactivity; Bimolecular deactivation-quenching. Determination of Reaction Mechanism: Classification,, rate constants and life time of reactive energy states- determination of rate constants of reaction, Effect of light intensity on the rate of photochemical reactions, Types of photochemical reaction- photo-dissociation, gas-phase photolysis.

UNIT II

Photochemistry of Alkenes and Carbony1 Compounds: Intramolecular reactions of the olefinic bond – geometrical isomerism, cyclisation reactions, rearrangement 1,4- and 1,5- dienes; Intramolecular reactions of carbony1 compounds – saturated, cyclic and acylic, β , γ – unsaturated and α , β - unsaturated compounds, Cyclohexadienones; Intermolecular cyloaddition reactions – dimerisations and oxetane formation.

UNIT III

Photochemistry of Aromatic Compounds : Isomerisations, additions and Substitutions; Miscellaneous Photochemical Reactions; Photo-Fires reaction of anilides, Photo- Fries rearrangement, Barton reaction, Singlet molecular oxygen Reactions;Photochemical formation of smog, Photo degradation of polymers, Photochemistry of vision.

UNIT IV

Excited states of metal complexes: Excited states of metal complexes: Comparison with organic compounds, electronically excited states of metal complexes, charges transfer spectra, charge transfer excitations; Ligand field photochemistry: Photosubstitutuion, Photoreduction, lability and Selectivity, Zero vibrational levels of ground state and excited state, energy content of excited state, zero-zero spectroscopic energy, development of the equations for redox potentials of the excited states;Redox reactions by excited metal complexes: Redox reactions of metal complexes in excited states, excited electron transfer using examples [Ru(bpy)]²⁺ complexes and [Fe(bpy)₃]³⁺ complex , role of spin-orbit coupling, life times of excited states in these complexes; Metal complex sensitizers: Metal complex sensitizer, electron relay, metal colloid systems, semiconductor supported metal or oxide systems, water photolysis, nitrogen fixation and carbon dioxide reduction.

UNIT V

Photochemistry and electricity generation; solar energy conversion and storage; Concepts of solar power, maximum current, open-circuit potential, short-circuit current, i-v characteristics, Energy conversion efficiency, Thermodynamic efficiency limit, Quantum efficiency, Maximum power, Fill factor. Solar power storage;Basic principles, fabrication, characteristics, application and latest status of various solar power techniques like Solar steam generator (solar concentrating solar power), Solar chimney or solar cells, Organic/Polymer solar cells, Nanocrystal solar cells, Multijunction photovoltaic cells, Photoeletrochemical cells, Photogalvanic cells, Point-contact solar cells, Porous Nanaoparticulate PEC, Perovskite Solar Cell.

Books Suggested:

- 1. Fundamentals of Photochemistry, K.K. Rohtagi-Mukherji, Wiley-Easter.
- 2. Molecular Photochemistry, N.J. Turro, W.A. Benjamin.
- 3. Introductory Photochemistry, A. Cox and T. Camp, McGraw-Hill.
- 4. Photochemistry, R.P. Kundall and A.Gilbert, Thomson Nelson.
- 5. Organic Photochemistry, J.Coxon and B. Halton, Cambridge University Press.
- 6. Solar Energy Hand Book, J.F. Kreider and F. Krejth, MacGraw Hill Book Co. 1981.

- 7. Solar Energy Conversion, R.C. Neville, Elsevier.
- 8. Alternative Energy Systems, B.K. Hodge, Wiley.
- Advanced Energy Systems, Second Edition, Nicolai V. Khartchenko; Vadym M. Kharchenko, Taylor & Francis.
- 10. Non- Conventional Energy Resources, D.S. Chauhan, New Age International
- 11. Concepts of Inorganic Photochemistry, A.W. Adamson and P.D. Fleischauer, Wiley
- 12. Inorganic Photochemistry, J.Chem.Educ.vol. 60 No. 10, 1983.
- 13. Progress in Inorganic Chemistry, Vol. 30ed. S.J. Lippard. Wiley.
- 14. Photochemistry of Coordination Compounds, V. Balzari and V. Carassiti, Academic Press.
- 15. Elements in Inorganic Photochemistry, G.J. Ferraudi, Wiley..

Group B

Elective Paper-II

CH-304B-II: ORGANIC SYNTHESIS I

UNIT I

Organometallic Reagents

Principle, preparations, properties and applications of the following in organic synthesis with mechanistic details.

Group I and II metal organic compounds- Li, Mg, Hg, Cd, and Zn compounds.

Transition metals- Cu, Pd, Ni, Fe, Co, and Ti compounds.

Other elements- Si and B compounds.

UNIT II

Oxidation

Introduction, Different oxidative processes.

Hydrocarbons- alkenes, aromatic rings, saturated C-H groups (activated and unactivated).

Alcohols, diols, aldehydes, ketones, ketals and carboxylic acids.

Amines, hydrazines, and sulphides.

Oxidations with ruthenium tetraoxide, iodobenzene diacetate and thallium (III) nitrate.

UNIT III

Reduction

Introduction. Different reductive processes.

Hydrocarbons - alkanes, alkenes, alkynes and aromatic rings.

Carbonyl compounds - aldehydes, ketones, acids and their derivatives

Epoxides.

Nitro, nitroso, azo and oxime groups.

Hydrogenolysis.

UNIT IV

Rearrangements

General mechanistic considerations – nature of migration, migratory aptitude, memory effects.A detailed study of the following rearrangements:

Pinacol-pinacolone, Wagner-Meerwein, Demjanov, Benzil-Benzilic acid, Favorskii, Arndt-Eistert synthesis, Neber, Beckmann, Hofmann, Curtius, Schmidt, Baeyer-Villiger, Shapiro reaction.

UNIT V

Metallocenes, Nonbenzenoid Aromatics and Polycyclic Aromatic Compounds.

General considerations, synthesis and reactions of some representative compounds.

Books Suggested:

- 1. Modern Synthetic Reactions, H.O. House, W.A. Benjamin.
- 2. Somer Modern Methods of Organic Synthesis, W. Carruthers, Cambridge Univ. Press.
- 3. Advanced Organic Chemistry, Reactions Mechanisms and Structure, J. March, John Wiley.
- Principles of Organic Synthesis, R.O.C. Norman and J.M. Coxon, Blackie Academic & Professional.
- 5. Advanced Organic Chemistry Part B. F.A. Carey and R.J. Sundberg, Plenum Press.
- 6. Rodd's Chemistry of Carbon Compounds, Ed. S. Coffey, Elsevier.

Group C

Elective Paper-I

CH-303C-I: BIOINORGANIC AND SUPRAMOLECULAR CHEMISTRY

UNIT I

Metal storage Transport: Iron storage and Transport; Oxygen carriers: Hb, Mb, ferritin and transferitin; Bio-mineralization; Iron Transport in Microbs: siderophores.

Calcium in Biology: Storage and Transport of Calcium & calcium in Muscle contraction, transport and regulation, intramoleculer process, extracellular binding protein, Ca²⁺ ATP ase structure, Ca²⁺ ATP ase reaction cycle, intracellular Ca⁺² transport.

UNIT II

Metalloenzyms: Zinc enzymes- carboxy peptidase and carbonic anhydrase. Iron enzymes-Reactivity and structure of catalase, peroxidase and cytochrome P450. Copper enzymes- Reactivity and structure of superoxide dimutase (SOD).

Co enzyme vitamin B_{12} – Names of different forms, biochemical function of cobalamin, Vitamin B_{12} , special characteristics of B_{12} co-enzyme.

UNIT III

Metals and chelates in medicine, metal deficiency and disease, toxic effect of metals, metal used for diagnosis and chemotherapy with particular reference to anticancer drugs.

UNIT IV

Supramoleculer chemistry: Concepts and language moleculer recognization, Principal of molecular receptors designs for different types of molecules, design and synthesis of co- receptor molecules and multiple recognition.

UNIT V

Supramolecular reactions and catalysis, supramolecular assemblies, Molecular and supramolecular devices, molecular and supra molecular photonic, electronic and ionic devices. supramolecular photochemistry

Books suggested:

- 2. Principles of Bioinorganic chemistry, SJ Lippard and J.M. Berg, University science books.
- 3. Bioinorganic chemistry, I Bertini, H.B. Garg, S.J. Lippard and J.S. Valentine, University science books.
- 4. Inorganic Biochemistry, Vol I and II Ed. G.S. Eichhorn, Elsevier progress in inorganic chemistry Vol. 18 and 38 ed. J.J. Lippard, Wiley.
- 5. Supra molecular chemistry, J.M. Lehn, VCH.
- 6. Bioinorganic chemistry, A K. Das Books and allied (P) Ltd.
- 7. Bioinorganic and supra molecular chemistry, Ajay kumar bhagi, G.R. Chatwal Himalaya publishing house.

Group C

Elective Paper-II

CH-304C-II: HETEROCYCLIC CHEMISTRY

UNIT I

Nomenclature of heterocycles: Systemic nomenclature of monocyclic, fused & bridge heterocycles.

Three Membered Heterocyclic Compounds With One Hetero Atom:

Aziridines, Oxiranes and Thiiranes

UNIT II

Four Membered Heterocyclic Compounds with One Hetero Atom:

Azitines & Azitidines; Oxitanes, Thietanes

Bicyclic Ring Systems Derived from Pyrrole, Furan and Thiophene:

Benzopyrroles, benzofurans and benzothiophenes

UNIT III

Five Membered Heterocyclic Compounds with One Hetero Atom:

Tautomerism

Pyrroles, Furans and Thiophenes

Five Membered Heterocyclic Compounds with Two Hetero Atoms:

Pyrazoles, Imidazoles, Oxazoles and Thiazoles

UNIT IV

Six Membered Heterocyclic Compounds With One Hetero Atom:

Pyridines, Pyrylium salts and α - and γ -Pyrones

Six Membered Heterocyclic Compounds with Two Hetero Atoms:

Pyrazines, Pyridazines and Pyrimidines,

Cinnolines and Phthalazines

UNIT V

Seven Membered Heterocyclic Compounds with Two Hetero Atoms:

Azepines, Oxepins and Thiepins

Bicyclic Ring Systems Derived from Pyridine:

Quinoline and Isoquinolune

Books Suggested:

- 1. Heterocyclic Chemistry Vol. 1-3, R.R. Gupta, M. Kumar and V. Gupta, Springer Verlag.
- 2. The Chemistry of Hetrocycles, T. Eicher and S. Hauptmann, Thieme.
- 3. Heterocyclic Chemistry, J.A. Joule, K. Mills and G.F. Smith, Chapman and Hall.
- 4. Heterocyclic Chemistry, T.L., Gilchrist, Longman Scientific Techinal.
- 5. Contemporary Heterocyclic Chemistry, G.R. Newkome and W.W. Paudler, Wiley-Inter Science.
- 6. An Introduction to the Heterocyclic Compounds, R.M. Acheson, John Wiley.
- 7. Comprehensive Heterocyclic Chemistry, A.R. Katritzky and C.W. Rees, eds. Pergamon Press.

Group D

Elective Paper-I

CH-303D-I: NUCLEAR AND RADIOCHEMISTRY

UNIT I

Stability of the nucleus, Mass Energy relationship for nuclear reactions, Properties of nucleus, Nuclear Models (The shell model, the liquid drop model, the fermi gas model, the collective model and the optical model).

Nuclear reactions, Energetics of nuclear reactions, fission and fusion reactions, spallation, fragmentation, stripping and pick up reactions, photonuclear and thermonuclear reactions.

UNIT II

Interaction of radiation with matter, passage of neutrons through matter, interaction of radiation with matter; measurement of radiations. Radiolysis of water, counting techniques (GM Ionisation, proportional and scintillation counter), counting statistics.

UNIT III

Applications of radioactivity, Activation Analysis, isotopic dilution analysis, radiometric titrations, application in chemical investigations and synthesis in physiochemical analysis, in age determination and in prospecting of natural reasources. Medical agricultural and industrial applications, source of electivity. Radiation hazards and protection.

UNIT IV

Nuclear reactors: Basic features, materials and design of nuclear power reactors, Conversion and Breeding, safety features of reactors, Health Physics: Radiation unit (exposure unit), External and doses from various sources of radiations, allowed limit of intake (ALI)

UNIT V

Applications of radioisotopes in biology & molecular biology: biodistribution, metallic & biochemical pathways for protein synthesis, purine nucleotide synthesis, role of methionine in research, radioligand assay, autoradiography, primer extension, Nick translation , hybridization, nucleic acid sequencing.

Books Recommended:

- 1. Essentials of Nuclear Chemistry, H.J. Arnikar.
- 2. Introduction to Nuclear Science, M.W. Sarton, East West Edition.
- 3. Theory of Nuclear Structure, M.K. Pal, East West Edition.
- 4. Principles of Radiochemistry, G.W.A. Newton and V.J. Robinson, Macmilan Education Ltd.
- 5. Nuclear Chemistry, A. Vertes and I. Kiss.
- 6. Fundamental of radiation Chemistry, A. Mojumdar, J. David, Morrisey, G. T. Seaborg
- 7. Fundamentals of Analytical Chemistry, D.A. Skoog, D.M. West and F.J.Holler. Publ. W B Saunders.

Group D

Elective Paper-II

CH-304D-II: MEDICINAL AND PHARMACEUTICAL CHEMISTRY

UNIT I

Drug design & Pharmacodynamics

Procedure followed in drug design, Concepts of lead compound and lead modification, concepts of pro drugs & soft drugs, structure-activity relationship(SAR), Theories of drug activity : occupancy theory, rate theory, induced fit theory .

An Introduction of pharmacodynamics, Mechanism of drug action, elementary treatment of enzyme stimulation, enzyme inhibition, sulphonamides , drug metabolism

UNIT II

Antineoplastic agents :

Inroduction, cancer chemotherapy, role of alkylating agents and antimetabolites in treatment of cancer.Mention of carcinolytic antibiotics and mitotic inhibitors.

Synthesis of cyclophosphamide, Uracil and mustards.

UNIT III

Cardiovascular Drugs :

Intoduction, Cardiovascular diseases, drug inhibitors of peripheral sympathetic function, Synthesis of amylnitrite, sorbitrate, Methyldopa and atenolol.

UNIT IV

Drugs: Psychotic and Antipsychotic -

Inroduction, CNS depressants, general anaesthetics, mode of action of; hypnotics, sedatives, antianxiety drugs. Anti depressants, stereochemical aspects of psychotropic drugs. Synthesis of diazepam, alprazolam and barbiturates..

UNIT V

Antibiotics :

Cell wall biosynthesis , inhibitors , β -lactam rings , antibiotics inhibiting protein synthesis , synthesis of penicillin –G , penicillin – V, Chloramphenicol and Tetracyclin.

Books Suggested:

- 1. Introduction to Medicinal Chemistry, A. Gringuage, Wiley-VCH.
- Wilson and Gisvold's Text Book of Organic Medicinal and Pharmaceutical Chemistry, Ed. Robert F. Dorge.
- 3. An Introduction to Drug Design, S.S. Pandeya and J.R. Dimmock, New Age International.
- Burger's Medicinal Chemistry and Drug Discovery, Vol-1 (Chapter-9 and Ch-14), Ed. M.E. Wolff, John Wiley.
- 5. Goodman and Gilman's Pharmacological Basis of Therapeutics, McGraw-Hill.
- 6. The Organic Chemistry of Drug Design and Drug Action, R.B. Silverman, Academic Press.
- 7. Strategies for Organic Drug Synthesis and Design, D. Lednicer, John Wiley.
Marking Scheme for Practicals III & IV Semester

Inorganic CH-305/405 Lab Course

| 1. 2. 3. 4. | Gravimetric Analysis Rare earth Mixture Inorganic Preparation Viva-voce | | 25 Marks 20 Marks 10 Marks 15 Marks | |
|----------------------|--|-------|--|--|
| | | Total | 70 Marks | |
| | | | | |
| Physic | al CH-308/408 Lab Course | | | |
| <u>1 119510</u> | | | | |
| | | | | |
| 1. | Major Experiment | | 35 Marks | |
| 2. | Minor Experiment | | 20 Marks | |
| 3. | Viva-Voce | | 15 Marks | |
| | | | | |
| | | Total | 70 Marks | |
| Organi | c CH-307/407 Lab Course | | | |
| | | | | |
| 1. | Mixture three components | | 25 Marks | |
| 2. | Extraction | | 10 Marks | |
| 3. | Organic Preparation | | 10 Marks | |
| 4. E | Spectroscopy Viva voca | | 10 Marks | |
| 5. | VIVA-VULE | | | |
| | | | | |
| | | Total | 70 Marks | |
| <u>Analyt</u> | ical CH-306/406 Lab Course | | | |
| 1. | Instrumental-I | | 20 Marks | |
| 2. | Instrumental-II | | 20 Marks | |
| 3. | COD/DO etc | | 15 Marks | |
| 4. | Viva-voce | | 15 Marks | |
| | | | | |

Total 70 Marks

M Sc II YEAR-2020-21

SEMESTER-IV

There will be two compulsory papers and two elective papers.

(<u>A student who had opted group in III Semester will continue with the same group in the IV Semester.</u>)

List of two compulsory papers:

Compulsory Paper-I

CH-401: SOLID STATE CHEMISTRY

Compulsory Paper-II

CH-402: BIO-CHEMISTRY

List of Elective Groups in M.Sc. IV Semester:

GROUP- A

CH 403A-III: INDUSTRIAL CHEMISTRY

CH 404A-IV: POLYMERS

GROUP-B

CH 403B-III: ORGANIC SYNTHESIS II

CH 404B-IV: ADVANCED ELECTROCHEMISTRY AND APPLICATIONS

GROUP-C

CH 403C-III: CHEMISTRY OF NATURAL PRODUCTS

CH 404C-IV: ENVIRONMENTAL CHEMISTRY

GROUP- D

CH 403D-III: PHYSICAL ORGANIC CHEMISTRY

CH 404D-IV: CHEMISTRY OF MATERIALS

Compulsory Paper I

CH-401: SOLID STATE CHEMISTRY

UNIT I

Solid State Reactions and Non-Stoichiometry

Crystalline solid, Solid State Reactions - General principles and Experimental procedures, Wagner's theory in reference to MgO and Al₂O₃, Enhancement of reactivity of solids, Co-precipitation as a precursor to solid state reaction, Kinetics of solid state reaction

Non-Stoichiometry – Introduction, Classification – Small and Large deviations from stoichiometry, Superlattice ordering of defects

UNIT II

Crystal Defects

Perfect crystal and Crystal Defect, Thermodynamic requirement of defect, Intrinsic and Extrinsic defects, Point defects - Schottky, Frenkel, Interstitial atom, Substitutional impurity atom and Color Centre, Line defect – Dislocation (edge and screw), Plane defects - Lineage boundary, Grain Boundary, Stacking fault, Thermodynamics of Schottky and Frenkel defect

UNIT III

Electronic Structure of Solids

Introduction to Free electron theory of Metals, Formation of Energy bands, Valence and Conduction bands, Kronig-Penny Model, Band theory of solids, Brillouin zone, Motion of electrons in a band – velocity and effective mass of an electron, f_k factor, Distinction between metal, semiconductor and insulator on the basis of Band theory

Electrically conducting solids - Conjugated systems, Charge-transfer complexes

UNIT IV

Semiconductors and Properties of Solids

Intrinsic and Extrinsic semiconductors, p-type and n-type semiconductors, Dependence of conductivity of n-type and p-type semiconductors on temperature, p-n Junction

Optical Properties – Photoconduction and Photoelectric effect

Magnetic Properties: Classification of materials – para-, dia-, ferro-, and antiferromagnet, Effect of temperature on magnetic susceptibility of para-, dia-, ferro-, antiferromagnetic substances, Magnetic Hysteresis

UNIT V

Superconductor

Superconductivity, Factors affecting superconductivity, Isotope effect, Meissner Effect, Magnetic effects – Type I and Type II superconductors, Persistent current, BCS theory of superconductivity, Cooper pair, Occurrence of superconductivity– conventional, organic and high temperature superconductors, Fullerene as superconductor

- 1. Solid State Chemistry and its Applications, A.R. West, Plenum
- 2. Principles of Solid State, H.V. Keer, Wiley Eastern
- 3. Solid State Chemistry, D.K. Chakrabarty, New Age International
- 4. Fundamentals of Solid State Physics, B.S. Saxena, R.C. Gupta and P.N. Saxena
- 5. Solid State Physics, A. J. Dekkar, Macmillan

Compulsory Paper II

CH-402: BIO-CHEMISTRY

UNIT I

Metal ions in Biological Systems: Role of metal ions in biological processes.

Dioxygen Uptake: Structure and function of haemoglobin, myoglobin, hemocyanins and hemerythrin, model system and synthetic complexes of iron and Copper. Electron Transfer in Biology: Structure and function of metalloproteins, Cytochromes and iron-sulphur proteins, synthetic models, peroxidases and catalases.

Nitrogenases: Biological nitrogen fixation, molyhydenum nitrogenases, model systems

UNIT II

Enzymes: Introduction and historical perspective, chemical and biological catalysis, remarkable properties of enzymes like catalytic power, binding energy specificity and regulation. Kinetics of enzyme action that is activation energy, Michaelis- Menten equation, Lineweaver Burk plot & factors effecting enzyme activity. Nomenclature and classification. Fischer's lock and key and Koshland's induced fit hypothesis. Types of inhibition, concept and identification of active site by the use of inhibitors and affinity labeling. Transition state theory, acid-base catalysis and covalent catalysis.

UNIT III

Co-Enzyme Chemistry: Cofactors as derived from vitamins, coenzyme, prosthetic groups, apoenzymes. Structure and biological functions of coenzyme A, thiamine pyrophosphate, pyridoxal phosphate, NAD+, NADP+, FMN, FAD, lipoic acid, vitamin B12, Mechanism of reaction catalysed by the above cofactors. Large-scale production and purification of enzymes, techniques.

UNIT IV

Bio-energetic and Bio-polymer Interactions: Standard free energy change in biochemical reactions, exergonic, endergonic. Hydrolysis of ATP, synthesis of ATP from ADP.

Forces involved in biopolymer interactions. Electrostatic charges and molecular expansion, hydrophobic forces, dispersion force interactions. Multiple equilibria and various types of binding processes in biological systems. Hydrogen ion titration curves.

UNIT V

Diffraction Methods and Statistical Mechanics in Biopolymers: Evaluation of size, shape, molecular weight by various experimental techniques. Light scattering,X-ray scattering, X-ray diffraction and photo correlation spectroscopy ORD. Chain configuration of macromolecules and calculation of average dimensions. Polypeptide and protein structures, introduction to protein folding.

- 1. The Inorganic Chemistry of Biological Processes, M.N.Hughes Wiles (1972).
- 2. Bioinorganic Chemistry-An Introduction, Enchiroochiai.
- 3. Principles of Bioinorganic Chemistry, S.J. Lippard and J.M.Berg, University Science Books.
- 4. Bioinorganic Chemistry, I Bertini, H.B. Gray, S.J.Lipard and J.S. Valentine, University Science Books.
- 5. Bioorganic Chemistry: A Chemical Approach to Enzyme Action, Hermann Dugas and C.Penny, Springer-Verlag.
- 6. Understanding Enzymes, Trevor Palmer, Prentice Hall.
- 7. Enzyme Chemistry:Impact and Applications, Ed. Collin J. Suckling, Chapman and Hall.
- 8. Enzyme Mechanisms Ed. M.I.Page and A.Williams, Royal Society of Chemistry.
- 9. Fundamentals of Enzymology, N.C. Price and L. Stevens, Oxford University Press.
- 10. Immobilized Enzymes: An Introduction and Applications in Biotechnology, Michael D. Tevan, John Wiley.
- 11. Enzymatic Reaction Mechanisms, C.Walsh, W.H. freeman.
- 12. Enzynie Structure and Mechanism, A Fersht, W.H. Freeman.
- 13. Biochemistry: The Chemical Reactions of Living Cells, D.E.Metzler, Academic Press.
- 14. Principles of Biochemistry, A.L.Lehninger, Worth Publishers.
- 15. Biochemistry, L. Strver, W.H.Freeman
- 16. Biochemistry, J.David Rawn, Neil Patterson.
- 17. Biochemistry, Voet and Voet, John Wiley.
- 18. Outlines of Biochemistry, E.E.Conn and P.K.Stumpf, Johh Wiley.
- 19. Bioorganic Chemistry: A Chemical Approach to Enzyme Achon. H. Dugas and C.Penny, Springer-Verlag.
- 20. Macromolecules: Structure and Function, F.World, Prentice Hall.

Group A

Elective Paper-I

CH-403A-III: INDUSTRIAL CHEMISTRY

UNIT I

Chemistry of colors

Introduction, Classification of dyes, according to chemical constitution and according to application. General ideas about the synthesis of different dye intermediate and synthetic dyes i.e. direct and reactive dyes, azoic colours, acid and basic dyes, newer cationic dyes for acrylics, Disperse dye, mordent and sulphur dyes. Pigment and fluorescence brightners. Colour fastness against light, washing, perspiration, rubbing etc. and its evaluation. Methods of colour measurements.

UNIT II

Industrial/ Commercial polymers and their compounding ingredients:

General characteristics of Fibers, Plastic, Rubbers and Adhesives-

Structure, properties and preparation of Polyamides, Polystyrene, Polychloride, Polymethylmethacrylate, Polymethacrylate, ABS, Epoxide, IR, SBR, NBR & IIR

Compounding Ingredients: Extenders, Fillers, plasticisers, stabilizers, anti oxidant and anti ozonants, Flame retardants, mould release agents, Sulphur valcanisation.

UNIT III

Ores and Minerals

Inorganic materials of industrial importance, their availability, forms and structure-

Bauxite, clay, mica, zeolites, copper pyrites, zinc blend, dolomite and coal.

UNIT IV

Characteristic Features of surfactants: Conditions under which interfacial phenomena and surfactants become significant. General structural features and behaviour of surfactants : General use of charge types, general effect of nature of hydrophobic group.

UNIT V

Micelle Critical micelle concentration (cmc), factors affecting the value of cmc in aqueous medium.factors determining the extent of Solubilization, effect of Solubilization. Formation of emulsions, factors determining emulsion stability, Mechanism of the cleaning process.

Books Recommended:

1

- 1. Hall, A.J.(8TH ed.): The Standard Hand Book of Textiles, Butter-Worth, London.
- 2. Clark, W.: An Introduction to Textiles Printing, A Practical Manual for use in Laboratories College and School of Arts, Bottorworth, London.
- 3. Shinai, V.A.: technology OF textile processing, Sevak publication, Bombay, Vols. I to IX
- 4. Chakravarty, R.R. : Glimpses of Textile Technology, Caxton Press, Delhi.
- 5. Peters, R.H.: Textile Chemistry, Elsevier, Amsterdam, Vol. I to Vol. II
- 6. Surfactants and Interfacial Phenomenon. Milton J. Rosen, Johan-Wiley, 1978.
- 7. Textbook of Polymer Science, F.W. Billmeyer Jr. Wiley.
- 8. Polymer Science, V.R. Gowariker, N.V. Viswanathan and J. Screedhar, Wiley-Eastern.

Group A

Elective Paper-II

CH-404A-IV: POLYMERS

UNIT I

Basics:

Importance of polymers. Basic concepts: Monomers, repeat units, degree of polymerization. Linear, branched and network polymers.

Classification of polymers.

Polymerization: condensation, addition, radical chain-ionic and co-ordination and co-polymerization. Polymerization conditions and polymer reactions. Polymerization in homogeneous and heterogeneous systems.

UNIT II

Polymer Characterization

Polydispersion-average molecular weight concept. Number, weight and viscocity average molecular weights. Polydispersity and molecular weight distribution. The practical significance of molecular weight. Measurement of molecular weights End-group analysis and ultracentrifugation methods.

Analysis and testing of polymers-chemical analysis of polymers, Microscopy.

Thermal techniques: thermo gravimetric analysis, differential thermal analysis, and physical testingtensile strength, impact. Tear resistance. Hardness and abrasion resistance.

UNIT III

Structure and Properties

Morphology and order in crystalline polymers-configurations of polymer chains. Crystal structures of polymers. Morphology of crystalline polymers, strain-induced morphology, crystallization and melting. Polymer structure and physical properties-crystalline melting point Tm-melting points of

homogeneous series, effect of chain flexibility and other steric factors, entropy and heat of fusion. The glass transition temperature, Tg-Relationship between Tm and Tg, effects of molecular weight, diluents, chemical structure, chain topology, branching and cross linking. Property requirements and polymer utilization.

UNIT IV

Polymer Processing

Plastics, elastomers and fibres. Compounding. Processing techniques: Calendering, die casting, rotational casting, film casting, injection moulding, blow moulding, extrusion moulding, thermoforming, foaming, reinforcing and fibre spining.

UNIT V

Properties of Commercial Polymers

Polyethylene, polyvinyl chloride, polyamides, polyesters, phenolic resins, epoxy resins and silicone polymers. Functional polymers – Fire retarding polymers and electrically conducting polymers. Biomedical polymers – contact lens, dental polymers, artificial heart, kidney, skin and blood cells.

- 1. Textbook of Polymer Science, F.W. Billmeyer Jr. Wiley.
- 2. Polymer Science, V.R. Gowariker, N.V. Viswanathan and J. Screedhar, Wiley-Eastern.
- 3. Functional Monomers and Polymers, K. Takemoto, Y. Inaki and RM. Ottanbrite.
- 4. Contemporary Polymer Chemistry, H.R. Alcock and F.W. Lambe, Prentice Hall.
- 5. Physics and Chemistry of Polymers, J.M.G. Gowie, Blackie Academic and Professional.
- 6. J.M.G. Gowie, Blackie Academic and Professional.

Group B

Elective Paper-I

CH-403B-III: ORGANIC SYNTHESIS II

UNIT I

Disconnection Approach

An introduction to synthons and synthetic equivalents, disconnection approach, functional group inter-conversions, the importance of the order of events in organic synthesis, one group C-X and two group C-X disconnections, chemoselectivity, reversal of polarity, cyclisation reactions, amine synthesis.

UNIT II

Protecting Groups, & Heterocyclic Compounds

Principle of protection of alcohol, amine, carbonyl and carboxyl groups.

Heterocyclic Compounds

IUPAC of Heterocyclic compounds, saturated heterocyclic compounds containing mono-hetero atom (O, S, N), synthesis of 3-, 4-, 5- and 6-membered rings, aromatic heterocyclic compounds in organic synthesis.

UNIT III

One Group C-C Disconnections

Alcohols and carbonyl compounds, regioselectivity. Alkene synthesis, use of acetylenes and aliphatic nitro compounds in organic synthesis.

UNIT IV

Two Group C-C Disconnections

Diels-Alder reaction, 1,3-difunctionalised compounds, α , β -unsaturated carbonyl compounds, control in carbonyl condensations, 1,5-difunctionalised compounds. Micheal addition and Robinson annelation.

UNIT V

Synthesis of Some Complex Molecules

Application of the above in the synthesis of following compounds:

Camphor, Longifoline, Cortisone, Reserpine, vitamin D, Juvabione, Aphidicolin and Fredericamycin A.

- 1. Designing Organic Synthesis, S. Warren, Wiley.
- 2. Organic Synthesis- Concept, Methods and Starting Materials, J. Fuhrhop and G. Penzillin, Verlage VCH.
- 3. Some Modern Methods of Organic Synthesis. W. Carruthers, Cambridge Univ. Press.
- 4. Modern Synthetic Reactions, H.O. House, W.A. Benjamin.
- 5. Advanced Organic Chemistry: Reactions, Mechanisms and Structure, J. March, Wiley.
- 6. Principles of Organic Synthesis, R. Norman and J.M. Coxon, Blackie Academic & Professional.
- 7. Advanced Organic Chemistry Part B, F. A. Carey and R.J. Sundberg, Plenum Press.

Group B

<u>Elective Paper-II</u>

CH-404B-IV: ADVANCED ELECTROCHEMISTRY AND APPLICATIONS

UNIT I

Electrochemical Energy Storage

Properties of Electrochemical energy stores: measure of battery performance, charging and discharging of batteries, storage density, energy density, Classical Batteries: (i) Lead Acid (ii) Nickel- Cadmium (iii) Zinc- Manganese dioxide

Modern Batteries: (i) Zinc Air (ii) Nickel- Metal Hydride (iii) Lithium battery

Future electricity stores: storage in (i) hydrogen (ii) alkali metals (iii) non aqueous solution

UNIT II

Electrochemical Energy Generators

Fuel cells: Hydrogen –Oxygen Cell, Electrochemical solar cell, and Application of Fuel Cell. Comparisons of batteries, fuel cells and super capacitors, electrochemical processes of particular relevance to energy conversion.

UNIT III

Corrosion and Material Protection

Electrochemical corrosion: Fundamentals and mechanism, thermodynamics and stability of metals, theories of corrosion, forms of corrosion, corrosion current and corrosion potential- Evans diagrams. Measurement of corrosion rate: Non electro chemical method and electrochemical method. corrosion monitoring and prevention methods. anodic protection ,by alternation in the medium, by alternation in the metal and design consideration, inhibitors, Green inhibitors.

UNIT IV

Kinetics of Electrode process and their nature

Kinetically and mass transport controlled electrochemical processes, Mass transport by migration, convection and diffusion. , essential of electrode reaction,. Current density, over potential, Tafel equation, Buttler- Volmer equation, Potentiostatic and galvanostatic methods including chronoamperometry, chronopotentiometry.

UNIT-V

Environmental Electrochemistry

Types of electro-organic reactions, constant current and constant potential, electrolysis, cell design, effect of variable, Techniques of electro organic synthesis, overvoltage, application of sewage waste water treatment, electrochemical incineration of human waste in combined space, electro- organic synthesis of novel drugs.

Books Recommended:

- 1. Modern electrochemistry, Vol. l, IIA, Vol. II B, JOM Brockris and A.K.N. Raddy, Plenum publication, New York.
- 2. Electrochemical methods by Allen J. Bard and Larry R.Faulkner, John Wiley.
- 3. Techniques of Electro-organic synthesis part I, II and III by N.L. Weinberg, john wiley.
- 4. Corrosion and Corrosion Engineering chemistry by M.G. Fontana, N.D. Green, McGraw-Hill, New York.
- 5. Electro chemistry by Carl H. Hamann, Andrew Hamett and Wolf Vielstich. Joh
- 6. M. G. Fontana "Corrosion Engineering", Mc Graw Hill, New York, 1997
- 7. ."Corrosion Metal Environment Reactions" eds. L L. Shreir, R. A. Jerman, G. T. Burstein, Butterwirths, London, 1994
- 8. . D. Gabe "Principles of Metal Surface Treatment and Protection", Merlin Books, London, 1993
- 9. Corrosion Inhibitors, Principles & Applications, V.S. Sastry, John Wiley & Sons.
- 10. Electrochemistry for clean environment by Bockrish
- 11. Electrochemistry by D R crow
- 12. Organic electrochemistry by M.M.Baizer

Group C

Elective Paper-I

CH-403C-III: CHEMISTRY OF NATURAL PRODUCTS

UNIT I

Terpenoids and Carotenoids

Classification, nomenclature, occurrence, isolation, general methods of structure determination, isoprene rule, biosynthesis.

Structure determination, synthesis of the following representative molecules: Citral, Geraniol, α -Terpeneol, Zingiberene, Phytol, Abietic acid and β -Carotene.

UNIT II

Alkaloids

Definition, nomenclature and physiological action, occurrence, isolation, general methods of structure elucidation, degradation, classification based on nitrogen heterocyclic ring, role of alkaloids in plants, biosynthesis.

Structure, synthesis of the following:Ephedrine, (+)⁻Cocaine(concine), Nicotine, Quinine and Morphine.

UNIT III

Steroids

Occurrence, nomenclature, basic skeleton, Diel's hydrocarbon, Stereochemistry biosynthesis. Isolation, structure determination of Cholesterol and Bile acids.

UNIT IV

Plant Pigments

Occurrence, nomenclature and general methods of structure determination. Isolation structure and synthesis of Apigenin, Luteolin, Quercetin, Myrcetin, Vitexin, Diadzein, Butein, Aureusin, Cyanidin, Hirsutidin.

Biosynthesis of flavonoids : Acetate pathway and Shikimic acid pathway.

UNIT V

Porphyrins

Structure of Haemoglobin and Chlorophyll.

Prostaglandins

Occurrence, nomenclature, classification, physiological effects. Synthesis of PGE_2 and $PGF_{2\alpha}$

Pyrethroids and Rotenones

Structure and reactions.

- 1. Natural Products: Chemistry and Biological Significance, J. Mann, R.S. Davidson, J.B. Hobbs, D.V. Banthrope and J.B. Harborne, Longman, Essex.
- 2. Organic Chemistry, Vol. 2 I.L. Finar, ELBS.
- 3. Stereoselective Synthesis: A Practical Approach, M. Nogradi, VCH.
- 4. Rodd's Chemistry of Carbon Compounds, Ed. S. Coffey, Elsevier.
- Chemistry, Biological and Pharmacological Properties of Medicinal Plants from the Americas, Ed. Kurt Hostettmann, M.P. Gupta and A. Marston, Harwood Academic Publishers.
- 6. Introduction to Flavonoids, B.A. Bohm, Hardwood Academic Publishers.
- 7. New Trends in Natural Product Chemistry, Atta-ur-Rahman and M.I. Choudhary, Harwood Academic Publishers.
- 8. Insecticides of Natural Origin, Sukh Dev, Harwood Academic Publishers.

Group C

Elective Paper-II

CH-404C-IV: ENVIRONMENTAL CHEMISTRY

UNIT I

Environment; An Introduction, Atmosphere & Air Pollution

Concept & scope of Environmental chemistry; Environmental segments; Environmental Pollution; Classification of pollutants; Bio-geological cycles in the environment: Hydrological cycle, C, N, O, S and P cycles in the environment; Bio-distribution of elements;

Structure and Composition of Atmosphere; Particles, Ions & Radicals in the atmosphere; Major sources of Air Pollutants.

Pollution by C, CO, NO_X, SO_X, HC, Acid Rain, Smog, Particulates; Green House effect/Global Warming, Ozone Layer; Effects & Control of Air Pollutants; Air quality standards; Sampling, Monitoring.

UNIT II

Hydrosphere & Water Pollution

Aquatic environment, Chemical composition of water bodies; Lakes, Streams, Rivers.

Classification of water pollution; Pollution by Pesticides, Polymers, Detergents, Agriculture and Sewage wastes; Purification and Treatment of water;

UNIT III

Lithosphere: Soil Pollution

Introduction: Soil formation, composition & classification; Acid-Base and Ion-exchange reactions in Soil; Macro- and Micronutrients, Soil Profile; Soil fertility and Productivity, Soil erosion, Soil Analysis (Moisture, Nitrogen & pH).

Soil Pollution: Sources & Classification, Effects of Pesticides, Fertilizers & Sediments, Control of soil pollution.

UNIT IV

Industrial Pollution & Toxicology

Classification, Nature and treatment of Industrial Effluents, Industrial Effluents from Distillery, Textile, Cement, Electroplating, Paper & pulp, Dairy & Detergent, Fertilizers, Tanning, .

Toxic Chemicals in the Environment, Biochemical Effects of Ozone, PAN, Carcinogens, Cyanides, Pesticides, Natural & Man-made Disasters.

Solutions to Environmental Problems; Preventive Environmental Management, Better Industrial Processes.

UNIT V

Green Chemistry

Principles and Goals of Green Chemistry, Green chemicals, reagents, catalysts, and solvents. Examples of green synthesis / reactions, Microwave assisted synthesis.

Books Recommended/Suggested

- 1. Environmental Chemistry: Edited by J. O'M. Bockris, Plenum Press.
- 2. Environmental Chemistry: S.E. Manahen, Lewis Publications.
- 3. Environmental Chemistry: H. Kaur, Pragati Prakashan.
- 4. Environmental Chemistry: AK Day, New Age Int. Publishers.
- 5. Environmental Chemistry: SM Khopkar, Wiley Estern.
- 6. Physico-chemical Examination of Water, Sewage & Industrial Effluents: K. Manivasakam.
- 7. An introduction to Green Chemistry, V Kumar, Vishal Publ..

Group D

Elective Paper-I

CH-403D-III: PHYSICAL ORGANIC CHEMISTRY

UNIT I

Principles of Reactivity

Mechanistic significance of entropy, enthalpy and Gibb's free energy. Arrhenius equation. Transition state theory. Uses of activation parameters, Hammond's postulate.Potential energy surface model. Reactivity and selectivity principles.

UNIT II

Kinetic Isotope Effect and Structural Effects:

Theory of isotope effects. Primary and secondary kinetic isotope effects. Heavy atom isotope effects. Tunneling effect. Solvent effects.

Linear free energy relationships (LFER) The Hammett equation, substituent constants, theories of substituent effects. Interpretation of σ -values. Reaction constant ρ . Deviations from Hammett equation. Dual-parameter correlations, inductive substituent constant. The Taft model, σ 1- and σ R-scales.

UNIT III

Solvation and Solvent Effects

Qualitative understanding of solvent-solute effects on reactivity. Thermodynamic measure of solvation. Effects of solvation on reaction rates and equilibria. Various empirical indexes of solvation based on physical properties, solvent-sensitive reaction rates, spectroscopic properties and scales for specific solvation.

UNIT IV

Steric and Conformational Properties

Various type of steric strain and their influence on reactivity. Steric acceleration. Molecular measurements of steric effects upon rates. Steric LFER. Conformational barrier to bond rotation, Rotation around partial double bonds. Winstein-Holness and Curtin-Hammett principle.

UNIT V

Nucleophilic and Electrophilic Reactivity

Structural and electronic effects on SN1 and SN2 reactivity. Solvent effects. Kinetic isotope effects. Intramolecular assistance. Electron trlansfer nature of SN2 reaction. SRN1 mechanism.

Electrophilic reactivity, general mechanism. Kinetic of SE2-Ar reaction. Structural effects on rates and selectivity.

- 1. Molecular Mechanics, U. Burkert and N.L. Allinger, ACS Monograph 177,1982.
- 2. Organic Chemists' Book of Orbitals. L. Salem and W.L. Jorgenses, Academic Press.
- 3. Mechanism and Theory in Organic Chemistry, T.H. Lowry and K.C. Richardson, Harper and Row.
- 4. Introduction to Theoretical Organic Chemistry and Molecular, Modeling, W.B. Smith, VCH, Weinheim.
- 5. Physical Organic Chemistry, N.S. Isaacs, ELBS/Longman.
- 6. Supramolecular Chemistry, Concepts and Perspectives, J.M. Lehn, VCH.
- 7. The Physical Basis of Organic Chemistry, H. Maskill, Oxford University Press.

Group D

Elective Paper-II

CH-404D-IV: CHEMISTRY OF MATERIALS

UNIT I

Multiphase Materials

Classification and properties of materials, Types of phase diagrams, Isomorphous, Eutectic, Peritectic, Monotectic and Eutectiod systems, Calculation of phase amounts from a phase diagram, Phase rule, Ferrous alloys Fe-C phase diagram, Non Ferro alloys, Phase diagrams of brass and tin bronze.

UNIT II

Ceramic Materials

Raw materials of glass, Cement and Ceramics, Refractories, Characterization, Properties and Applications, Abrasives, kinds and uses, Powder metallurgy, Manufacturing process, Properties and Applications, Advantages and Limitations,

UNIT III

Composite Materials

Traditional composites, concrete, Asphalt and Wood, Synthetic composites, dispersion reinforced, Particle reinforced, Laminated and fiber reinforced composites, applications of composites.

UNIT IV

Polymeric and advanced materials : Brief idea of following :Insulating material, Semiconductors, Superconductors, Fullerenes, Optical fibers, Organic electronic material.

UNIT V

Environmental effects of Materials : Corrosion mechanisms of dry and wet corrosion, Galvanic and concentration cell corrosion, Pitting and stress corrosion, Corrosion control methods, Types, preparation and uses of adhesives, Types and Application of paints and Pigments.

- 1. Solid State Physics, N.W. Ashcroft and N.D. Mermin, Saunders College.
- 2. Material Science and Engineering, An Introduction, W.D. Callister, Wiley.
- 3. Principles of the Solid State, H.V. Keer, Wiley Eastern.
- 4. Materials Science, J.C. Anderson, K.D. Leaver, J.M. Alexander and R.D. Rawlings, ELBS.
- 5. Thermotropic Liquid Crystals, Ed., G.W. Gray, John Wiley.
- 6. Handbook of Liquid Crystals, Kelker and Hatz, Chemie Verlag.

LABORATORY COURSES

III & IV Semester(2021-22)

LABORATORY COURSE 1

CH-305/405: INORGANIC LAB

I. Preparation of some Inorganic coordination compounds/ Complexes.

II. Analysis the given mixture for four rare elements.

III. Estimation of three constituent in the given sample of alloy / Coin (Two gravimetrically and one volumetrically).

IV. Spectrophotometry

- a. Iron- phenanthroline complex: Job's Method of continuous variations.
- b. Find out the stability constant of metal complexes by Bjerrum's Method.

V. Complexometry

- **a.** Estimate Zn in given tablet/ sample complexometrically using xylenol orange as an indicator.
- **b.** Estimate Ni in given sample complexometrically using mureoxide as an indicator.

LABORATORY COURSE 2

CH-306/406: ANALYTICAL LAB

I. pH metry:

- 1. To determine the dissociation constants of dibasic and tribasic acids.
- 2. Titration of mixture of acids (HCl + CH₃ COOH) against strong base.

II. Spectrophotometry:

1. Determination of P_{ka} of an indicator (e.g. methyl red) in (a) aqueous and (b) micellor media.

2. Determination of stoichiometry and stability constant of inorganic (e.g. Iron– salicylic acid) and organic (e.g. Amine – Iodine).

3. To determine the concentration of chromium and Complexes a binary mixture.

III. Polarography:

- 1. To study oxygen wave by polorography.
- 2. To characterize and determine Pb^{2+} . Cd^{2+} and Zn^{2+} , ions by polarography/ cyclic voltammetry

IV Fluorometry

1. Determination of strength of Vitamin B (Riboflavin) and Aluminium.

V. Nephelometry

- 1. Determination of sulphate content in water sample.
- 2. Determination of phosphate content in water sample.

VI. Flame photometry

- 1. Estimation of Mg, K and Ca.
- 2. Estimation in a mixture (Na and K; K and Ca).

VII. Water and Waste Water examination:

- 1. DO and BOD determination.
- 2. COD estimation.
- 3. Fluoride and nitrate determination.

VIII. Cement Analysis

IX. Chromatography: Column

- 1. Systematic Qualitative Organic analysis by H. Middleton.
- 2. Qualitative and Quantitative hand book of Organic analysis by H. Clark
- 3. Vogel's Text book of practical Organic Chemistry by Vogel

LABORATORY COURSE 3

CH-307/407: ORGANIC LAB

I. Qualitative Analysis

Separation, purification and identification of three components of a mixture of organic compounds (three solids or two liquids and one solid, two solids and one liquid).

II. Multi-step Synthesis of Organic Compounds

 $Benzophenone \rightarrow Benzpinacol \rightarrow Benzpinacolone$

 \rightarrow Benzophenone \rightarrow Benzophenone oxime \rightarrow Benzanilide

 $\text{Benzoin} \rightarrow \text{Benzil} \rightarrow \text{Benzilic acid}$

Skraup synthesis: Preparation of quinoline from aniline.

Synthesis using microwaves

To carry out oxidation of alcohols and oxime by PCC.

Synthesis using phase transfer catalyst

Alkylation of diethyl malonate or ethyl acetoacetate with an alkyl halide.

III. Extraction of Organic Compounds from Natural Sources

- 1. Isolation of caffeine from tea leaves.
- 2. Isolation of casein from milk (the students are required to try some typical colour reactions of proteins).
- Isolation of lactose from milk (purity of sugar should be checked by TLC and PC and R_fvalue reported).
- 4. Isolation of piperine from black pepper.
- 5. Isolation of lycopene from tomatoes.

- 6. Isolation of -cartoene from carrots.
- 7. Isolation of eugenol from cloves.

IV. Paper Chromatography / TLC

Separation and identification of the sugars present in the given mixture of glucose, fructose and sucrose by paper chromatography and determination of Rf values.

V. Spectroscopy

Identification of organic compounds by the analysis of their spectral data (UV, IR, PMR, MS).

Spectrophotometric (UV/VIS) Estimations

- 2. Amino acids
- 3. Proteins
- 4. Carbohydrates
- 5. Ascorbic acid
- 6. Aspirin
- 7. Caffiene

- 1. Systematic Qualitative Organic analysis by H. Middleton.
- 2. Qualitative and Quantitative hand book of Organic analysis by H. Clark
- 3. Vogel's Text book of practical Organic Chemistry by Vogel
- 4. Practical Organic Chemistry by N.K. Vishnoi.

LABORATORY COURSE 4

CH-308/408: PHYSICAL LAB

I. Chemical Kinetics

- (i) To investigate the kinetics of the reaction between I^{-} and persulphate ion
- (a) Order of the reaction
- (b) Energy of activation of the reaction.
- (c) Effect of ionic strength on rate.
- (ii) To find out the order of the reaction of saponification of ester using unequal concentrations of reactants.

II. Chemical kinetics

- (i) To investigate the kinetics of the reaction between ceric ammonium sulfate and glycollic acid.
- (a) Order with respect to ceric ion.
- (b) Order with respect to glycollic acid.
- (c) Energy of activation of the reaction.
- (d) Effect of ionic strength on rate.
- (e) To study the reaction between cericammonium nitrate and primary alcohol.

II. Thermodynamics

(i) Determination of partial molar volume of solute (e.g.,KCl) and solvent in a binary mixture.

(ii) Determination of the temperature dependence of the solubility of a compound in two solvents having similar intermolecular interactions (benzoic acid in water and in DMSO-water mixture) and calculate the partial molar heat of solution.

III. Phase Equilibrium

- (i) To find out the equilibrium constant for the triiodide formation:
- (ii) To find the formula of complex cuprammonium ion by distribution method.

IV. Conductometry

(i) To find out the equivalent conductance of strong electrolytes at different dilutions and to verify Debye Huckel Onsagar equation.

(ii) To determine the equivalent conductance of a weak electrolyte at infinite dilution.

(iii) To determine the dissociation constant of acetic acid/Oxalic acid and verify the Ostwald's dilution law.

(iv) To determine the degree of hydrolysis and hydrolysis constant of ammonium chloride at room temperature.

(v) To determine the activity coefficient of zinc ions in the solution of 0.002 M ZnSO₄ using Debye-Huckel's Limiting Law.

(vi) Determination of the velocity constant, order of the reaction and energy of activation for saponification of ethyl acetate by NaOH conductometrically.

(vii) To determine the solubility and solubility product of sparingly soluble salt (PbSO₄, BaSO₄)

V. Potentiometry/pH metry

(i) To determine the dissociation constants of weak acids (oxalic, tartaric, phosphoric) using pH meter.

(ii) To determine the temperature dependence of emf of a cell.

(iii) To determine the degree of hydrolysis of aniline hydrochloride for three different solutions at room temperature and hence calculate the hydrolysis constant of the salt and dissociation constant of the base.

(iv) To study the acid-base titration in a non-aqueous media using a pH meter.

(v) To find out thermodynamic constants ΔG , ΔS and ΔH for the reaction by emf measurements.

- 1. Practical Physical Chemistry, A.M. James and F.E. Prichard, Longman.
- 2. Findley's Practical Physical Chemistry, B.P. Levitt, Longman.
- 3. Experimental Physical Chemistry, R.C. Das and B. Behera, Tata McGraw Hill.
- 4. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House.
- Advanced Experimental Chemistry, vol.1 Physical J.N. Gurtu and R. Kapoor, S. Chand & Co.

SYLLABUS M. Sc. Home Science Semester Semester III & IV 2021-2022

P.G. DEPARTMENT OF HOME SCIENCE, J. N. V UNIVERSITY, JODHPUR Semester-wise Theory Papers/Practical/Skill component

Teaching and Examination scheme

| Type of course | Cours e code | Title of the course | Lecture- Tutorial- Practical/Wee | No. of credits | Continuous Comprehensi ve Assessment | End- Semester Examinatio | Total |
|---------------------------|-----------------|--|--|-------------------|--|--|-------|
| | | | K | | (CCA) | n (ESE) [University Examinatio n] | |
| Semester III | | <u>Textile Group – A</u> | | | | - | |
| Core course | 1 | Textile Chemistry and | 4 | 4 | 30 | 70 | 100 |
| H. Sc. – 301- A | 2 | processing | 4 | 4 | 20 | 70 | 100 |
| H Sc = 302 = A | 2 | Construction | 4 | 4 | 30 | /0 | 100 |
| 11. Sc 502 - A | | Techniques | | | | | |
| Core course – | 3 | Quality Control for | 4 | 4 | 30 | 70 | 100 |
| H. Sc303- A | | Textiles and Apparel | | | | | |
| | | Fabrics | | | | | |
| Core course | 4 | Knitting Technology, | 4 | 4 | 30 | 70 | 100 |
| H. Sc304- A | | Knitwear Design and | | | | | |
| Core course | Pr -1 | Textile Chemistry | 8 | 4 | 30 | 70 | 100 |
| Practical | 11. 1 | Textile Chemistry | 0 | • | 50 | 10 | 100 |
| H. Sc305- A | | | | | | | |
| Core course | Pr. – 2 | Quality Control for | 8 | 4 | 30 | 70 | 100 |
| Practical – | | Textiles and Apparel | | | | | |
| H. Sc306 - A | | Conden Studies | 2.0.2 | | | | |
| H Sc -307-A | | Gender Studies | 2-0-2 | | | | |
| Skill Course II | | Population Education | 2-0-2 | | | | |
| H. Sc307- A | | and Community | | | | | |
| | | Health | | | | | |
| Skill Course III | | Nutrition Science: | 2-0-2 | | | | |
| H. Sc307- A | | Basic Concepts | | 24 | 100 | 420 | (00 |
| 10tal Semester IV | | | | 24 | 180 | 420 | 600 |
| Core course – | 1 | Women Fabric | 4 | 4 | 30 | 70 | 100 |
| H. Sc 401- A | _ | Structure, analysis and | - | | | | |
| | | Technical Textiles | | | | | |
| Core course – | 2 | History of Fashion | 4 | 4 | 30 | 70 | 100 |
| H. Sc 402 - A | 2 | and Fashion Design | 4 | 1 | 20 | 70 | 100 |
| $H_{Sc} = 403 - A$ | 5 | and Merchandising | 4 | 4 | 50 | 70 | 100 |
| Core course – | 4 | Garment Production. | 4 | 4 | 30 | 70 | 100 |
| H. Sc 404- A | | Management and | | | | | |
| | | Entrepreneurship | | | | | |
| Core course | Pr1 | Garment Construction | 8 | 4 | 30 | 70 | 100 |
| $Practical - U S_2 = 405$ | | and Commercial Production | | | | | |
| Core course | Pr = 2 | Woven Fabric | 8 | 4 | 30 | 70 | 100 |
| Practical - | 11. 2 | Structures and | 0 | • | 50 | 10 | 100 |
| H. Sc 406- A | | Knitwear Design | | | | | |
| | | Development | | | | | |
| Skill Course I | | Gender Studies | 2-0-2 | | | | |
| H. Sc 407- A | | Domulation Education | 2.0.2 | | | | |
| H. Sc 407- A | | and Community | 2-0-2 | | | | |
| | | Health | | | | | |
| Skill Course III | | Nutrition Science: | 2-0-2 | | | | |
| H. Sc 407- A | | Basic Concepts | | | | | |
| Total | | | | 24 | 180 | 420 | 600 |
| Semester III | | Foods & Nutrition | | | | | |
| Core course | 1 | <u>Group – B</u> Advanced Nutritional | 1 | 1 | 30 | 70 | 100 |
| H. Sc 301- B | 1 | Biochemistry - I | т | т | 50 | 10 | 100 |
| Core course – | 2 | Clinical Nutrition – I | 4 | 4 | 30 | 70 | 100 |
| H. Sc 302- B | | | | | | | |

| Core course $-$ | 3 | Advanced Nutrition - I | 4 | 4 | 30 | 70 | 100 |
|--|--|--|---|--|---|--|---|
| Core course – | 4 | Medical Nutrition | 4 | 4 | 30 | 70 | 100 |
| H. Sc 304- B | Dr 1 | Biochemistry - Blood | 8 | 1 | 30 | 70 | 100 |
| Practical - H. Sc 305- B | 111 | Analysis | 0 | 7 | 50 | 70 | 100 |
| Core course | Pr. – 2 | Dietary counseling. | 8 | 4 | 30 | 70 | 100 |
| Practical – H. Sc 306- B | | and Preparation of | | | | | |
| | | Therapeutic Diets | | | | | |
| Skill Course I | | Gender Studies | 2-0-2 | | | | |
| Skill Course II | | Population Education | 2-0-2 | | | | |
| H. Sc 307- B | | and Community Health | | | | | |
| Skill Course III H Sc - 307- B | | Nutrition Science: Basic Concents | 2-0-2 | | | | |
| Total | | Busic concepts | | 24 | 180 | 420 | 600 |
| Semester IV | | | | | • | | 100 |
| Core course – H Sc - 401- B | 1 | Advanced Nutritional Biochemistry - II | 4 | 4 | 30 | 70 | 100 |
| Core course – | 2 | Clinical Nutrition – II | 4 | 4 | 30 | 70 | 100 |
| H. Sc 402- B | 2 | A | 4 | 4 | 20 | 70 | 100 |
| H. Sc 403- B | 3 | II | 4 | 4 | 30 | /0 | 100 |
| Core course – | 4 | Nutrition in Critical | 4 | 4 | 30 | 70 | 100 |
| H. Sc 404- B | Pr_1 | Care Biochemistry – Food | 8 | 4 | 30 | 70 | 100 |
| Practical – H. Sc 405- B | 111 | Analysis | 0 | | 50 | 70 | 100 |
| Core course | Pr. – 2 | Internship – Visit to | 8 | 4 | 30 | 70 | 100 |
| H. Sc 406- B | | study of patients | | | | | |
| Skill Course I | | Gender Studies | 2-0-2 | | | | |
| H. Sc 407- B | | Dopulation Education | 2.0.2 | | | | |
| H. Sc 407- B | | and Community Health | 2-0-2 | | | | |
| | | | 2.0.2 | | | | i |
| Skill Course III | | Nutrition Science: | 2-0-2 | | | | |
| H. Sc 407- B | | Basic Concepts | 2-0-2 | 24 | 180 | 420 | 600 |
| Skill Course III H. Sc 407- B Total Semester III | | Nutrition Science: Basic Concepts Human Development Group - C | 2-0-2 | 24 | 180 | 420 | 600 |
| Skill Course III H. Sc 407- B Total Semester III Core course – | 1 | Nutrition Science: Basic Concepts Human Development Group - C Parent and | 4 | 24 4 | 180 30 | 420 70 | 600 100 |
| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301- C | 1 | Nutrition Science: Basic Concepts Human Development Group - C Parent and Community Education Guidance and | 4 | 24 4 | 180 30 | 420 70 | 600 100 |
| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301- C Core course – H. Sc. – 302 - C | 1 | Nutrition Science: Basic Concepts <u>Human Development</u> <u>Group - C</u> Parent and Community Education Guidance and Counseling | 4 | 24 4 4 | 180 30 30 | 420 70 70 | 600 100 100 |
| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301- C Core course – H. Sc. – 302 - C Core course – | 1 2 3 | Nutrition Science: Basic Concepts Human Development Group – C Parent and Community Education Guidance and Counseling Theories of Child | 2-0-2 4 4 4 | 24 4 4 4 | 180 30 30 30 | 420 70 70 70 | 600 100 100 100 |
| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301- C Core course – H. Sc. – 302 - C Core course – H. Sc. – 303 - C | 1 2 3 | Nutrition Science: Basic Concepts <u>Human Development</u> <u>Group - C</u> Parent and Community Education Guidance and Counseling Theories of Child Development and Personality | 2-0-2 4 4 4 4 | 24 4 4 4 | 180 30 30 30 30 30 | 420 70 70 70 | 600 100 100 100 |
| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301- C Core course – H. Sc. – 302 - C Core course – H. Sc. – 303 - C | 1 2 3 4 | Nutrition Science: Basic Concepts Human Development Group – C Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care | 2-0-2 4 4 4 4 4 | 24 4 4 4 4 | 180 30 30 30 30 30 30 30 30 | 420 70 70 70 70 | 600 100 100 100 100 |
| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301- C Core course – H. Sc. – 302 - C Core course – H. Sc. – 303 - C Core course – H. Sc. – 304 - C | 1 2 3 4 | Nutrition Science: Basic Concepts <u>Human Development</u> <u>Group - C</u> Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care and Education | 2-0-2 4 4 4 4 4 4 | 24 4 4 4 4 4 | 180 30 30 30 30 30 30 30 | 420 70 70 70 70 70 70 70 70 | 600 100 100 100 100 |
| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301- C Core course – H. Sc. – 302 - C Core course – H. Sc. – 303 - C Core course – H. Sc. – 304 - C Core course Practical – | 1 2 3 4 Pr1 | Nutrition Science: Basic Concepts Human Development Group – C Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care and Education Planning, Preparation of Activities and | 2-0-2 4 4 4 4 4 8 | 24 4 4 4 4 4 4 | 180 30 30 30 30 30 30 30 30 30 30 30 30 30 | 420 70 70 70 70 70 70 70 70 70 70 | 600 100 100 100 100 100 |
| Skill Course III H. Sc 407 - B Total Semester III Core course – H. Sc 301 - C Core course – H. Sc 302 - C Core course – H. Sc 303 - C Core course – H. Sc 304 - C Core course Practical - H. Sc 305 - C | 1 2 3 4 Pr1 | Nutrition Science: Basic Concepts Human Development Group – C Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care and Education Planning, Preparation of Activities and Material for Children | 2-0-2 4 4 4 4 4 8 | 24 4 4 4 4 4 4 | 180 30 30 30 30 30 30 30 30 30 30 30 30 30 | 420 70 70 70 70 70 70 70 70 70 70 70 70 70 | 600 100 100 100 100 100 100 |
| Skill Course III H. Sc 407 - B Total Semester III Core course – H. Sc 301 - C Core course – H. Sc 302 - C Core course – H. Sc 303 - C Core course – H. Sc 304 - C Core course Practical - H. Sc 305 - C Core course Practical – | 1 2 3 4 Pr1 Pr2 | Nutrition Science: Basic Concepts Human Development Group – C Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care and Education Planning, Preparation of Activities and Material for Children Educational Programme for Parent | 2-0-2 4 4 4 4 4 8 8 | 24 4 4 4 4 4 4 4 4 | 180 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 | 420 70 70 70 70 70 70 70 70 70 70 70 70 | 600 100 100 100 100 100 100 |
| Skill Course III H. Sc 407 - B Total Semester III Core course – H. Sc 301 - C Core course – H. Sc 302 - C Core course – H. Sc 303 - C Core course – H. Sc 303 - C Core course Practical - H. Sc 305 - C Core course Practical – H. Sc 306 - C | 1 2 3 4 Pr1 Pr2 | Nutrition Science: Basic Concepts Human Development Group – C Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care and Education Planning, Preparation of Activities and Material for Children Educational Programme for Parent and Community | 2-0-2 4 4 4 4 8 8 | 24 4 4 4 4 4 4 4 4 4 | 180 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 | 420 70 70 70 70 70 70 70 70 70 70 70 | 600 100 100 100 100 100 100 |
| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301 - C Core course – H. Sc 302 - C Core course – H. Sc 303 - C Core course – H. Sc 304 - C Core course Practical - H. Sc 305 - C Core course Practical – H. Sc 306 - C Skill Course I | 1 2 3 4 Pr1 Pr2 | Nutrition Science: Basic Concepts Human Development Group – C Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care and Education Planning, Preparation of Activities and Material for Children Educational Programme for Parent and Community Gender Studies | 2-0-2 4 4 4 4 8 8 2-0-2 | 24 4 4 4 4 4 4 4 4 | 180 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 | 420 70 70 70 70 70 70 70 70 70 70 | 600 100 100 100 100 100 100 |
| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301 - C Core course – H. Sc 302 - C Core course – H. Sc 303 - C Core course – H. Sc 303 - C Core course Practical - H. Sc 305 - C Core course Practical – H. Sc 305 - C Core course Practical – H. Sc 306 - C Skill Course I H. Sc 307 - C Skill Course II | 1 2 3 4 Pr1 Pr2 | Nutrition Science: Basic Concepts Human Development Group – C Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care and Education Planning, Preparation of Activities and Material for Children Educational Programme for Parent and Community Gender Studies Population Education | 2-0-2 4 4 4 4 8 8 2-0-2 2-0-2 | 24 4 4 4 4 4 4 4 4 4 | 180 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 | 420 70 70 70 70 70 70 70 70 70 | 600 100 100 100 100 100 100 |
| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301 - C Core course – H. Sc 302 - C Core course – H. Sc 303 - C Core course – H. Sc 304 - C Core course Practical - H. Sc 304 - C Core course Practical - H. Sc 305 - C Core course Practical – H. Sc 306 - C Skill Course I H. Sc 307 - C | 1 2 3 4 Pr1 Pr2 | Nutrition Science: Basic Concepts <u>Human Development</u> <u>Group – C</u> Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care and Education Planning, Preparation of Activities and Material for Children Educational Programme for Parent and Community Gender Studies Population Education and Community Health | 2-0-2 4 4 4 8 8 2-0-2 2-0-2 2-0-2 | 24 4 4 4 4 4 4 4 4 | 180 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 | 420 70 70 70 70 70 70 70 70 | 600 100 100 100 100 100 100 |
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| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301 - C Core course – H. Sc 302 - C Core course – H. Sc 303 - C Core course – H. Sc 304 - C Core course Practical - H. Sc 304 - C Core course Practical – H. Sc 305 - C Core course Practical – H. Sc 305 - C Skill Course I H. Sc 307 - C Skill Course III H. Sc 307 - C Skill Course III H. Sc 307 - C | 1 2 3 4 Pr1 Pr2 | Nutrition Science: Basic Concepts Human Development <u>Group - C</u> Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care and Education Planning, Preparation of Activities and Material for Children Educational Programme for Parent and Community Gender Studies Population Education and Community Health Nutrition Science: Basic Concepts | 2-0-2 4 4 4 4 8 8 2-0-2 2-0-2 2-0-2 2-0-2 | 24 4 4 4 4 4 4 4 24 | 180 30 <td>420 70 70 70 70 70 70 70 70 420</td> <td>600 100 100 100 100 100 100 100</td> | 420 70 70 70 70 70 70 70 70 420 | 600 100 100 100 100 100 100 100 |
| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301 - C Core course – H. Sc 302 - C Core course – H. Sc 303 - C Core course – H. Sc 304 - C Core course Practical - H. Sc 305 - C Core course Practical – H. Sc 305 - C Core course Practical – H. Sc 306 - C Skill Course I H. Sc 307 - C Skill Course III H. Sc 307 - C Skill Course III H. Sc 307 - C Total Semester IV | 1 2 3 4 Pr1 Pr2 | Nutrition Science: Basic Concepts <u>Human Development</u> <u>Group – C</u> Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care and Education Planning, Preparation of Activities and Material for Children Educational Programme for Parent and Community Gender Studies Population Education and Community Health Nutrition Science: Basic Concepts | 2-0-2 4 4 4 4 8 8 2-0-2 2-0-2 2-0-2 | 24 4 4 4 4 4 4 4 4 4 4 24 24 | 180 30 180 | 420 70 70 70 70 70 70 70 70 70 70 70 70 70 420 | 600 100 100 100 100 100 100 600 6 |
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| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301- C Core course – H. Sc 302 - C Core course – H. Sc 303 - C Core course – H. Sc 304 - C Core course Practical – H. Sc 305 - C Core course Practical – H. Sc 306 - C Skill Course I H. Sc 307 - C Skill Course II H. Sc 307 - C Skill Course III H. Sc 307 - C Skill Course III H. Sc 307 - C C Total Semester IV Core course – H. Sc 401 - C Core course – H. Sc 402 - C | 1 2 3 4 Pr1 Pr2 1 2 | Nutrition Science: Basic Concepts Human Development <u>Group - C</u> Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care and Education Planning, Preparation of Activities and Material for Children Educational Programme for Parent and Community Gender Studies Population Education and Community Health Nutrition Science: Basic Concepts Advanced Family Studies Family and Child welfare | 2-0-2 4 4 4 4 8 8 2-0-2 2-0-2 2-0-2 2-0-2 4 4 4 | 24 | 180 30 | 420 70 | 600 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 |
| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301- C Core course – H. Sc 302 - C Core course – H. Sc 303 - C Core course – H. Sc 304 - C Core course Practical - H. Sc 305 - C Core course Practical – H. Sc 306 - C Skill Course II H. Sc 307 - C Skill Course II H. Sc 307 - C Skill Course III H. Sc 307 - C Skill Course III H. Sc 307 - C Skill Course III H. Sc 307 - C Core course – H. Sc 401 - C Core course – H. Sc 402 - C | 1 2 3 4 Pr1 Pr2 1 2 3 | Nutrition Science: Basic Concepts Human Development <u>Group - C</u> Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care and Education Planning, Preparation of Activities and Material for Children Educational Programme for Parent and Community Gender Studies Population Education and Community Health Nutrition Science: Basic Concepts Advanced Family Studies Family and Child welfare Children with Special Need | 2-0-2 4 4 4 4 8 8 2-0-2 2-0-2 2-0-2 2-0-2 4 4 4 4 4 4 | 24 | 180 30 | 420 70 70 70 70 70 70 70 70 70 70 70 70 70 | 600 100 |
| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301- C Core course – H. Sc 302 - C Core course – H. Sc 303 - C Core course – H. Sc 304 - C Core course Practical - H. Sc 305 - C Core course Practical – H. Sc 306 - C Skill Course I H. Sc 307 - C Skill Course II H. Sc 307 - C Skill Course II H. Sc 307 - C Skill Course II H. Sc 307 - C C Skill Course II H. Sc 307 - C Core course – H. Sc 401 - C Core course – H. Sc 402 - C Core course – H. Sc 403 - C | 1 2 3 4 Pr1 Pr2 | Nutrition Science: Basic Concepts Human Development Group – C Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care and Education Planning, Preparation of Activities and Material for Children Educational Programme for Parent and Community Gender Studies Population Education and Community Health Nutrition Science: Basic Concepts Advanced Family Studies Family and Child welfare Children with Special Need | $ \begin{array}{c} 2-0-2 \\ $ | 24 4 | 180 30 30 | 420 70 70 70 70 70 70 70 70 70 70 70 70 70 | 600 100 |
| Skill Course III H. Sc 407- B Total Semester III Core course – H. Sc 301- C Core course – H. Sc 302 - C Core course – H. Sc 303 - C Core course – H. Sc 304 - C Core course Practical - H. Sc 305 - C Core course Practical – H. Sc 306 - C Skill Course II H. Sc 307 - C Skill Course II H. Sc 307 - C Skill Course III H. Sc 307 - C Skill Course III H. Sc 307 - C Core course – H. Sc 401 - C Core course – H. Sc 402 - C Core course – H. Sc 403 - C | 1 2 3 4 Pr1 Pr2 1 2 3 4 | Nutrition Science: Basic Concepts Human Development Group – C Parent and Community Education Guidance and Counseling Theories of Child Development and Personality Early Childhood Care and Education Planning, Preparation of Activities and Material for Children Educational Programme for Parent and Community Gender Studies Population Education and Community Health Nutrition Science: Basic Concepts Advanced Family Studies Family and Child welfare Children with Special Need Entrepreneurship in Women and Child Care Services | 2-0-2 4 4 4 4 8 8 2-0-2 2-0-2 2-0-2 2-0-2 4 4 4 4 4 4 4 4 4 4 | 24 4 | 180 30 | 420 70 <td>600 100</td> | 600 100 |

| Practical – | | Internship | | | | | |
|------------------|---------|----------------------|-------|----|-----|-----|-----|
| H. Sc. – 405 - C | | | | | | | |
| Core course | Pr. – 2 | Planning programmes | 8 | 4 | 30 | 70 | 100 |
| Practical - | | for Parents and | | | | | |
| H. Sc. – 406 - C | | Community | | | | | |
| Skill Course I | | Gender Studies | 2-0-2 | | | | |
| H. Sc. – 407 - C | | | | | | | |
| Skill Course II | | Population Education | 2-0-2 | | | | |
| H. Sc. – 407 - C | | and Community | | | | | |
| | | Health | | | | | |
| Skill Course III | | Nutrition Science: | 2-0-2 | | | | |
| H. Sc. – 407 - C | | Basic Concepts | | | | | |
| Total | | | | 24 | 180 | 420 | 600 |

(SEMESTER - III) 2021-2022 (GROUP – A) CLOTHING TEXTILE TEXTILE CHEMISTRY AND PROCESSING CORE COURSE – H. Sc. – 301 - A

MM-70 Pd/ wk- 4

Unit - I

- 1. Definition of Polymers, its types, degree and methods of polymerisation, polymerisation process, molecular weights of polymers and its determination.
- 2. Orientation and crystallinity of fibre molecules; their influence on the fibre properties
- 3. Molecular structure and Morphology of cellulose and protein fibres

Unit - II

- 1. History of dyestuffs, light, colour, dyestuffs, Structure & Use wise classification of dyes.
- 2. Colour Colour mixing system, colour order system, CIE colour specification, Instruments for the measurement of colour, understanding Colour difference, Hue, Chroma, etc. Understanding the use of Colour Index Standards, dye shade cards and pantone colour coding.
- 3. Commercial dyes, their C.I. constitution number and their C.I generic number, nomenclature of commercial dyes.
- 4. Introduction on Banned dyes

Unit- III

- 1. Brief chemical composition and properties of wetting agent, softeners (anionic, cationic and non-ionic), detergents, levelling agents, carriers, bleaching agents, thickeners, binders, eco-friendly chemicals
- 2. Introduction to equipments and machineries used in processing
- 3. Brief introduction to Preparatory Processes Singeing, Desizing, Scouring, Bleaching and Mercerization

Unit - IV

- 1. Dyeing Principles of Dyeing and Mechanism of dyes like like direct, reactive, vat, azoic, sulphur, basic, acid, disperse and natural dyes.
- Printing Principles of printing, printing using dyes and pigments on (silk, cotton, Polyester, & blends)
- 3. Fixation of prints using various methods, Innovative Printing methods

Unit - V

- 1. Finishes Classification of finishes, application and mechanism of mechanical (all routine finish),
- 2. Chemical & Specialty Finishes –like (wrinkle free, durable press, flame retardant, water proof, soil & satin release, antibacterial).
- 3. Introduction to Post Treatment of dyed, printed and finished fabrics. (Soaping, rinsing, washing and fixation).

References:

- 1. Technology of Textile Processing Shenai, V.A. (1984), Vol.- IX, Sevak Publication
- 2. Hand Book of Textile Fibers Cook, J. Gordon, Merrow Publishing Co. Ltd, England
- 3. Manmade Fibers Moncrief: R.W, John Wiley & Sons New York.
- 4. Dyeing and Chemical technology of Textile Fibers Trotman, E.R. (1975), Charles Griffino Company Ltd, London.
- 5. An Introduction to Textile Finishing Marsh, J.T. (1979), B. I. Publications.
- 6. Chemicals after Treatment of Textiles Mark H., Wooding N.S. & Atlas Smeeds,(1970), John Wiley & Sons Inc., NY.

PATTERN MAKING AND CONSTRUCTION TECHNIQUES CORE COURSE – H. Sc. – 302 - A

MM-70 Pd/ wk- 4

Unit - I

- 1. Study of Anthropometric measurements- Procedure for taking body measurements for men, women and children
- 2. Formation of standard size chart in relation to asymmetrical and ideal figure types, Evaluation of posture.
- 3. Difference between Drafting, Paper pattern & decoding a pattern.

Unit - II

- 1. Equipments used for measurements, drafting, cutting, stitching and finishing.
- 2. Sewing needles & sewing threads, manufacture fibre used, essential quality of sewing thread.
- 3. Types of machines and attachments used for garment manufacturing domestic and industrial.

Unit - III

- 1. Scope and Importance of Paper Pattern, Different types of patterns.
- 2. Different methods of pattern making.
- 3. Draping and Commercial paper pattern.
- 4. Basic Terminology : Paper Pattern, Templates, Seamless pattern, Block, Grain Line, Working Pattern, Production Pattern, Design Specification Sheet, Cost Sheet, Land Marks, Bowing, Pattern Grading, Bust point, Balance, Notches, Draping, Ease, Pattern Plot, Pivotal point, Bias cut.
- 5. Layout for special fabrics for bold & unidirectional prints, stripes and checks

Unit - IV

- 1. Advanced techniques of pattern making incorporating style lines & fullness.
- 2. Principles of contouring, surplice/off shoulder and halter designs; built-in necklines, cowls and collars.
- 3. Skirts, advanced sleeve variations, exaggerated armholes, pockets, bias cut dresses.
- 4. Jackets, types of pants; pattern adoption to knits.
- 5. Handling of special fabrics while cutting and stitching (Pile, lace, Sheers & Heavy weight, knits and leather)

Unit - V

- 1. Factors affecting good fit.
- 2. Basic pattern alterations in length, width, waist, hipline etc.
- 3. Common problems encountered in fitting & their remedies.
- 4. Grading Terminology, Types of grade, Principles of Grading
- 5. Calculation of cost for different garments.

References:

- 1. Kallal, Marry, Jo., Clothing Construction, MacMillan Press Ltd. 1985.
- 2. Thomas, Anna. Jacob., The Art of Sewing, UBS PD Publishers Ltd., New Delhi.
- 3. Stamper, Sharp & Donell., Evaluating Apparel Quality, Fairchild Publications, New York.
- 4. Graff, J.L, Concepts in Clothing (1976), Mc Graw Hill, New York.
- 5. Readers Digest-A complete guide to sewing, The Readers Digest Association Ltd., London.
- 6. Dress Pattern Designing Natalie Bray
- 7. Garment Technology for Fashion Designers Gerry Cooklin.

QUALITY CONTROL FOR TEXTILES AND APPAREL FABRIC CORE COURSE – H. Sc. – 303 - A

MM-70 Pd/ wk- 4

Unit- 1

- 1. Introduction to Quality standards importance benefits levels & sources of quality standards
- British standards & ISO standards for the apparel industry ISO 9000 & 14000 standards & SA 8000 - Total Quality Management systems. Quality – Introduction – definition & importance
- 3. Quality inspection raw material product online final inspection

Unit- II

- 1. Garment defects: Cutting defects Sewing defects assembly defects Pressing -Finishing &Packaging defects.
- 2. Concepts of TQM tools used for quality assurance

3. Care labels - International care labelling system

Unit-III

- 1. Starting a quality control program
- 2. Implementation of quality system in production line
- 3. Product specification & analysis using analytical tools -
- 4. Quality management through inspection
- 5. Seven quality tools.

Unit-IV

- 1. Testing: Testing of fibre length maturity.
- 2. Yarn Testing testing of yarn strength- yarn count.
- 3. Fabric testing Bursting strength testing Abrasion testing Pilling testing Drapemeter Crease recovery- stiffness testing.

Unit-V

- 1. Accessories testing -Inspecting garments using spec sheets Inspecting garments using measuring tapes - without using measuring tapes
- 2. Button quality testing Interlining quality testing
- 3. Packing a shirt and identifying faults.
- Quality costs & customer returns
 Inspection procedures AQL & apparel quality controls.

References:

- 1. Pradeep V Mehta, Managing Quality in Apparel Industry, NIFT pub.
- 2. Mehta P V, An Introduction to quality control for the apparel industry, Marcel Dekker
- 3. Slater K, Physical Testing & Quality Control, Vol 23, No.1/2/3, Textile Inst. 1993.
- 4. John H Skinkle, Textile Testing, Brooklyn pub. NY
- 5. Sara J Kadolph, Quality Assurance for textiles & apparels, Fairchild pub, 1998.
- 6. Ruth Clock & Grace Kunz, Apparel Manufacture Sewn Product Analysis, Upper Sadale River pub., NY, 2000.

KNITTING TECHNOLOGY, KNITWEAR DESIGN AND CAD **CORE COURSE – H. Sc. – 304 - A**

MM-70 Pd/ wk-4

Unit-1

- 1. Introduction to knitted fabrics. Difference between knits and wovens, Indian knitting industry past, present and future.
- Latest Knitting machines, weft -knitting machines- warp knitting machines Knitted fabric 2. defects.

Unit-II

- 1. Hand knitting, terms used in knitting, weft knitting & warp knitting introduction and comparison.
- 2. Parts and functions of weft knitting and warp knitting machines.
- 3. Knitted garment manufacture: Cutting stitching quality control of knitted garments- knit wear garment designs and developments.

Unit- III

- 1. Wefts knit structures single jersey or plain rib purl interlock Knit- float- tuck and stitch structures – designing of weft structures.
- 2. Warp Knit Fabrics -warp knit structures underlap -overlap closed lap and open lap stitches.

Unit-IV

- 1. Ideal workstation for CAD- Selection of suitable hardware & software; role of computers in Textile and Apparel Designing production.
- 2. Types of images and characteristics; saving of images; colour ways in computers, creation of new designs for textile surface - planning for various weave designs - stripes, checks etc; leading to application and change of fabric texture, print and colour.

Unit-V

- 1. Creation of designs in apparel; texture variation by using effects like embossing, blooming, transparency and translucent look on a garment.
- 2. Use of 3 D software for customisation of created designs as per end uses.

References:

- 1. David J Spencer, Knitting Technology, Pergeman press UK
- 2. Terry Brackenbury, Knitted Clothing Technology, Blackwell Science Publications.
- 3. Samuel Raz, Flat Knitting Technology, Germany.
- 4. Smirfitt, An Introduction to Weft Knitting, Merrow Publications.
- 5. Cegielka L, The knitting Industry: Present needs, future requirements, Vol 19, No. 1, The Textile Institute 1988.
- 6. Winfred Aldrich, CAD in Clothing & Textiles, Blackwell science, 1994 Annual World, Computers in the world of textiles, Textile Institute, UK, 1984. Taylor P,
- 7. Computers in Fashion Industry, Heinemann pub., 1990
- 8. The Textile Institute. Winning through Information Technology, UK. Berkstresser. Buhanan & Graddy, Automation in the Textile Industry: from Fibres to Apparels, The Textile institute, UK.1995
- 9. Veinsinet D O. Computer Aided Drafting & Design-Concept & Application, 1987

PRACTICAL – 5 TEXTILE CHEMISTRY CORE COURSE – H. Sc. – 305 - A

CCA-30 ESE-70 Pd/ wk-8

- 1. Qualitative Identification of fibers cotton, polyester, viscose, polyamide, silk, wool, jute, tencel and others. Use of burning, microscopic, chemical tests.
- 2. Quantitative Analysis of binary blends
- 3. Desizing, scouring and bleaching of grey fabric using chemical and eco-friendly agents
- 4. Dyeing of cotton with direct dye by exhaust method
- 5. Dyeing of wool and silk with acid dye by exhaust method
- 6. Dyeing of polyester with disperse dye by HTHP method
- 7. Use of natural dyes and mordants (Synthetic & natural) to dye and print cotton, silk and wool
- 8. Printing on cotton fabric with reactive dyes and pigment dyes
- 9.Printing on silk with acid dyes, polyester with disperse dye and cotton/polyester blend with disperse and reactive dyes.
- 10.. Finishing- Application of any 2 specialty finishes on cotton, polyester and cotton polyester blend (using pad-dry cure method)
- 11. Identification of dyes, direct, reactive, azo, vat, sulphur, acid and disperse dyes on fabrics.

PRACTICAL – 6 QUALITY CONTROL FOR TEXTILES AND APPAREL CORE COURSE - H. Sc. - 306 - A

CCA-30 ESE-70 Pd/ wk-8

Yarn Testing

- 1. Yarn Crimp in woven fabrics
- 2. Yarn twist -i) Single spun yarn and ply yarn,
- 3. Yarn strength test -i) Single strand test and ii) skein / lea strength test and CSP

Fabric and Garment Testing

- 1. Moisture Regain and moisture content of Textile materials
- 2. Strength Properties of Textile and Apparels
 - a) Breaking force and Elongation of fabrics (Strip and grab test)
 - b) Tearing Strength of woven and non-woven fabrics.
 - c) Bursting Strength of knitted fabrics.

Objective Evaluation of fabric handle -

- 1. Fabric Stiffness (bending length)
- 2. Fabric Drape.
- 3. Crease recovery –
- Fabric / Garment Serviceability -

 - Snag Test
 Pilling Test
 Abrasion Test

Wear Comfort of Clothing -

1. Air Permeability

Thickness Test -

- 1. Woven and Knit fabrics
- 2. Non woven fabrics

Fabric Count and Cover factor -

- 1. Woven Fabrics
- 2. Fabric Count (wales and courses / inch) and Stitch

Dimensional changes in Fabrics and apparels -

- 1. Due to automatic home laundering of woven and knit fabrics
- 2. Due to automatic home laundering of garments

Evaluation of Colourfastness of dyed fabrics / apparels to –

- 1. Artificial Light

- Crocking
 Perspiration
 Washing in Launderometer
- 5. Heat : Hot Pressing

Sewing Threads - tests for -

- 1. Diameter
- 2. Thread Twist and Twist Balance
- 3. Yarn number / Count

GENDER STUDIES SKILL COURSE – H. Sc. – 307 - A

MM-50 Pd/ wk- 2

Unit – 1 Gender and Development:

- Concept of gender, gender roles, changing trends, gender analysis matrix.
- Shift from welfare to development and empowerment, gender in development, gender and development.

Unit – 2

• National and international efforts for gender empowerment.

Unit – 3

- 1. Meaning of status of women A situational analysis demographic, education, employment, political and health (general, occupational, and reproductive)
- 2. Violence against Women- Dowry, divorce, female feticide and infanticide, domestic violence.

Unit – 4

- 1. Sexual harassment and exploitation, trafficking, portrayal of women in mass media. Efforts for elimination of all forms of discrimination
- 2. Policies and Programmes for Women's Development:
- 3. National policy for Empowerment of women, policy perspectives, mainstreaming

Unit – 5

- 1. Economic empowerment- Poverty eradication, micro finance and self-help groups,
- 2. Introduction of laws for domestic violence against women (2005) and sexual harassment (2013)

PRACTICAL COURSE

MM-50 Pd/ wk- 2

- 1. Preparation of E-content for gender sensitization
- 2. Identification and assessment of gender issues in current print and electronic media
- 3. Collection and evaluation of Ten articles on gender issues

POPULATION EDUCATION AND COMMUNITY HEALTH SKILL COURSE – H. Sc. – 307 - A

MM-50 Pd/ wk- 2

Unit – 1: Health and Health Care

- 1. Concepts of health and positive health, Health- disease continuum, factors affecting health, health as a human right.
- 2. Concept of community health, global health, health for all.

Unit – 2

- 1. Primary health care- definitions, principles components, comprehensive health care, levels of prevention, Concept of reproductive health for adolescent girls and boys.
- 2. Health and Development indices
- 3. Health indices and related indices in community health, fertility indicators, vital statistics, mortality, morbidity indicators, demographic indicators - sex ratio

Unit – 3

- 1. Indicators for social and mental health, Human Development index, Disability adjusted life years (DALY). Reproductive Health index. Major Health Problems in India
- 2. Health administrative set up, Peripheral, state, National, urban-rural(Introduction to National Rural Health Mission), National family Health surveys

Unit – 4

1. National Health Programmes- ICDS, AIDS prevention Programme, Reproductive Child Health (RCH) birth control methods, population education

• Concept of population education: Various definitions Significance and scope of population education, Family life education, Sex education, Causes and consequences of population Blast. Trends in population growth terms related to population dynamics

PRACTICAL COURSE

MM-50 Pd/ wk- 2

- 1. Preparation of teaching Aids on population dynamics
- 2. First Aid and home nursing
 - I. Bandages
 - Roller-finger, arm, leg, elbow, knee, cap line
 - Triangular head, palm/foot, slingh
- 2. Bed making
- 3. Recording of temperature
- 4. Use of kidney tray, spittoon, eye glass, thermometer, hot water bag, ice cap, blood pressure estimations, blood sugar testing

NUTRITION SCIENCE: BASIC CONCEPTS SKILL COURSE – H. Sc. – 307 - A

MM-50 Pd/ wk- 2

UNIT – I

Food and nutrition – meaning, functions, classification nutrition and health (Basic concepts) UNIT – II

Food groups – Characteristics of food groups, classification of food groups, Balanced diet, nutrient requirements for various age groups

UNIT – II

Anthropometric assessment of nutritional status

UNIT - IV

- Therapeutic modification of normal diet and reasons for dietary changes in Obesity, congestive heart disease, diabetes, hypertension.
- Dietary counseling

UNIT – V

Food adulteration - Introduction, common adulterants in foods

PRACTICAL COURSE

MM-50 Pd/ wk- 2

1. Assessment of nutritional status of individual and for community group using - weight, height MUAC waist and hip circumferences

2. Qualitative testing of some foods for adulteration

(SEMESTER - IV) 2021-2022 (GROUP – A) CLOTHING & TEXTILE WOVEN FABRIC STRUCTURE ANALYSIS AND TECHNICAL TEXTILES CORE COURSE – H. Sc. – 401 - A

MM-70 Pd/ wk- 4

Unit-I

- 1. Yarn and their Characteristics Continuous Filament and Spun Yarns, Uniformity, Smoothness and lustre, Resistance to flattening, Fibre and yarn strength, Fibre density shape and crimp, Bulked and textured yarns, Core spun and Stretch yarns
- 2. Yarn count (single and folded or ply yarns) different numbering systems, resultant count, yarn diameter, yarn twist and its influence on woven structure

Unit - II

- 1. Brief study of Preparatory Machines Cone and cheese winding machine, Pirn winding, Beam warping machine, Sizing machines and the different yarn packages with their characteristics
- Weaving Looms Brief introduction to working of the following looms Tappet, Dobby, Jacquard, Shuttle less looms (projectile, rapier, water jet, air jet and circular loom) - Basic operations in weaving (Shedding, picking, beating, take up, let off), Drawing in knotting and denting plans

Unit - III

- 1. Elements of cloth structure Weave and weave notation
- 2. Elementary Weaves Plain Weave - Introduction, Classification of plain cloth, Derivatives - Warp rib weave, weft rib weave, matt, Ornamentation of plain weave Twill weave - Introduction, Balance and unbalance twill, angle of twill,
- 3. Sateen and satin weaves General characteristics, regular and irregular sateens and satin
- 4. Other weaves Diamonds and Diapers, Crepe, Honeycomb, Huckaback.
- 5. Warp, weft pile fabric and terry & Turkish towels
- 6. Gauze and net leno, Damask

Unit - IV

- 1. Simple colour and weave effects General considerations, combining weave with colour, representation of colour and weave effect on graph paper
- 2. Classification of colour and weave effect, producing variety of effects using same weave and colour - continuous line effect, Hound's tooth effect, Bird's eye and spot, all over effect. Compound colour and weave effect - Stripe and checks, colour and weave effect

Unit - V

- 1. Technical Textiles Introduction Definition & Scope, Development Processes, Applications, Globalizations, Future prospects of technical textile industry
- 2. Brief introduction to Technical fibres Conventional and New developed fibres and their applications Application of Technical Textiles - Medical textiles, Geo textiles, Defence textiles, Transport textiles, Automotive textiles and others

References:

- 1. Watson Textile Design and Colour– Grosicki, Z.J, Newness Butter Worths.
- 2. Advance Textile Design –William Watson, Longmans Green and Co. Ltd.
- 3. Grammar of Textile Design- Nisbet H., Taraporewale Sons and Co., Bombay.
- 4. Weaving Mechanisms K.T. Aswani Mahajan Book Distributors, Ahmedabad.
- 5. Weaving Calculations R. Sengupta, Taraporewale Sons and Co., Bombay
- 6. Woven Cloth Construction Robinson and Mark, Butter Worth and Co.Ltd, London.
- 7. Elements of Weaving Thorpe, Azaba, Doubleday and Co. New York
- 8. Modern Weaving Singh R. H., Mahanjan Book Distributors, Ahmedabad.
- 9. Weaving Technology Kulkarni M.M., Virinda, Publication, Jalgaon.

10. Yarn and Cloth Calculation. - Amalsar D.M

HISTORY OF FASHION AND FASHION DESIGN **CORE COURSE – H. Sc. – 402 - A**

MM-70 Pd/ wk- 4

Unit - I

- 1. Growth of the couture: The Beginning of Dress
- 2. Couture from Ancient Period (First Century B.C. to Fifth Century A.D.) Egyptian, Greek, Roman, French
- 3. Couture from Middle Age Period (Fifth Century A.D to 15th Century) Italian, French, England, Flemish & German

Unit - II

- 1. Couture from Renaissance Period (15th Century to18th Century)Italian, German, French, Spain, England
- 2. Couture from 18th Century till date France, Italy, England, American, Japanese
- 3. Costumes of India (Past to Present)

Unit - III

- 1. Introduction to Fashion terminologies, concepts, its creation and analysis
- 2. Elements used in creating a design.
- 3. Composition- -with one element-with more than one elements.
- Color- Its sensitivity and composition in dress.
 Harmony- in form of space coverage to design of the dress.

Unit - IV

- 1. Components of fashion: -Style-Silhouette- Details- Color-Texture-Trims
- 2. Fashion Designer and his role in Fashion Industry
- 3. Fashion Forecasting.
- 4. Understanding and sketching of theme based on fashion forecast
- 5. Sourcing of raw materials.

Unit - V

- 1. Developing line, based on fabric and them selected.
- 2. Spec sheet study, Sampling, Garment analysis
- 3. Costing construction of garments, Line presentation, Use of sale promotion material.
- 4. Study of fashion markets and its segments.

5. Designers- International and National.

References:

1. Inside fashion design-Sharon Lee Tate, Harper and row, Publishers New York

2. Life Styles, Fashion Styles-Kathryn Samuel, Orbis, London

3. The Great Fashion Designers-Milbank, C.R. (1985) Couture, Thames and Hudson Publications

4. The Changing World of Fashion-Carter, E (1977), G.P. Putnam's Sons, New York

5. The World of Fashion-Rubin, L. G.(1976), Canfield Press, San Francisco

6. Fashion Kaleidoscope-Castelino, M. (1994), Rup & Co.

7. The Fashion Makers-Walz B. and Morris, B. (1978), Random House

8. Lifestyle – Fashion styles-Samuel, K. (1986), Orbis Book Publishing Corporation Ltd, London

9. Fashion Design and Product Development-Carr, H. and Pomery, J. (1992), Blackwell Scientific Publications, London, Edinburgh, Boston, Abling Bina, Fashion Sketchbook, Fairchild Publishers, New York

10. The Concise History of Costume and Fashion-Laver. James , New York, Harry Abrahams, 1960

11. Costume through the ages-Laver. James , New York, Simon and Schuster, 1968

12. The Mode in Costume-Wilcox. Turner R, New York, Charles Scribner's Sons, 1958

FASHION MARKETING AND MERCHANDISING CORE COURSE – H. Sc. – 403 - A

MM-70 Pd/ wk- 4

Unit - I

1. Fashion Business an introduction and its scope, forms of business organisation.

- 2. Fashion Merchandising An introduction, role of merchandiser.
- 3. Calculation of material cost Design specification sheet & cost sheet.

Unit - II

- 1. International and domestic fashion markets : Haute Couture, Pret-a-porter, mass production.
- 2. Understanding marketing and marketing process: Nature and scope, concept of market.
- Strategic planning in the markets the fashion market and the marketing environment.

Unit - III

- 1. Selecting Target markets : Measuring and forecasting demand. Market segmentation, targeting and positioning for competitive advantage.
- 2. Marketing Research Consumer market and behaviour of consumer.
- 3. Principles of Management :
- 4. Advertising Media, Image, Advertisements.
- 5. Techniques of sales promotion, promotional stores.

Unit -IV

- 1. Consumer Decision Processes and Behaviour; Consumer Analysis & Marketing Strategy;
- 2. Consumer Trends; Market Segmentation; Diffusion of innovation.
- 3. Counterfeit textiles and consumer protection measures; Global Consumer Markets.

Unit- V

- 1. Retail Management :
- 2. Specialty Stores : Single line, stores, single Brand Stores or Private label retailers limited line and multiple line stores.
- 3. Departmental Stores.
- 4. Mass Merchants Discounters, Off price retailers, out let stores.

References:

- 1. Fashion Marketing and Merchandising Pooja Chatley
- 2. Fashion Marketing Mike Essay
- 3. Fashion Buying Halen Goworek Blackwell
- 4. Fashion Concept to Consumer Dickerson, Person.
- 5. Inside Fashion Business Jeanne Thee A.

GARMENT PRODUCTION, MANAGEMENT AND ENTREPRENEURSHIP CORE COURSE – H. Sc. – 404 - A

MM-70 Pd/ wk- 4

Unit- I

- 1. Complexity of management in garment industries- Objective and expectations; status of garment industry in India
- 2. Production, marketing, distribution, consumption and export trends over last five years.

Unit - II

- 1. Personnel management in domestic and export apparel industry
- 2. Government policies in export and imports; effect of trade globalization;
- 3. Problems of apparel industry and remedial measures.

Unit - III

- 1. Supply chain management in Textiles & Apparel
- 2. Principles and role in branding; evaluation of key issues facing Textile and Apparel Designing businesses in global markets considering ethical, economic, political, social and professional implications.
- 3. Developments in textile & apparel industries before and after phasing out quota system.

Unit - IV

- 1. Recent trends in major exporting countries, trade policies; integrated strategies towards fair globalisation- improving competitiveness and social responsibility in the industry.
- 2. Actions, policies and shared responsibilities role of governments, manufacturers, buyers, trade unions and Multinational enterprises.

Unit - V

- 1. Demographics related to textiles & apparel of various countries before and after phasing out quota system
- 2. Analysis of opportunities and extent of utilisation by the leading countries sourcing options considering quality, production capabilities, workers' rights, investment risk, logistics, legal compliance, and trade policies
- 3. Study on supply chain management in textiles & apparel preparation of flow diagrams describing the supply system in different countries and analysis.

References:

- 1. Easey Mike 2000. Fashion Marketing. Blackwell Science.
- 2. Jarnow J & Guessio M. 1991. Inside the Fashion Business. Prentice Hall.
- 3. Paola de Helena & Muellor Stewart Carol 1986. Marketing Todays Fashion. Prentice Hall.

PRACTICAL - 7

GARMENT CONSTRUCTION AND COMMERCIAL PRODUCTION CORE COURSE – H. Sc. – 405 - A

CCA-30 ESE-70 Pd/ wk- 8

- 1. Procedures used in the development of slopers and patterns
- 2. Developing dart less slopers; Princess line variations ; Blouses; Halters and surplice; Vests and their types; Collars; Sleeves- kimono and raglan variations.
- 3. Construction of two children garments
- 4. Drafting and construction of the following : Blouse, Night Wear, Salwar Kameez.
- 5. Construction of Skirt and Blouse by draping method.
- 6. Designing and Construction of the following :
- Night Wear, Salwar Kameez, Trouser, Jacket, Ethnic Dress (Lehnga Choli/ Evening Gown). 4. Preparing two dresses according to fashion on order.

References:

- 1. Bane A. 1996. Creative Clothing Construction. Mc Graw-Hill.
- 2. Connie Amaden-Crawford. 1989. The Art of Fashion Draping. Fair Child Publ.
- 3. Janine Mee & Michal Purdy. 1987. Modelling on the Dress Stand. BSP Professional Books.
- 4. Natalie Bray. 1994. Dress Fitting. Blackwell.

PRACTICAL - 8 WOVEN FABRIC STRUCTURES AND KNITWEAR DESIGN DEVELOPMENT CORE COURSE – H. Sc. – 406 - A

CCA-30 ESE-70 Pd/ wk- 8

- 1. Weaving- Preparation of draft plans, peg plans etc. for all weaves ;Analysis of woven samples ; Weaving samples of various weaves
- 2. Developing designs for weaving- motif preparation and placement, colour and texture plans;
- 3. Documentation of traditional and modified textile designs and development of textile design library.
- 4. Revision and practice on CAD commands; Creating stripes and checks using various commands
- 5. Introduction to commands from different tool groups- file menu, freehand tools, geometric tool, selection tool, selection utility tool, colour utilities tool and general utilities tool; Developing motifs by scanning and drawing using the CAD commands;
- Study & identification of different types of knitted fabrics; Practicing the knitting on flat knitting machines – Familiarisation of commands; making samples of different designs produces ;Making samples of different designs using multicoloured / and complex designing techniques;
- 7. Visit to a knitted garment unit. Visit to an apparel industry
- 8. Inspection of raw material classification and analysis of fabric defects; Study of specification sheets various garments; Analysis of sewing & fasteners quality; Study of quality auditing system in the industry; Quality analysis of selected garments available in the market.
- 9. Students are required to have industrial training in an export house/garment industry for three weeks. The students will prepare and submit a survey report on the industry based on observation and training obtained by them. The students are required to record the detailed information about the industry supported by photographs, samples, diagrams etc.

References:

- 1. Davis L Msrisn. 1980. Visual Design in Dress. Prentice Hall.
- 2. Prakash K. 1994. Impression A Classic Collection of Textile Designs. Design Points.
- 3. Prakash K. 1995. Traditional Indian Motifs for Weaving & Textile Printing.Design Points.
- 4. Rene Weiss Chase 1997. CAD for Fashion Design. Prentice Hall.
- 5. Winfred Aldrich 1992. CAD in Clothing & Textiles. BSP Professional Books.
- 6. Yates MP. 1996. Textiles A Handbook for Designers. W.W. Norton.

GENDER STUDIES SKILL COURSE – H. Sc. – 407 - A

MM-50 Pd/ wk- 2

Unit – 1 Gender and Development:

- Concept of gender, gender roles, changing trends, gender analysis matrix.
- Shift from welfare to development and empowerment, gender in development, gender and development.

Unit – 2

• National and international efforts for gender empowerment.

Unit – 3

- Meaning of status of women A situational analysis demographic, education, employment, political and health (general, occupational, and reproductive)
- Violence against Women- Dowry, divorce, female feticide and infanticide, domestic violence.

Unit – 4

- Sexual harassment and exploitation, trafficking, portrayal of women in mass media. Efforts for elimination of all forms of discrimination
- Policies and Programmes for Women's Development:
- National policy for Empowerment of women, policy perspectives, mainstreaming

Unit – 5

- Economic empowerment- Poverty eradication, micro finance and self-help groups,
- Introduction of laws for domestic violence against women (2005) and sexual harassment (2013)

PRACTICAL COURSE

- Preparation of E-content for gender sensitization
- Identification and assessment of gender issues in current print and electronic media
- Collection and evaluation of Ten articles on gender issues

POPULATION EDUCATION AND COMMUNITY HEALTH SKILL COURSE – H. Sc. – 407 - A

MM-50 Pd/ wk- 2

Unit – 1: Health and Health Care

- Concepts of health and positive health, Health- disease continuum, factors affecting health, health as a human right.
- Concept of community health, global health, health for all.

Unit – 2

- Primary health care- definitions, principles components, comprehensive health care, levels of prevention, Concept of reproductive health for adolescent girls and boys.
- Health and Development indices
- Health indices and related indices in community health, fertility indicators, vital statistics, mortality, morbidity indicators, demographic indicators sex ratio

Unit – 3

- Indicators for social and mental health, Human Development index, Disability adjusted life years (DALY). Reproductive Health index. Major Health Problems in India
- Health administrative set up, Peripheral, state, National, urban-rural(Introduction to National Rural Health Mission), National family Health surveys

Unit – 4

• National Health Programmes- ICDS, AIDS prevention Programme, Reproductive Child Health (RCH) birth control methods, population education

Unit – 5

• Concept of population education: Various definitions Significance and scope of population education, Family life education, Sex education, Causes and consequences of population Blast. Trends in population growth terms related to population dynamics

PRACTICAL COURSE

MM-50 Pd/ wk- 2

- Preparation of teaching Aids on population dynamics
- First Aid and home nursing
 - II. Bandages
 - Roller-finger, arm, leg, elbow, knee, cap line
 - Triangular head, palm/foot, slingh
- Bed making
- Recording of temperature
- Use of kidney tray, spittoon, eye glass, thermometer, hot water bag, ice cap, blood pressure estimations, blood sugar testing

NUTRITION SCIENCE: BASIC CONCEPTS SKILL COURSE – H. Sc. – 407 - A

MM-50 Pd/ wk- 2

UNIT – I

Food and nutrition – meaning, functions, classification nutrition and health (Basic concepts) UNIT – II

Food groups – Characteristics of food groups, classification of food groups, Balanced diet, nutrient requirements for various age groups

UNIT – II

Anthropometric assessment of nutritional status

UNIT – IV

- Therapeutic modification of normal diet and reasons for dietary changes in Obesity, congestive heart disease, diabetes, hypertension.
- Dietary counseling

UNIT – V

Food adulteration – Introduction, common adulterants in foods

PRACTICAL COURSE

MM-50

- Pd/ wk- 2
- Assessment of nutritional status of individual and for community group using weight, height MUAC waist and hip circumferences
- Qualitative testing of some foods for adulteration

(SEMESTER - III) 2021-2020 (GROUP – B) FOODS & NUTRITION ADVANCED NUTRITIONAL BIOCHEMISTRY - I CORE COURSE – H. Sc. – 301 - B

MM-70 Pd/ wk- 4

Unit 1

- Enzyme Distribution, Factors affecting enzyme activity, acture site, mechanism of enzyme action, enzyme inhibition, specificity, Km value and its significance. Enzymes in clinical diagnosis.
- 2. Biological oxidation High energy compounds. Biological oxidation. Electron transport chain. Oxidative phosphorylation

Unit 2

- 1. Introduction to metabolism. Citric acid cycle Inportance, reactions. Role of citric acid cycle in metabolism gluconeogenesis, transamination, deamination and fatty acid synthesis.
- 2. Glycolysis and oxidation of pyruvate.

Unit 3

- 1. Metabolism of glycogen
- 2. Gluconeogenesis and control of blood glueose
- **3.** Pentose phosphate pathway
- 4. Altered metabolism in diabeted mellitus

Unit -4

- 1. Biosynthesis of fatty acides
- 2. Oxidation of fatty acides
 - B- Oxidation, L- and W- oxidation, odd number carbon atoms FA
- 3. Metabolism of ketone bodies

Unit 5

- 1. Bio-synthesis of unsaturated fatty acids. Desaturase system, elongation of FA
- 2. Metabolism of acylglycerols-catabolism. Bio synthesis of triacylglycerol and phospholipids.
- 3. Cholesterol metabolism biosynthesis, regulation, degradation of cholesterol synthesis of bile acids

CLINICAL NUTRITION – I CORE COURSE – H. Sc. – 302 - B

MM-70 Pd/ wk- 4

Unit 1:

- 1. Nutritional and the gastrointestinal- tract malabsorption and patho physiology, carbohydrate intolerance
- 2. Disorders of the Esophagus- Esophagitis, Hiatus, Hernia, Esophageal Reflux, Achalasia, Esophageal obstruction, Indigestion gastritis
- 3. Disorders of the stomach- peptic ulcer. Disorders of small intestine and colon Diarrhea, constipation, irritable colon syndrome, crone's disease, diverticulosis ulcerative colitis

Unit 2:

- 1. Diagnostic tests in gastrointestinal disease- Measurement of motility and gastric acidity. Influence of food on gastric acidity and motility
- 2. Parasitic infections
- 3. Nutrition and liver diseases

Unit 3:

- 1. Gall bladder diseases
- 2. Fevers and Nutrition- Acute and chronic
- 3. Surgery, burns and nutrition

Unit 4:

- 1. Nutrition in types of cardiovascular diseases, Role of lipid and other- Nutrients
- 2. Bile acid metabolism
- 3. Prostaglandins

Unit 5:

- 1. Nutrition and weight managements Obesity, over weight underweight Theroy, diagnosis, prvention & tratment.
- 2. Dietary counseling dietitian code, ethics and responsibilities stepes and follow up programme counseling for different diseases

REFERENCE

• K.M. Varghese Company, Bombay, Comparative Aspects of Nutrition and Metabolic Diseases-CRC Press VIIed. 1988 Joyar M.C and Keteroon: Nutrition and Disease

ADVANCED NUTRITION - I CORE COURSE - H. Sc. - 303 - B

MM-70 Pd/ wk- 4

Unit - 1

- 1. Nutritional Requirements Definition
 - a. Factors influencing the nutrient requirements for deriving RDA
 - i. Probability concept of requirement
 - ii. Age, sex and body weight
 - iii. Individual variability
 - iv. Bioavailability of nutrients
 b. Basic terminology in nutrional requirement minimum, maintenance, safe requirements, and subsistence allowance, RDA, RNIs, dietary reference intakes (DRIs.)
 - c. Internationally used definitions RDA, adequate intake (AI), upper level (UL), estimated average requirement (EAR)
 - d. Reference Indian adult man and woman
- 2. Human energy requirements
 - a. Introduction, units of energy, definition of energy requirement (ER), total energy expenditure (TEE)
 - b. Components of energy requirements basal metabolism, metabolic response to food, physical activity (PAL, PAR), growth, pregnancy, lactation.

Unit - 2

- 1. Factors affecting energy expenditure and requirements
 - a. Factors affecting BMR
 - b. Factors affecting the thermic effect of food
 - c. Factors affecting the energy expended in physical activity
- 2. Methods of estimation of energy expenditure and requirements
- **3.** Energy requirements and recommendations infants, children and adolescent, adults, pregnancy and lactation

Unit - 3

- 1. Energy imbalance changes in body weight and body composition
- 2. Dietary fibre components and classification, properties. Effects of DF, health benefits and intake of fibre
- 3. Registant starch (RS)
- 4. Fructo oligosaccharides (FOS)

Unit - 4

- 1. Protein- methods of determination of protein PER, digestibility coefficient, biological value, NPU, NPR, protein energy rotio (NDP cal%)
- 2. Improvement of quality of protein in the diet mutual supplementation, supplementation with individual amino acids
- **3.** Factors influencing protein requirements at different stages of life age, environment temperature, previous diet, physical activity
- 4. Nutritional requirements recommended allowances for proteins and amino acids

Unit - 5

- 1. Dietary fat chemistry
- 2. Classification of fatty acids
 - a. Saturated and unsaturated
 - b. Short, medium and long chain
 - c. Essential fatty acids trans fatty acids
- 3. Non-glycoside components and there nutritional and health promoting effects
- 4. Recommendation of FAO and WHO on dietary fats
- 5. RDA for Indians in 1990
- 6. Sources of fat in Indian diets- invisible and visible fats
- 7. Recommended intake of dietary fats for Indians
 - a. Quantity of visible fat
 - i. Minimum for adults, pregnant and lactating woment, infants, children and adolescents
 - ii. Maximum levels

- 1. Quality of fat
- Quality of total fat from diet other then visible fat
 Choice of cooking medium ie n-3 and n-6 fatty acid ratio in Indian diet
- Choice of cooking medium ie n-3 and n-6 fatty acid ratio in Indian diet
 Role of dietary fatty acids in perverting CHD and other diet related non-communicable diseases (DR-NCD)
- 9. Excessive fat intake
 - a. Changing trends in dietary intake
 - b. Eating out
 - c. Diseases: Association and preventive measures

MEDICAL NUTRITION CORE COURSE – H. Sc. – 304 - B

MM-70 Pd/ wk- 4

Unit – 1

- 1. Dietetics the science and art of human nutrition care.
- 2. Role and types of Dietitian in health care units.
- 3. Comprehensive nutritional services for patients in hospitals concept, risk factors, nutritional stress, interpersonal relation with the patient.

Unit-2

- 1. Nutritional care process model.
- 2. Nutritional assessment for critical and bed ridden patient.
- 3. Enteral feeds, their characteristics, enteral formula composition, enteral commercial formulas for adults and pediatrics.

Unit -3

- 1. Anthropometric measures for hospitalized patient.
- 2. Diagnostic test parameters for hospitalized patient.
- **3.** Preliminary steps in making diet chart for patient.

Unit – 4

- 1. Patient care and counseling.
- 2. Nutrition monitoring and evaluation.
- 3. Rehabilitation services and centers.

Unit – 5

- 1. Hospital administration.
- 2. Documentation in nutrition care record, medical record, charting system.
- 3. Food handling and serving of food in hospitals.

PRACTICAL – 5 BIOCHEMISTRY - BLOOD ANALYSIS CORE COURSE – H. Sc. – 305 - B

CCA-30 ESE-70 Pd/ wk- 8

Blood analysis:

- Blood count
- DLC
- Hemoglobin Estimation
- Blood film
- Urine: Glucose detection
- Enzyme Assay: Alkaline Phosphates transaminase
- SGOT, SGPT

PRACTICAL – 6 DIETARY COUNSELING. PLANNING CACULATION AND PREPARATION OF THERAPEUTIC DIETS CORE COURSE – H. Sc. – 306 - B

17

- Dietary Counseling
- Planning, calculation, preparation, services, evaluation of therapeutic diets, covered in theory the practical diarrohoea, constipation, peptic ulcer, hepatitis, cirrohosis, acute & chroinc fever, obesity and under weight.

GENDER STUDIES SKILL COURSE – H. Sc. – 307 - B

MM-50 Pd/ wk- 2

Unit – 1 Gender and Development:

- Concept of gender, gender roles, changing trends, gender analysis matrix.
- Shift from welfare to development and empowerment, gender in development, gender and development.

Unit – 2

• National and international efforts for gender empowerment.

Unit – 3

- Meaning of status of women A situational analysis demographic, education, employment, political and health (general, occupational, and reproductive)
- Violence against Women- Dowry, divorce, female feticide and infanticide, domestic violence.

Unit – 4

- Sexual harassment and exploitation, trafficking, portrayal of women in mass media. Efforts for elimination of all forms of discrimination
- Policies and Programmes for Women's Development:
- National policy for Empowerment of women, policy perspectives, mainstreaming

Unit – 5

- Economic empowerment- Poverty eradication, micro finance and self-help groups,
- Introduction of laws for domestic violence against women (2005) and sexual harassment (2013)

PRACTICAL COURSE

MM-50 Pd/ wk- 2

- Preparation of E-content for gender sensitization
- Identification and assessment of gender issues in current print and electronic media
- Collection and evaluation of Ten articles on gender issues

POPULATION EDUCATION AND COMMUNITY HEALTH SKILL COURSE – H. Sc. – 307 - B

MM-50 Pd/ wk- 2

Unit – 1: Health and Health Care

- Concepts of health and positive health, Health- disease continuum, factors affecting health, health as a human right.
- Concept of community health, global health, health for all.

Unit – 2

- Primary health care- definitions, principles components, comprehensive health care, levels of prevention, Concept of reproductive health for adolescent girls and boys.
- Health and Development indices
- Health indices and related indices in community health, fertility indicators, vital statistics, mortality, morbidity indicators, demographic indicators sex ratio
- Unit 3
 - Indicators for social and mental health, Human Development index, Disability adjusted life years (DALY). Reproductive Health index. Major Health Problems in India
 - Health administrative set up, Peripheral, state, National, urban-rural(Introduction to National Rural Health Mission), National family Health surveys

Unit – 4

• National Health Programmes- ICDS, AIDS prevention Programme, Reproductive Child Health (RCH) birth control methods, population education

Unit – 5

• Concept of population education: Various definitions Significance and scope of population education, Family life education, Sex education, Causes and consequences of population Blast. Trends in population growth terms related to population dynamics

PRACTICAL COURSE

MM-50 Pd/ wk- 2

- Preparation of teaching Aids on population dynamics
- First Aid and home nursing
 - III. Bandages
 - Roller-finger, arm, leg, elbow, knee, cap line
 - Triangular head, palm/foot, slingh
- Bed making
- Recording of temperature
- Use of kidney tray, spittoon, eye glass, thermometer, hot water bag, ice cap, blood pressure estimations, blood sugar testing

NUTRITION SCIENCE: BASIC CONCEPTS SKILL COURSE – H. Sc. – 307 - B

MM-50 Pd/ wk- 2

UNIT – I

Food and nutrition – meaning, functions, classification nutrition and health (Basic concepts) UNIT – II

Food groups – Characteristics of food groups, classification of food groups, Balanced diet, nutrient requirements for various age groups

UNIT – II

Anthropometric assessment of nutritional status

UNIT – IV

- Therapeutic modification of normal diet and reasons for dietary changes in Obesity, congestive heart disease, diabetes, hypertension.
- Dietary counseling

UNIT – V

Food adulteration - Introduction, common adulterants in foods

PRACTICAL COURSE

MM-50

Pd/ wk- 2

- Assessment of nutritional status of individual and for community group using weight, height MUAC waist and hip circumferences
- Qualitative testing of some foods for adulteration

(SEMESTER - IV) 2021-2022 (GROUP – B) FOODS & NUTRITION ADVANCED NUTRITIONAL BIOCHEMISTRY - II CORE COURSE – H. Sc. – 401 - B

MM-70 Pd/ wk- 4

Unit – 1

Metabolism of proteins and amino acids –

- 1. Amino acid pool, metabolism of AA transamination, deamination
- 2. Bio synthesis of nutritionally nonessential amino acids
- 3. Metabolism of ammonia, bio-synthesis of urea

Unit – 2

- 1. Catabolism of the carbon skeletons of amino acids, creative and creatinine synthesis
- 2. Changes in blood picture in protein malnutrition

Unit – 3

- 1. Nucleic acid mechanics of DNA. Replication and transcription of DNA and translation
- 2. Protein bio-synthesis
- 3. Bio synthesis, regulation and breakdown of purine and pyrimidine nucleotides.

Unit – 4

Hormones - introduction, definition

1. Hypothalamic hormones

- a. Regulation of release, bio-chemical functions and abnormalities of
- 2. Anterior pituitary hormones
 - a. The growth hormone prolactin group
 - b. The glycoprotein hormones
 - c. The pre-opiomelanocartin peptide family
- 3. Posterior pituitary hormones
 - a. Oxytocin
 - b. Antidiuretie hormone (ADH)
- 4. Thyroid hormones thyroxine (T4)
- 5. Triidothyroxine (T3)

Unit – 5

Synthesis, biochemical functions, abnormalities of hormones of

- 1. Adrenal cortex adrenocortico steroids
- 2. Adrenal medulla catecholamines epinpnrine and norepinephrine
- 3. Hormones of gonads Androgens Estrogens, Progesterone
- 4. The menstrual cycle
 - a. Follicular and luteal phase
 - b. menopause

CLINICAL NUTRITION – II CORE COURSE – H. Sc. – 402 - B

MM-70 Pd/ wk- 4

Unit 1:

- 1. Nutrition and Dental health- Structure, development and maturation of dental caries, role of nutrients in dental health
- 2. Food allergy
- 3. Renal diseases- Previous diseases in brief. Acute and chronic renal disease.

Unit 2:

1. Nutrition and cancer- carcinogenesis and mutagenesis, types of cancer, metabolic effects of cancer- cancer cachexia, anorexia. Nutrition effects of cancer therapy- surgery, radiation therapy, Chemotherapy, Immune therapy, nutrients and their relationship with cancer

Unit 3:

1. Diabetes Mellitus- Nature, classification, high risk factors, metabolic effects, symptoms, diagnosis for diabetes treatment- diet, nutritional requirement, glycogenic sweeteners, drugs, acute complication in diabetes

Unit 4:

- 1. Food nutrient and drug interaction- classes of drug, their gastrointestinal side effects, other nutritional effects and their dietary precautions
- 2. Drug metabolism
- 3. Effects of drugs on nutrition- Alteration in taste, appetite and food intake, alteration in nutrient absorption, alteration in nutrient metabolism, alteration in nutrient excretion

Unit 5:

- 1. Effects of food on drug utilization- Alteration in drug absorption, alteration in drug metabolism and drug excretion
- 2. Alcohol and metabolism, effects of alcohol and nutrition, wrenickes and korsakoffs syndromes
- 3. Diet counseling steps and computer application in clinical nutrition

REFERENCE

- Anita, F.P.: Clinical Dietetics and Nutrition, Oxford Univ. Press UJ ed. 1989
- Shills, M.E. and Young, V.R.: Modern Nutrition in Health and Disease
- K.M. Varghese Company, Bombay, Comparative Aspects of Nutrition and Metabolic Diseases-CRC Press VIIed. 1988 Joyar M.C and Keteroon: Nutrition and Disease

ADVANCED NUTRITION - II CORE COURSE – H. Sc. – 403 - B

MM-70 Pd/ wk- 4

Unit – 1

1. Vitamins bioavailability, requirements and interaction with other nutrients. Preventive and therapeutic measures (inapplicable) fat soluble vitamins – A, D, E, K. water soluble vitamins B

complex – Thiamin, Riboflarin, Niacin, Pyridoxine (B6) folate, cynocobalamine (B12) Ascorbic acid

Unit – 2

Mineral

- 1. The significance of inleractions among the minerals and the dietary requirements of various minerals for different age groups
 - Macro minerals calcium, phosphorus magnesium, sodium, potassium
 - Micro minerals iron, iodine, zinc, copper, selenium, chromium, managanese and fluorine

Unit – 3

- 1. Inborn errors of metabolism
 - a. Carbohydrate metabolism
 - b. Amino acid metabolism
 - c. Lipid metabolism
 - d. Lipoproteins classification and composition
 - e. Hyper lipoproteinemia
 - f. Vitamin therapy

Unit – 4

- 1. The elderly introduction
 - a. Definition of old age
 - b. Nutrition and ageing
 - c. Physiological changes
 - d. Changes in body composition and techniques for measuring
 - e. Nutritional requirements and dietary modification
 - f. Guidelines for planning diet for elderly

Unit – 5

Nutritional requirement for special conditions

- 1. Introduction
- 2. Calamity and emergency management
- 3. Information refuired for management of emergencies
- 4. Nutritional requirement for extreme environements Hot, cold, high, altitude, space misstion

NUTRITION IN CRITICAL CARE CORE COURSE – H. Sc. – 404 - B

MM-70 Pd/ wk- 4

Unit -1

- 1. Management of critically ill patient.
 - . Mechanically ventilated
 - . Handicapped
 - . Paralytic
- 2. Special feeding methods for critically ill patient through needle.

Unit – 2

- 1. Nutrition interventions and strategies for individual level of patient, meaning and steps involved.
- 2. Nutrition for terminally ill patient- Angioplasty, stenting, heart ,liver and kidney transplant, dialysis, cancer patient, multiple organ failure patient.

Unit – 3

- 1. Nutritional support in home care.
- 2. Patient social and behavioral change, factors and ability to change.
- 3. Nutrition care plan and evaluation of effectiveness in care of patient.

Unit – 4

- 1. Nutrition during stress (depression) Physiologic hormonal role, causes, factors, prevention through diet, exercise and yoga.
- 2. Family support and counseling during stress.

Unit – 5

- 1. Nutrition in neurological disorders Dysphagia, alzheimers disease (dementia), parkinsons disease ,epilepsy.
- 2. Nutrition measure and strategies for combating risk of diseases: Osteoporosis, rheumatoid, asthma, CAD, diabetes and cancer.

REFERENCES

- Willick, M.: Nutrition in the 20th Century: Current Concepts in Nutrition Research Advances in Nutrition
- Solomans and Rosenberg: Absorption and Malabsorption on Mineral Elements

PRACTICAL – 7 BIOCHEMISTRY – FOOD ANALYSIS CORE COURSE – H. Sc. – 405 - B

CCA-30 ESE-70 Pd/ wk- 8

Estimation of Calcium in food. Estimation of Protein by Biuret method. Colorimetric and flurometric Method: - Estimation Phosphorus of Vit. A, C & riboflavin in foods Chromatography:

Glucose, Iron, total and free cholesterol, creatinine in urine (qualitative analysis).

PRACTICAL – 8 INTERNSHIP – VISIT TO HOSPITAL AND CASE STUDY CORE COURSE – H. Sc. – 406 - B

CCA-30 ESE-70

Pd/ wk- 8

- Block placement of the students in the real work situations of hospitals: Medical ward, Dietary department for 6 to 8 wks.
- Planning, calculation and preparation of diets in Protein Energy malnutrition, Vitamin A deficiency- Gluten free diet, renal diseases. hypertension, hyperlipidaemia, diabetes, gall bladder.

GENDER STUDIES SKILL COURSE – H. Sc. – 407 - B

MM-50 Pd/ wk- 2

Unit – 1 Gender and Development:

- Concept of gender, gender roles, changing trends, gender analysis matrix.
- Shift from welfare to development and empowerment, gender in development, gender and development.

Unit – 2

• National and international efforts for gender empowerment.

Unit – 3

- Meaning of status of women A situational analysis demographic, education, employment, political and health (general, occupational, and reproductive)
- Violence against Women- Dowry, divorce, female feticide and infanticide, domestic violence.

Unit – 4

- Sexual harassment and exploitation, trafficking, portrayal of women in mass media. Efforts for elimination of all forms of discrimination
- Policies and Programmes for Women's Development:
- National policy for Empowerment of women, policy perspectives, mainstreaming

Unit – 5

- Economic empowerment- Poverty eradication, micro finance and self-help groups,
- Introduction of laws for domestic violence against women (2005) and sexual harassment (2013)

PRACTICAL COURSE

MM-50 Pd/ wk- 2

- Preparation of E-content for gender sensitization
- Identification and assessment of gender issues in current print and electronic media
- Collection and evaluation of Ten articles on gender issues

POPULATION EDUCATION AND COMMUNITY HEALTH SKILL COURSE – H. Sc. – 407 - B

MM-50 Pd/ wk- 2

Unit – 1: Health and Health Care

- Concepts of health and positive health, Health- disease continuum, factors affecting health, health as a human right.
- Concept of community health, global health, health for all.

Unit – 2

- Primary health care- definitions, principles components, comprehensive health care, levels of prevention, Concept of reproductive health for adolescent girls and boys.
- Health and Development indices
- Health indices and related indices in community health, fertility indicators, vital statistics, mortality, morbidity indicators, demographic indicators sex ratio

Unit – 3

- Indicators for social and mental health, Human Development index, Disability adjusted life years (DALY). Reproductive Health index. Major Health Problems in India
- Health administrative set up, Peripheral, state, National, urban-rural(Introduction to National Rural Health Mission), National family Health surveys

Unit – 4

• National Health Programmes- ICDS, AIDS prevention Programme, Reproductive Child Health (RCH) birth control methods, population education

Unit – 5

• Concept of population education: Various definitions Significance and scope of population education, Family life education, Sex education, Causes and consequences of population Blast. Trends in population growth terms related to population dynamics

PRACTICAL COURSE

MM-50 Pd/ wk- 2

- Preparation of teaching Aids on population dynamics
- First Aid and home nursing
 - IV. Bandages
 - Roller-finger, arm, leg, elbow, knee, cap line
 - Triangular head, palm/foot, slingh
- Bed making
- Recording of temperature
- Use of kidney tray, spittoon, eye glass, thermometer, hot water bag, ice cap, blood pressure estimations, blood sugar testing

NUTRITION SCIENCE: BASIC CONCEPTS SKILL COURSE – H. Sc – 407 - B

MM-50 Pd/ wk- 2

UNIT – I

Food and nutrition – meaning, functions, classification nutrition and health (Basic concepts) UNIT – II

Food groups – Characteristics of food groups, classification of food groups, Balanced diet, nutrient requirements for various age groups

UNIT – II

Anthropometric assessment of nutritional status

UNIT – IV

- Therapeutic modification of normal diet and reasons for dietary changes in Obesity, congestive heart disease, diabetes, hypertension.
- Dietary counseling

UNIT - V

Food adulteration – Introduction, common adulterants in foods

PRACTICAL COURSE

MM-50

Pd/ wk- 2

- Assessment of nutritional status of individual and for community group using weight, height MUAC waist and hip circumferences
- Qualitative testing of some foods for adulteration

SEMESTER - III) 2021-2022 (GROUP – C) HUMAN DEVELOPMENT PARENT AND COMMUNITY EDUCATION CORE COURSE – H. Sc. – 301 - C

MM-70 Pd/ wk- 4

- 1. Parent education
- 2. Aims and objectives ,Purpose, Importance
- 3. Parent and community co-operation in planning programmes :
- a. For community education and development
- b. For parent education and development

Unit 2

Unit 1

- 1. Parenthood: The nature and characteristics of Parent-Child Relations, Concept of parenthood, parenting skills,
- 2. Role of parents: Mothering and Fathering Characteristics and determinants. Grandparents as co-parents
- 3. Diversity of Contemporary Families: Changing concept of parenthood and childhood. Strategies for contemporary parenting.

Unit 3

- 1. Developmental Interaction in the Child-Rearing Years: Child birth and the transition to parenthood, evolving personal Concepts of parenthood, providing structure and nurturance for infants, supports for care giving in Infancy.
- 2. Developmental Interactions in Early Childhood: Parenting young children, providing nurturance for young children, beginning socialization experiences, refining parenting behaviors and styles.
- 3. Developmental Interactions in Middle Childhood: New models of parenting behavior, continuing socialization experiences, parenting school age children, discovering personal capacities and sense of responsibility.
- 4. Developmental Interactions in Adolescents and Early Adulthood: Parental role in development of a sense of personal identity and adjustment to puberty, developing healthy sexual relations. Establishing a sense of intimacy in Early Adulthood, preparation for independent living.

Unit 4

- 1. Challenging Issues of Contemporary Parenting: Parenting in the Single Parent Family System, Step Family System, High- Risk Families (Abusive families, Addiction, Violence affected).
- 2. Special Concerns of Parenting (in short): Adoption Issues, Parenting Child with special needs, Homosexuality and parenting, Maltreatment and parents.
- 3. Services for parents: Family Counselling, Parental Coaching, guidance services and forums for parents.

Unit 5

- 1. Community Education: objectives, targets & goals, techniques, components, sources of information, adoption of new ideas & practices, content & principles of community education, audio-visual aids in community education.
- 2. Parental and community awareness and perceptions about children and media
- 3. Impact of media on family dynamics

REFERENCES

- Burgers and Locke: The Family, American Book Co. New York 1953
- Duvalh E.: Family development, J.B. Lippincott, New York, 3rd ed. 1967
- Foster: Marriage and Family Relations, Macmillan, 1950

GUIDANCE AND COUNSELLING CORE COURSE – H. Sc. – 302 - C

Unit – 1

- 1. Meaning, concept, need, principles, philosophy and aims of guidance. Principles and techniques of group guidance.
- 2. The process of counseling:
 - Stages
 - Problem exploration and classification Stage
 - Developing new perspective and setting goals Stage
 - Implementation and evaluation

Unit – 2

1. Counseling Techniques and Practices: Rapport techniques and practices, Questioning, Listening, Reflecting, Acceptance, Silence, Leading, Reassurance, Non-verbal behavior, Terminating Skills-Special Consideration, Structuring the process, optimal concern. Recording counseling process

Unit – 3

- 1. Need of counseling
- 2. Counseling Theories: Key concepts and techniques, Cognitive behavior modification strategies like self-instruction
- 3. Gestalt approach

Unit – 4

- 1. Transactional approach, Behavior Therapy modification, rational emotive Therapy- Areas of guidance:Educational, vocational and personal concept.
- 2. Characteristics of an effective counselor: The Clients characteristics, Age, Sex, Cultural expectations

Unit - 5

Ethics in counselling

- 1. Type of Counseling- Individual, Group, Child Therapy, Marriage & Family, Vocational guidance and counseling, Ethics in counseling
- 2. Techniques of collecting information-testing and non-testing(brief description)

REFERENCES

- Mehta, D.S.: Handbook of Disabled in India, Allied Publishers Private Ltd. Bombay, 1983
- Smith, M.S., Naisworti, J.T.: The Exceptional Child: A Functional Approach, McGraw Hill, 1975
- Encyclopedia of Social Work in India, 3 volumes, Director, Publication Division, Ministry of Information & Broadcasting, India, Planning Commission
- Chaudhary, P.D.: Child Welfare and Development, Atmaram and Sons, New Delhi, 1980
- Crukshank, W.M. & Johanson, G. O.: Education of Exceptional Children, Oxford Publication Comp. 1970
- Gajendragadkar, D.N.: Disabled in India, Somaiya Publishers, 1983
- Udia Shanker: Exceptional Children, Sterling Publishers Ltd. New Delhi
- Chapman: Management of Emotional Problem of Children and Adolescence
- Jessie Francis Williams: Children with Specific Living Difficulties, Pergamon Press, 2nd ed.
- Frussive, E.C. and Barbe, WE. (Edited); Educating Children with Living Disabilities, Appellatives Century Crofts Pub. New York, 1967
- State, D.H.: Helping Children with Learning Difficulties, World Locke Educationals
- Geraheart, B.R.: Learning Disabilities: Education strategies Mosby college publishing, 1985
- Bumard, P. (1999). Counselling skills training. New Delhi: Viva Books.

THEORIES OF CHILD DEVELOPMENT AND PERSONALITY CORE COURSE – H. Sc. – 303 - C

MM-70 Pd/ wk- 4

Unit - 1

- 1. Theoretical perspectives in behavior and development: Introduction, Role of theory, Nature of behavior theory, Importance of theories in understanding behavior
- 2. Principles, basic concept, critique and implication of theories: Psychodynamic theories
 - Freud's Psychoanalytic theory and
 - Erickson's Psycho social theory

Unit - 2

1. Learning theories with reference to Pavlov, Watson, Skinner, Harlow and Sears

2. James Lange theory of emotion and Kohlberg's theory of morality

Unit – 3

- 1. Cognitive Organism theory of Piaget
- 2. Vygotsky of Cognition & Socio cultural theory
- Unit 4
 - 1. Ecological theory of Bronfenbrenner's
 - 2. Attachment theory of Bowlbey
- Unit 5
 - 1. Kohlberg's theory or morality
 - 2. Overall theory of child development

REFERENCES

- Baldwin, A.L.: Theories of Child Development, John Willey, 1980
- Maier, H.W.: Three Theories of Child Development, Harper and Row, 3rd Ed.
- Bandura, A.: Social Learning Theory, Englewood Cliff N.J. Prentice Hall, 1977
- Brontenbrenner, U.: The Ecology of Human development, Cambridge Harvard Univ. Press. 1979
- Hall & Londsey: Theories of Personality, N.Y. 1970
- Langer. J.: Theories of Development, Holt, Rinehart & Winston, New York, 1969

EARLY CHILDHOOD CARE AND EDUCATION CORE COURSE – H. Sc. – 304 - C

MM-70 Pd/ wk- 4

Unit 1

- 1. Introduction to Early Childhood Care and Education
- 2. Importance, need and scope of ECCE
- 3. Objectives of ECCE
- 4. Play way methods and its difference from formal and non-formal methods
- 5. Types of preschools/programs: Play centers, day care, Montessori, kindergarten, Balwadi, Anganwadi, Crèche,Nursery school etc.

Unit 2

- 1. Philosophical foundations of Early Childhood Care and Education
 - Western contributions: Pestalozzi, Rousseau, Frobel, Montessori and John Dewey
 - Indian Contributors: M.K. Gandhi, Rabindranath Tagore, Tarabai Modak, Gijubai Badheka

Unit 3

- 1. Development of ECCE in India
- 2. Evolution of ECCE in India
 - Pre Independence period
 - Post Independence: Contribution of Five Year Plans, Kothari Commission, Yashpal Committee, Maharashtra Preschool Center, Act to Right to Education Bill
- 3. Contribution of the following agencies/programmes to ECCE in India
- ICCW, IAPE, NCERT, ICDS, UNICEF, NCTE, Mobile Crèches.

Unit 4

- 1. Concept of organization and administration of early childhood centers
- 2. Administrative set up and functions of personnel working at different levels. Staff/personnel service conditions. Role and responsibilities, essential qualities of a care giver/teacher, other personnel.
- 3. Building and equipment: Location and site, arrangement of rooms, different types and size of rooms, play ground, storage facilities, selection of different types of outdoor and indoor equipment, maintenance and display of equipment and material.
- 4. Record and Report: Types, aim and purpose/need, general characteristics e.g., anecdotal, cumulative, sample work, medical, Budget etc.

Unit5

- 1. Programme Planning
 - Planning: Setting goals and objectives of plans- long term, short term, weekly and daily planning. Routine and schedules
 - Teaching and learning strategies
 - Need and use of Individual Education Plan (IEP)
- 2. Construction of early childhood curriculum
 - Teaching language, math's, science and cognitive concepts,Use of art, music, drama and literature in the classroom
 - Curriculum content, Pedagogical practices and Educational settings.
 - Principles of curriculum development Text book content, syllabi and other learning resources curriculum model Processes in assessment and evaluation

3. Role of teacher in classroom processes • School discipline, reward and punishment

• Adequacy of Facilities • Learning without burden • Practices in child focused education • Inclusion of children with disadvantage and disabilities •Dropout, retention and continuity in schooling. • De-schooling, home - schooling and out of school learning

PRACTICAL -5 PLANNING, PREPARATION OF ACTIVITIES AND MATERIAL FOR CHILDREN CORE COURSE – H. Sc. – 305 - C

CCA-30 ESE-70 Pd/ wk- 8

- 1. Preparing a book of story/rhymes for preschool child
- 2. visit to Nursery School/Anganwadi/ Day Care Centers/Crèches/Orphanages and prepare report
- 3. A educational kit/toy for a preschool child
- 4. Preparing a quiz for school going children based on their interest
- 5. Organizing FGD in schools for adolescents on issues of their interest
- 6. Participation in a nursery school to plan, execute, supervise and evaluate its activities Assessing administrative problem,

PRACTICAL -6 EDUCATIONAL PROGRAMME FOR PARENT AND COMMUNITY CORE COURSE – H. Sc. – 306 - C

CCA-30 ESE-70 Pd/ wk- 8

- 1. Visit to different community based centers and prepare reports.
- 2. Preparation of teaching aid for parents & community
- Demonstration of teaching aids for a.Parents
 b.Community education
- 4. Preparing a handbook for parent education
- 5. plan, implement and evaluate the programme/workshop for parent and community, prepare report
- 6. conduct a connselling session for parents

GENDER STUDIES SKILL COURSE – H. Sc. – 307 - C

MM-50 Pd/ wk- 2

Unit – 1 Gender and Development:

- Concept of gender, gender roles, changing trends, gender analysis matrix.
- Shift from welfare to development and empowerment, gender in development, gender and development.

Unit – 2

• National and international efforts for gender empowerment.

Unit – 3

- Meaning of status of women A situational analysis demographic, education, employment, political and health (general, occupational, and reproductive)
- Violence against Women- Dowry, divorce, female feticide and infanticide, domestic violence.

Unit – 4

- Sexual harassment and exploitation, trafficking, portrayal of women in mass media. Efforts for elimination of all forms of discrimination
- Policies and Programmes for Women's Development:
- National policy for Empowerment of women, policy perspectives, mainstreaming Unit 5
 - Economic empowerment- Poverty eradication, micro finance and self-help groups,
 - Introduction of laws for domestic violence against women (2005) and sexual harassment (2013)

PRACTICAL COURSE

- Preparation of E-content for gender sensitization
- Identification and assessment of gender issues in current print and electronic media
- Collection and evaluation of Ten articles on gender issues

POPULATION EDUCATION AND COMMUNITY HEALTH SKILL COURSE – H. Sc. – 307 - C

MM-50 Pd/ wk- 2

- Unit 1: Health and Health Care
 - Concepts of health and positive health, Health- disease continuum, factors affecting health, health as a human right.
 - Concept of community health, global health, health for all.

Unit – 2

- Primary health care- definitions, principles components, comprehensive health care, levels of prevention, Concept of reproductive health for adolescent girls and boys.
- Health and Development indices
- Health indices and related indices in community health, fertility indicators, vital statistics, mortality, morbidity indicators, demographic indicators sex ratio

Unit – 3

- Indicators for social and mental health, Human Development index, Disability adjusted life years (DALY). Reproductive Health index. Major Health Problems in India
- Health administrative set up, Peripheral, state, National, urban-rural(Introduction to National Rural Health Mission), National family Health surveys

Unit – 4

- National Health Programmes- ICDS, AIDS prevention Programme, Reproductive Child Health (RCH) birth control methods, population education
- Unit 5
 - Concept of population education: Various definitions Significance and scope of population education, Family life education, Sex education, Causes and consequences of population Blast. Trends in population growth terms related to population dynamics

PRACTICAL COURSE

MM-50 Pd/ wk- 2

- Preparation of teaching Aids on population dynamics
- First Aid and home nursing

V. Bandages

- Roller-finger, arm, leg, elbow, knee, cap line
- Triangular head, palm/foot, slingh
- Bed making
- Recording of temperature
- Use of kidney tray, spittoon, eye glass, thermometer, hot water bag, ice cap, blood pressure estimations, blood sugar testing

NUTRITION SCIENCE: BASIC CONCEPTS SKILL COURSE – H. Sc. – 307 - C

MM-50 Pd/ wk- 2

UNIT – I

- Food and nutrition meaning, functions, classification nutrition and health (Basic concepts) UNIT II
 - Food groups Characteristics of food groups, classification of food groups, Balanced diet, nutrient requirements for various age groups

UNIT – II

Anthropometric assessment of nutritional status

UNIT – IV

- Therapeutic modification of normal diet and reasons for dietary changes in Obesity, congestive heart disease, diabetes, hypertension.
- Dietary counseling

UNIT - V

Food adulteration – Introduction, common adulterants in foods

PRACTICAL COURSE

MM-50 Pd/ wk- 2

- Assessment of nutritional status of individual and for community group using weight, height MUAC waist and hip circumferences
- Qualitative testing of some foods for adulteration

(SEMESTER – IV) 2021-2022 (GROUP – C) HUMAN DEVELOPMENT ADVANCED FAMILY STUDIES CORE COURSE – H. Sc. – 401 - C

MM-70 Pd/ wk- 4

Unit - 1

Marriage:

- 1. Concept, need, importance of marriage for individual/family/society
- 2. Preparation of marriage
- 3. Cultural aspects in marriage
- 4. Legal aspects of marriage
- 5. Marital counseling
- 6. Effect of modernization on marriage.
- 7. Kinship: Concept, Types, usages and roles

Unit – 2

- 1. Approaches to family studies
 - Development approach
 - Interactional approach
 - Institutional approach
 - Structural functional approach
 - Systems approach
 - Exchange Theory
- 2. The family in social context
 - Family and society
 - Changing sex-role and man women relationship
 - Functions of modern families: Urban, Rural, sociocultural background
 - Population problems and family

Unit 3

- 1. Conceptual overview of family life cycle
 - Stages in family life cycle and their developmental task
 - Problems of parenthood at different stages
 - Socialization of the child
 - Parental strategies in child rearing

Unit – 4

- 1. Pattern of marital adjustment, areas of adjustment (Money, in-law and sex)
- 2. Employment of women and family conflict & adjustment
- 3. Generation Gap and adjustment

Unit 5

- 1. Family Disorganization
 - Meaning, Types of Conflicts and resolving conflicts
- 2. Contemporary Issues: Dynamics, Intervention and Relief Programs
 - Family violence, battered women, child maltreatment and sexual abuse
 - Families in trouble separation and divorce, remarriage
 - Single parents family

REFERENCES

- Duvalh E.: Family development, J.B. Lippincott, New York, 3rd ed. 1967
- Foster: Marriage and Family Relations, Macmillan, 1950
- Hill R. and Waller: The Family, Holt Rinehart and Winstion, New York (Latest ed.)
- Kapadia, K.M.: Marriage and Family, Oxford, Calcutta Univ. Press, 3rd ed. 1972

- Prabhy: Hindar Social Organization, Popular Book Co. 1954
- Williamson, R.C.: Marriage and Family Relations, Collier Macmillan, London, 1969

FAMILY AND CHILD WELFARE CORE COURSE – H. Sc. – 402 - C

MM-70 Pd/ wk- 4

Unit – 1

- 1. Concept, meaning, definition and scope of family and child welfare
- 2. Relationship of parent, child and society
- 3. Rights and responsibilities of society & parents: Convention on child rights

Unit – 2

- 1. Historical orientation of family and child welfare services in India
- 2. International and National agencies involved in family and child welfare (objectives and major services) UNICAF, CARE, NIPCCD, CSWB, NCW

Unit – 3

- 1. Supportive and substitutive services for child and family (objectives and services)
 - a. Services for infants (crèche, mobile crèche, nutrition and health services etc.)
 - b. Services for children
 - i. Need for family focus in welfare programmes for children
 - ii. Nutrition services
 - iii. Health services
 - iv. Education services
 - v. Recreational services
 - vi. Protection services

Unit – 4

- 1. Services for women. Maternal, health and nutrition, protection (PCPNDT) domestic violence bill, education and empowerment services etc.
- 2. Services for family as a unit (economic, social and psychological)

Unit – 5

- 1. Problem of child trafficking, substance abuse: nature indeedneed management
- 2. Monitoring and evaluation of family and child welfare programmes with special reference to ICDS

REFERENCES

- Encyclopedia of Social Work in India, 3 volumes, Director, Publication Division, Ministry of Information & Broadcasting, India, Planning Commission
- Chaudhary, P.D.: Child Welfare and Development, Atmaram and Sons, New Delhi, 1980
- D'Souza , Alfred: Women in Contemporary India and South Asia, Macha publication, New Delhi, 1970
- Kapoor, Premilla: Marriage and Working Women in India, Vikas Publication, Delhi. 1970
- Desai, N.: Women in Modern India, Vora and Company, Princess Street Bombay, 1977
- Wornen and the Law of inheritance, 1981-82
- Mitra, Ashok: The Status of Women, Literacy and Employment, Allied Publishers Pvt. Ltd., Bombay, 1979
- International Women's year book edited by Roy Kinkier, 1975, Bashodhary Publication, Bombay
- Research Unit on Women Studies, Women in India, SNDT Women University, April, 1981
- D'SWza, Alfred: Women in contemporary India , Traditional Images and Changing Rules
- Jain Devaki: Women's Quest for Power Five Indian Case Studies, Vikash Publication House Pvt., Sahibabad, India, 1980
- Govt. of India. Ministry of Health & Family Welfare (1982). National Mental health program for India.
- Grahamm, P.J., Jegede, R.O., Kapur, M. Minde, C., Nikapota. A.P. & Sell, H.L. (1983). A manual on child mental health and psychosocial development Part II, for primary health workers, New Delhi WHO

CHILDREN WITH SPECIAL NEED CORE COURSE – H. Sc. – 403 - C

MM-70 Pd/ wk- 4

Unit -1

Disabilities and Disability Studies

- 2. Various approaches to defining and understanding disability: the biomedical, social, rehabilitation, legal and education model.
- 3. The role of context in the meaning of normality and disability

Unit -2

- 1. Disability: Major Types and their Understanding
- 2. Nature, classification, causes, assessment, treatment, training and rehabilitation of the following:
 - Physical and Loco motor impairments
 - Intellectual impairments: Mental Retardation
 - Sensory Impairments: Visual and Hearing Impairment

Unit -3

- 1. Nature, Causes and Assessment of the following (Briefly)
 - Learning Disabilities
 - Giftedness
 - Communication Disorders

Unit -4

- 1. Autistic Spectrum Disorders and Pervasive Developmental Disorders:
 - Psychoneurosis
 - anxiety
 - phobia
 - obsessive compulsive neurosis
 - autism
 - Psychosis Schizophrenia
 - Paranoid disorder and affective reaction

Unit -5

- 1. Disability Policy and Legislation: Legislative approaches in the provision of services to people with disorders and disabilities.
- 2. Physical and social barriers in the development of persons with disabilities.

REFERENCES

- Mehta, D.S.: Handbook of Disabled in India, Allied Publishers Private Ltd. Bombay, 1983
- Smith, M.S., Naisworti, J.T.: The Exceptional Child: A Functional Approach, McGraw Hill, 1975
- Encyclopedia of Social Work in India, 3 volumes, Director, Publication Division, Ministry of Information & Broadcasting, India, Planning Commission
- Chaudhary, P.D.: Child Welfare and Development, Atmaram and Sons, New Delhi, 1980
- Crukshank, W.M. & Johanson, G. O.: Education of Exceptional Children, Oxford Publication Comp. 1970
- Gajendragadkar, D.N.: Disabled in India, Somaiya Publishers, 1983
- Udia Shanker: Exceptional Children, Sterling Publishers Ltd. New Delhi
- Chapman: Management of Emotional Problem of Children and Adolescence
- Jessie Francis Williams: Children with Specific Living Difficulties, Pergamon Press, 2nd ed.
- Frussive, E.C. and Barbe, WE. (Edited); Educating Children with Living Disabilities, Appellatives Century Crofts Pub. New York, 1967
- State, D.H.: Helping Children with Learning Difficulties, World Locke Educationals
- Geraheart, B.R.: Learning Disabilities: Education strategies Mosby college publishing, 1985

ENTERPREUNERSHIP IN WOMEN AND CHILD CARE SERVICES CORE COURSE – H. Sc. – 404 - C

MM-70 Pd/ wk- 4

Unit-1

- 1. Child care centers
- 2. Requirement for running child care centers
- 3. Demand for child care centers
- 4. Entrepreneur:
 - Concept and Requirement of staff, furniture, equipment and building for entrepreneurship
 - Growth of the entrepreneurship and its factor affecting

Unit -2

- 1. Importance. Scope and major areas of entrepreneurship in child care
- 2. Personal and professional characteristics of entrepreneur
- 3. Qualities of person working with children
- 4. Essential qualities for an entrepreneur

- 5. Consideration in entrepreneurship: financial consideration, social consideration, ethical consideration
- 6. Benefit for developing entrepreneurship for: country, state, society, youth, children, women etc **Unit -3**
 - 1. Strategies and constraints of project implementation
 - Project proposal
 - Project registration
 - Project objectives
 - Evaluation report
 - Proposal format

Unit -4

- 1. Steps in developing project for child
- Objectives
- Funding
- Meaning of feasibility
- Legal processing

Unit -5

- 1. Development of innovative curriculum
- 2. Budget : Cost benefit analysis
- 3. Human resources
- 4. Regulatory process
- 5. Network analysis
- 6. Recurring expenditure
- 7. Financial input for a project

REFERENCES

- Status of Women in India, A Synopsis of the Report of National Committee (1971-74) New Delni, ICSSR 1974,2
- D'Souza , Alfred: Women in Contemporary India and South Asia, Macha publication, New Delhi, 1970
- Kapoor, Premilla: Marriage and Working Women in India, Vikas Publication, Delhi. 1970
- Mitra, Ashok: The Status of Women, Literacy and Employment, Allied Publishers Pvt. Ltd., Bombay, 1979
- International Women's year book edited by Roy Kinkier, 1975, Bashodhary Publication, Bombay
- Research Unit on Women Studies, Women in India, SNDT Women University, April, 1981
- D'SWza, Alfred: Women in contemporary India , Traditional Images and Changing Rules
- Baker. H.A. Bertheide. G.W. and Others (Eds)(1980). Women Today: A multi

PRACTICAL – 7 COUNSELLING AND INTERNSHIP CORE COURSE – H. Sc. – 405 - C

CCA-30 ESE-70 Pd/ wk- 8

- Block placement of the students in the real work situations of nursery schools, child welfare institute, guidance and counseling centers women and family welfare organigation etc.
- Planning, implementation, evaluation of program course content in placement centers.
- Prepare and present the internship report.

PRACTICAL – 8 PLANNING PROGRAMMES FOR PARENTS AND COMMUNITY CORE COURSE – H. Sc. – 406 - C

CCA-30 ESE-70 Pd/ wk- 8

1. Planning & execution and evaluation with reports on

- b. Parent education programme
- c. Bal mela
- d. Presenting seminar on current issues in human development
- 2. Visit to various rehabilitation centers for :
 - a. Women
 - b. Old age
 - c. Exceptional children
 - d. Juvenile delinquent children
- 3. Report writing of case profiles of children with special needs
- 4. Preparation and use of teaching aids for child, women, parents, and community education
- 5. Counseling for parents of children with special needs

GENDER STUDIES SKILL COURSE – H. Sc. – 407 - C

MM-50 Pd/ wk- 2

Unit – 1 Gender and Development:

- Concept of gender, gender roles, changing trends, gender analysis matrix.
- Shift from welfare to development and empowerment, gender in development, gender and development.

Unit – 2

• National and international efforts for gender empowerment.

Unit – 3

- Meaning of status of women A situational analysis demographic, education, employment, political and health (general, occupational, and reproductive)
- Violence against Women- Dowry, divorce, female feticide and infanticide, domestic violence. Unit – 4
 - - Sexual harassment and exploitation, trafficking, portrayal of women in mass media. Efforts for elimination of all forms of discrimination
 - Policies and Programmes for Women's Development:
 - National policy for Empowerment of women, policy perspectives, mainstreaming

Unit – 5

- Economic empowerment- Poverty eradication, micro finance and self-help groups,
- Introduction of laws for domestic violence against women (2005) and sexual harassment (2013)

PRACTICAL COURSE

MM-50 Pd/ wk- 2

- Preparation of E-content for gender sensitization
- Identification and assessment of gender issues in current print and electronic media
- Collection and evaluation of Ten articles on gender issues

POPULATION EDUCATION AND COMMUNITY HEALTH SKILL COURSE – H. Sc. – 407 - C

MM-50 Pd/ wk- 2

Unit – 1: Health and Health Care

- Concepts of health and positive health, Health- disease continuum, factors affecting health, health as a human right.
- Concept of community health, global health, health for all.

Unit – 2

- Primary health care- definitions, principles components, comprehensive health care, levels of prevention, Concept of reproductive health for adolescent girls and boys.
- Health and Development indices
- Health indices and related indices in community health, fertility indicators, vital statistics, mortality, morbidity indicators, demographic indicators - sex ratio

Unit – 3

- Indicators for social and mental health, Human Development index, Disability adjusted life years (DALY). Reproductive Health index. Major Health Problems in India
- Health administrative set up, Peripheral, state, National, urban-rural(Introduction to National Rural Health Mission), National family Health surveys

Unit – 4

• National Health Programmes- ICDS, AIDS prevention Programme, Reproductive Child Health (RCH) birth control methods, population education

Unit – 5

• Concept of population education: Various definitions Significance and scope of population education, Family life education, Sex education, Causes and consequences of population Blast. Trends in population growth terms related to population dynamics

PRACTICAL COURSE

MM-50 Pd/ wk- 2

- Preparation of teaching Aids on population dynamics
- First Aid and home nursing
 - VI. Bandages
 - Roller-finger, arm, leg, elbow, knee, cap line
 - Triangular head, palm/foot, slingh
- Bed making
- Recording of temperature
- Use of kidney tray, spittoon, eye glass, thermometer, hot water bag, ice cap, blood pressure estimations, blood sugar testing

NUTRITION SCIENCE: BASIC CONCEPTS SKILL COURSE – H. Sc. – 407 - C

MM-50 Pd/ wk- 2

UNIT – I

Food and nutrition – meaning, functions, classification nutrition and health (Basic concepts) UNIT – II

Food groups – Characteristics of food groups, classification of food groups, Balanced diet, nutrient requirements for various age groups

UNIT – II

Anthropometric assessment of nutritional status

UNIT - IV

- Therapeutic modification of normal diet and reasons for dietary changes in Obesity, congestive heart disease, diabetes, hypertension.
- Dietary counseling

UNIT – V

Food adulteration – Introduction, common adulterants in foods

PRACTICAL COURSE

MM-50

Pd/ wk- 2

- Assessment of nutritional status of individual and for community group using weight, height MUAC waist and hip circumferences
- Qualitative testing of some foods for adulteration

SYLLABUS

CHEMISTRY

Under Choice Based Credit System (CBCS)

M.Sc. (PREVIOUS) EXAMINATION, 2019-20

JAI NARAIN VYAS UNIVERSITY

JODHPUR

INTRODUCTION

Jai Narain Vyas University, Jodhpur was established in July 1962. It is a regional University now and operates in the limits of Jodhpur, Jalore, Barmer, Pali and Jaiselmer districts. The Department of Chemistry is located in the New Campus of the University, near the Bhagat-ki Kothi Railway Station, Pali Road. (The Department runs post graduate course in chemistry and has various research laboratories). More than 700 candidates have been awarded with degree of Ph.D. and three candidates have been awarded D.Sc. degree. About 1700 research papers from various faculty members and research scholars have been published in the International and National Scientific Journals. The Department have received research projects from different agencies like U.G.C., C.S.I.R., D.S.T., D.B.T., I.C.A.R., DRDO, DAE etc from time to time. In 1983, U.G.C. has formulated a programme under which certain departments, selected on the basis of their

achievements in the field of teaching and research, they were provided with infrastructure for raising the standard of their post-graduate education and research to international level. The programme was formulated as Committee on Strengthening of Infrastructure of Science and Technology (COSIST) of U.G.C.

The Department is one of the three departments of chemistry in the country, which were selected for this programme. M.Sc. was awarded under COSIST programme from 1985 to 2003, there after department was identified by the UGC under SAP (Special Assistance Programme) in 2010 for research support to the department. Thereafter DST awarded II level FIST programme to the department in 2010.

<u>Awards</u>

Apart from the university gold medal for securing highest marks in M.Sc/B.Sc., following awards have been instituted in the Department of Chemistry for the meritorious students:

- 1. Professor R.C. Kapoor Gold Medal for securing highest marks in M.Sc. (Chemistry)
- 2. Professor J.P. Saxena Award for excellence in Organic Chemistry
- 3. Sushila Bhandari Ugam Kanwar Bhandari Memorial Abhay-II Award for excellence in Physical Chemistry
- 4. Dr. Kamla Tandon Memorial Award for excellence in Inorganic Chemistry.
- 5. B.M.Gang Memorial Award for excellence in Analytical Chemistry

Academic and Research Programme

Under Special Assistance Program (SAP), Department of Chemistry offers a two year (4 semesters) integrated programme leading to the Master's degree in Chemistry in two sections of 40 students each. Syllabus is designed to cover all four branches of chemistry viz. Inorganic Chemistry, Organic Chemistry, Physical Chemistry and Analytical Chemistry. IInd and IVth semester offers a choice of eight electives each to strengthen diverse field of interdisciplinary nature.

Department of Chemistry has advanced facilities for research in major areas of Chemistry leading to Ph.D.. The major research interests of the faculty members includes: Nanotechnology, Biosensors; Electrochemistry & Electroanalytical Chemistry, Chemical Dynamics & Reaction Mechanism; Mineral Beneficiation; Oil & Fats; Natural Products; Synthetic Heterocyclics; Chemical Spectroscopy; Synthetic & Structural Organo & Organometallic Chemistry; Effluent Treatment; Environmental Chemistry; Synthetic Organic Chemistry; Photochemistry; Solar Energy Conversion & Storage; Co-ordination Chemistry; Green Chemistry and Applied Chemistry.

ADMISSION

The minimum qualification for admission to M.Sc. course is B.Sc. (10+2+3) degree with Chemistry as a major subject. The details of the eligibility conditions and admission procedures are given in the admission forms. The admission would be done on the basis of merit as per university rules. Reservation for SC, ST and OBC would also be done as per J.N.V. University, Jodhpur rules. Candidates are required to attend minimum 75% of the classes in theory and practicals both.

FACILITIES

The Department of Chemistry possesses several sophisticated, advanced and modern equipments required for teaching and research. The specialized instruments includes Electrochemical Analysers, Surface plasmon Resonance Spectrometer, Fluorescence Spectrophotometer, FTIR, UV-VIS spectrophotometers, Stoped-flow spectrophotometers, HPLC, Low temperature thermostats, Flame photometers, Ion meters, Centrifuge and computers for networking. In addition, certain facilities related to equipments are also available with USIC in the Faculty of Science.

FACULTY MEMBERS

PROFESSOR & HEAD

Dr. Kailash Daga Ph.D.

PROFESSOR

Dr. (Miss) Seema Kothari Ph.D. Dr. (Mrs.) Vinita Sharma Ph.D. Dr. (Mrs.) S. Loonker Ph.D. Dr. (Mrs.) V. Choudhary Ph.D. Dr. (Mrs.) S. Gaur Ph.D. Dr. V. Gupta Ph.D. Dr. A.V. Singh Ph.D. Dr. (Mrs.) P. Mishra Ph.D. Dr. K.R. Genwa Ph.D. Dr. A. Arora Ph.D. Dr. R.C. Meena Ph.D.

ASSOCIATE PROFESSOR

Dr. J.S. Rathore Ph.D. Dr. Rajendra Mathur Ph.D. Dr. P. Koli Ph.D. ASSISTANT PROFESSOR Dr. S.L. Meena Ph.D. Dr. Jaishree Rathore Ph.D. Ms. Meenakshi Jonwal M.Sc. Dr. Anita Meena Ph.D. Dr. Priyanka Purohit Ph.D.

Co-ordination Chemistry , Applied and environmental Chemistry

Reactions Kinetics, Correlation Analysis

Organic Chemistry Reaction Mechanism

Polymers, Environmental and applied Chemistry

Environmental Chemistry,Co-ordination Chemistry, Environmental Chemistry Co-ordination Chemistry,

Environmental Chemistry, Applied Chemistry; Effluent Treatment Studies Physical Chemistry, Mineral beneficiation and Environmental Chemistry Organic Reaction Mechanism

Solar energy conversion technologies

Natural products, Oils and fats

Photochemistry (Solar energy Conversion technologies)

Analytical Chemistry Environmental Chemistry Polymer Science

Organic Chemistry and Solar Energy Conversion and storage

Photo Electrochemistry, Corrosion & its prevention

Organic Chemistry

Inorganic Chemistry

Physical Chemistry

Chemical Kinetics

Dr. Rajni Bais Ph.D. Dr. Sangeeta Parihar Ph.D. Dr. Om Prakash Ph.D. Sh. R.L. Saini M.Sc. Dr. Anurag Choudhary Ph.D. Dr. Seema Parveen Ph.D. Dr. Amita Dhariwal Ph.D. Analytical Electrochemistry Environmental Chemistry Chemical Kinetics Organic Chemistry Chemical Kinetics Organic and Phytochemistry

Analytical Chemistry

Definitions of Key Words:

- Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year.
- 2. Choice Based Credit System (CBCS): The CBCS provides choice for students to select from the prescribed elective and skill courses. A student need to select two elective papers offered by the Department in which he/she is doing core course this shall be the part of core programme, during third and fourth semester. Each student has to complete four skill courses: two within the Department and two from other Departments within JNV University or the Universities approved by JNV University
- 3. Course: Usually referred to, as 'papers' is a component of a programme. All courses need not carry the same weightage. The courses should define learning objectives and learning outcomes. A course may be designed to comprise lectures/ tutorials/laboratory work/ field work/ project work/ self-study etc. or a combination of some of these.
- 4. **Credit Based Semester System (CBSS)**: Under the CBSS, the requirement for awarding a degree is prescribed in terms of number of credits to be completed by the students.
- 5. Credit Point: It is the product of grade point and number of credits for a course.
- 6. **Credit**: A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one period of teaching (lecture or tutorial) or two periods of practical work/field work per week.
- 7. **Cumulative Grade Point Average (CGPA)**: It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.
- 8. **Grade Point**: It is a numerical weight allotted to each letter grade on a 10-point scale.
- 9. Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.

- 10. **Programme**: An educational programme leading to award of the Postgraduate Degree in the Core subject in which he/she is admitted.
- 11. Semester Grade Point Average (SGPA): It is a measure of performance of work done in a semester. It is ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.
- 12. Semester: Each semester will consist of 15-18 weeks of academic work equivalent to 90 actual teaching days. The odd semester may be scheduled from July to November/ December and even semester from December/January to May.

Odd semester University examination shall be during second/third week of December and even semester University examination shall be during second/third week of May. The Department shall conduct the Practical examinations of odd and even semesters as per the Panel of Examiners approved by the University. Each Board of examiners shall consist of one external Examiner from other University/Institute and another from the Department.

13. **Transcript or Grade Card or Certificate:** Based on the grades earned, a statement of grades obtained shall be issued to all the registered students after every semester. This statement will display the course details (code, title, number of credits, grade secured) along with SGPA of that semester and CGPA earned till that semester

Fairness in Assessment

Assessment is an integral part of system of education as it is instrumental in identifying and certifying the academic standards accomplished by a student and projecting them far and wide as an objective and impartial indicator of a student's performance. Accordingly the Faculty of Science resolves the following:

a. All internal assessments shall be open assessment system only and that are based on Quizzes, term test, seminar

- b. Attendance shall carry the prescribed marks in all papers and Practical examination internal assessment
- c. In each semester three out of four theoretical component University examination shall be undertaken by external examiners from outside the university conducting examination, who may be appointed by the competent authority

Grievances and Redressal Mechanism

- a) The students will have the right to make an appeal against any component of evaluation. Such appeal has to be made to the Head/Principal of the College or the Chairperson of the University Department concerned as the case may be clearly stating in writing the reason(s) for the complaint / appeal.
- b) The appeal will be assessed by the Chairman and he/she shall place before the Grievance Redressal Committee (GRC), Chaired by the Dean, Faculty of Science comprising all HODs of the Faculty and if need be Course Teacher(s) be called for suitable explanation; GRC shall meet at least once in a semester and prior to CCA finalization.
- c) The Committee will consider the case and may give a personal hearing to the appellant before deciding the case. The decision of the Committee will be final.

| S.No. | Letter Grade | Meaning | Grade Point |
|-------|--------------|---------------|-------------|
| 1 | ·0' | Outstanding | 10 |
| 2 | 'A+' | Excellent | 9 |
| 3 | 'A' | Very Good | 8 |
| 4 | 'B+' | Good | 7 |
| 5 | 'B' | Above Average | 6 |
| 6 | °C' | Average | 5 |
| 7 | 'Р' | Pass | 4 |
| 8 | 'F' | Fail | 0 |
| 9 | 'Ab' | Absent | 0 |

Table 1: Grades and Grade Points

i.

A student obtaining Grade F in a paper shall be considered failed and will be required to reappear in the University End Semester examination.
ii. For noncredit courses (Skill Courses) 'Satisfactory' or "Unsatisfactory' shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA

Grade Point assignment

and > 95 % marks Grade Point 10.0
90 to less than 95 % marks Grade Point 9.5
85 to less than 90 % marks Grade Point 9.0
80 to less than 85 % marks Grade Point 8.5
75 to less than 80 % marks Grade Point 8.0
70 to less than 75 % marks Grade Point 7.5
65 to less than 70 % marks Grade Point 7.0
60 to less than 65 % marks Grade Point 6.5
55 to less than 50 % marks Grade Point 5.5
45 to less than 50 % marks Grade Point 5.0
40 to less than 45 % marks Grade Point 4.5

S

Computation of SGPA and CGPA:

i. The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student,

i.e

SGPA (Si) =
$$\Sigma$$
(Ci x Gi) / Σ Ci

Where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

ii. The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme,i.e.

 $CGPA = \Sigma(Ci \times Si) / \Sigma Ci$

where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

| Illustration | for SGPA |
|--------------|----------|
|--------------|----------|

| S.No. | Course | Credit | Grade letter | Grade point | Credit Point |
|-------|--------------|--------|--------------|-------------|-------------------|
| | | | | | (Credit x Grade) |
| | | | | | |
| 1 | Course 1 | 4 | В | 6 | 4 x 6 =24 |
| 2 | Course 2 | 4 | B+ | 7 | 4 X 7 =28 |
| 3 | Course 3 | 4 | В | 6 | 4X 6 = 24 |
| 4 | Course 4 | 4 | 0 | 10 | 4 X 10 =40 |
| 5 | Course 5- | 4 | С | 5 | 4 X 5 =20 |
| | Practical I | | | | |
| 6 | Course 6 – | 4 | В | 6 | 4 X 6 = 24 |
| | Practical II | | | | |
| | Total | 24 | | | 24+28+24+40+20+24 |
| | | | | | =160 |

Thus, SGPA =160/24 =6.67

Illustration for CGPA

| | Semester- I | Semester-II | Semester-III | Semester-IV |
|--------|-------------|-------------|--------------|-------------|
| Credit | 24 | 24 | 24 | 24 |
| SGPA | 6.67 | 7.25 | 7 | 6.25 |

CGPA = (24X6.67+ 24X 7.25 + 24X7 + 24 X 6.25)/96

652.08/96 = 6.79

Semester-wise Theory Papers/Practical / Skill component

| Type of course | Course | Title o | f the | Lecture- | No. of | Continuous | End- | Total |
|----------------|--------|---------|-------|------------|---------|---------------|--------------|-------|
| | code | Course | | Tutorial- | credits | Comprehensive | Semester | |
| | | | | Practical/ | | Assessment | Examination | |
| | | | | Week | | (CCA) | (ESE) | |
| | | | | | | | [University | |
| | | | | | | | Examination] | |

Semester I

| Core course 1 | CH 101 | Inorganic | 6-0-0 | 4 | 30 | 70 | 100 |
|---------------|--------|--------------------|--------|---|----|----|-----|
| | | Chemistry | | | | | |
| Core course 2 | CH 102 | Organic Chemistry | 6-0-0 | 4 | 30 | 70 | 100 |
| Core course 3 | CH 103 | Physical Chemistry | 6-0-0 | 4 | 30 | 70 | 100 |
| Core course 4 | CH 104 | Instrumental | 6-0-0 | 4 | 30 | 70 | 100 |
| | | Methods of | | | | | |
| | | Analysis | | | | | |
| Core course | CH 105 | Inorganic Lab | 0-0-12 | 4 | 30 | 70 | 100 |
| practical 1 | | | | | | | |
| Core course | CH 106 | Physical Lab | 0-0-12 | 4 | 30 | 70 | 100 |
| practical 2 | | | | | | | |

| Skill Course I | As per the l | ist | 2-0-2 | | | | |
|-----------------|--------------|-------------|---------------------|-------|-----|-----|-----|
| Total | | | I | 24 | 180 | 420 | 600 |
| Semester II | | | | | | | |
| Core course 5 | CH 201 | Inorganic | 6-0-0 | 4 | 30 | 70 | 100 |
| | | Chemistry | | | | | |
| Core course 6 | CH 202 | Organic | 6-0-0 | 4 | 30 | 70 | 100 |
| | | Chemistry | | | | | |
| Core course 7 | CH 203 | Physical | 6-0-0 | 4 | 30 | 70 | 100 |
| | | Chemistry | | | | | |
| Core course 8 | CH 204 | Analytical | 6-0-0 | 4 | 30 | 70 | 100 |
| | | Chemistry | | | | | |
| Core course | CH 205 | Organic Lab | 0-0-12 | 4 | 30 | 70 | 100 |
| practical 3 | | | | | | | |
| Core course | CH 206 | Analytical | 0-0-12 | 4 | 30 | 70 | 100 |
| practical 4 | | Lab | | | | | |
| Skill course II | As per the | list | 2-0-2 | 2-0-2 | | | |
| Total | 1 | | $\mathbf{\bigcirc}$ | 24 | 180 | 420 | 600 |
| Semester III | c (| X | | 1 | | 1 | _1 |

Semester III

| Core course 9 | CH 301 | Group Theory | 6-0-0 | 4 | 30 | 70 | 100 |
|----------------|----------------------|----------------|-------|-------|----|----|-----|
| | | & Inorganic | | | | | |
| | | Spectroscopy | | | | | |
| Core course 10 | CH 302 | Application of | 6-0-0 | 4 | 30 | 70 | 100 |
| | | Spectroscopy | | | | | |
| Discipline | (303A-I/303B-I/303C- | | 6-0-0 | 6-0-0 | 30 | 70 | 100 |
| Specific | I/303D-I) | | | | | | |
| Elective 1 | | | | | | | |

| Discipline | (304A-II/304B-II/304C- | | 6-0-0 | 6-0-0 | 30 | 70 | 100 |
|------------------|------------------------|-----------|--------|-------|-----|-----|-----|
| Specific | II/304D-II) | | | | | | |
| Elective 2 | | | | | | | |
| Core course | СН | Lab. | 0-0-24 | 4 | 30 | 70 | 100 |
| practical 5 | 305/307 | Course1/3 | | | | | |
| Core course | СН | Lab. | 0-0-24 | 4 | 30 | 70 | 100 |
| practical 6 | 306/308 | Course2/4 | | | | | |
| Skill course III | As per the l | ist | 2-0-2 | 2-0-2 | | | |
| Total | | | | 24 | 180 | 420 | 600 |

Semester IV

| Core course 11 | CH 401 | Solid State | 6-0-0 | 4 | 30 | 70 | 100 |
|-----------------|--------------|---------------|--------|----|-----|-----|-----|
| | | Chemistry | | | | | |
| Core course 12 | CH 402 | Bio Chemistry | 6-0-0 | 4 | 30 | 70 | 100 |
| Discipline | 403A-III/40 |)3B-III/403C- | 6-0-0 | 4 | 30 | 70 | 100 |
| Specific | III/403D-II | Ι | | | | | |
| Elective 3 | | | | | | | |
| Discipline | 404A-IV/40 | 04B-IV/404C- | 6-0-0 | 4 | 30 | 70 | 100 |
| Specific | IV/404D-IV | | | | | | |
| Elective 4 | | | | | | | |
| Core course | СН | Lab. | 0-0-24 | 4 | 30 | 70 | 100 |
| practical 7 | 405/407 | Course1/3 | | | | | |
| Core course | СН | Lab. | 0-0-24 | 4 | 30 | 70 | 100 |
| practical 8 | 406/408 | Course2/4 | | | | | |
| Skill course IV | As per the l | ist | 2-0-2 | | | | |
| Total | | | 1 | 24 | 180 | 420 | 600 |

* The Department shall offer two skill courses per semester from the list of skill courses approved for the Department.

In view of the course content, the Department of Chemistry distributed the Periods between Theory/Tutorial/Practical as under per paper

- 4:0:0 (four lectures only (no tutorial and no practical)) For Theory
- 0:0:5 (no lecture, no tutorial, and practical)-For practical
- 2-0-2 (two lectures, no tutorial and two practical/field experimentations) For Skill course

The Duration of the Period shall be forty five minutes. In each of these combinations, the first value stands for the same number of lecture instructions per week, whereas the last two values stand for double the number of tutorial / practical instructions per week.

In each practical group the number of students that can be accommodated will be fifteen.

Course Evaluation (Evaluation of the Students)

All courses (Core/ Elective) involve an evaluation system of students that has the following two components:-

- (i) **Continuous Comprehensive Assessment (CCA)** accounting for 30% of the final grade that a student gets in a course; and
- (ii) End-Semester Examination (ESE) accounting for the remaining 70% of the final grade that the student gets in a course.
- (i) **Continuous Comprehensive Assessment (CCA)**: This would have the following components:
 - a. **Quizzes:** Two Quiz examinations of 45 minutes duration each having a maximum of 40 marks shall be arranged for theory paper during the semester course period
 - b. Term Test: One term test shall be arranged for each theory paper prior to End-Semester Examination; examination duration shall be of three hours; maximum marks is 70
 - c. **Seminar**: Each student shall prepare and deliver a seminar per theory paper; maximum marks shall be 15. The seminar shall commence after first quiz examination and shall be completed prior to term test for all the papers.

d. Classroom Attendance – Each student will have to attend a minimum of 75% Lectures / Tutorials / Practicals. A student having less than 75% attendance will not be allowed to appear in the End-Semester Examination (ESE). Attendance shall have 15 marks and will be awarded by following the system proposed below:

Those having greater than 75% attendance (for those participating in Co-curricular activities, 25% will be added to per cent attendance) will be awarded CCA marks as follows:-

| 75% to 80% | = | 3 marks |
|------------|---|----------|
| 80% to 85% | = | 6 marks |
| 85% to 90% | = | 9 marks |
| 90% to 95% | = | 12 marks |
| >95% | = | 15 marks |

Each student's cumulative attendance shall be displayed in the Department Notice Board every month with a copy to the Dean, Faculty of Science.

- e. CCA are based on open evaluation system without any bias to any student
- f. Any grievance received in the Department from student shall be placed before the Grievance Redressal Committee with adjudicated comments

Each component marks will be added without rounding and the total thus obtained is ratio by a factor of six. This value shall be rounded.

| Illustration: | Quiz $1 - Marks$ obtained = 30 | | | | |
|----------------------|----------------------------------|---------------------------------|--|--|--|
| | Quiz 2 – Marks o | obtained $= 35.5$ | | | |
| | Term Test Marks | Term Test Marks obtained = 50.5 | | | |
| | Seminar Marks obtained = 14 | | | | |
| | Attendance Marl | ks obtained $= 9$ | | | |
| | Total | = 139.00 | | | |
| | Conversion | = 139/6 = 21.16666 | | | |
| | Award | = 22.00 | | | |

Skill Course Evaluation: Based on his/her performance and hands on practice, the respective Department shall declare the result as "Satisfactory" or "Non-Satisfactory"; each student need to get a minimum of three "Satisfactory" declaration for the course completion

In laboratory courses (having only practical (*P*) component), the CCA will be based on students attendance (50%); hands on Practical and sessional (50%).

For QUIZ (2 quizzes per semester), 40 marks per Quiz and total of 80 marks, 45 minutes duration for each quiz:

| Types of question | Number of | Marks | Total marks |
|----------------------------|-----------|--------------|-------------|
| | Questions | Per question | per type |
| 1. Multiple choice | 10 | 1 | 10 |
| 2. Fill in the blanks | 10 | 2 | 20 |
| 3. Short answer (15 words) | 5 | 2 | 10 |
| Total | 25 | | 40 |

For the Term test and ESE:

Part A

Ten short type questions (Definitions, illustrations, functions, short explanations, etc ;) for two marks each. $10 \times 2= 20$ marks; two questions from each Unit; no choice in this part

Part B

Five short answer (250 words) type questions for four marks each. $5 \times 4 = 20$ marks; one question from each Unit with internal choice.

Part C

Five questions of long/explanatory answer (400 words) type, one drawn from each Unit; student need to answer any three; ten marks each; $3 \times 10 = 30$ marks

20+20+30 = 70 marks

Qualifying for Next semester

1. A student acquiring minimum of 40% in total of the CCA is eligible to join next semester.

- 2. A student who does not pass the examination (CCA+ESE) in any course(s) (or due to some reason as he/she not able to appear in the ESE, other conditions being fulfilled, and so is considered as 'Fail'), shall be permitted to appear in such failed course(s) in the subsequent ESE to be held in the following October / November or April / May, or when the course is offered next, as the case may be.
- **3.** A student who fails in one or more papers in a semester shall get three more chances to complete the same; if he/she fails to complete the same within the prescribed time i.e three additional chances for each paper; the student is ineligible for the Postgraduate degree in the Subject in which he/she is admitted. Additional chances examination fee shall be on additive basis.

Improvement Option:

Every student shall have the opportunity to improve Credit thorough University Examination only. Improvement opportunity for each paper is only with two additional chances; improvement examination fee shall be on additive basis; the Credit obtained in improvement examination shall be final. There shall be no improvement opportunity in Practical examinations.

Result Declaration:

The ESE (End Semester Examination/University Examination) results shall be declared within twenty days of the last examination. The Theory/ Practical Classes of even semesters shall begin from the next day of ESE; whereas odd semester classes shall commence after summer vacation.

Skill Based Course in Chemistry

| S.No. | Course No. | Name of Course |
|-------|------------|--|
| A | SK-CH-1 | Water Analysis |
| В | SK-CH-2 | Food Adulteration and Testing |
| С | SK-CH-3 | Application of solar Energy |
| D | SK-CH-4 | Ores and building material |
| Ε | SK-CH-5 | Polymer Technology |
| D | SK-CH-6 | Conservation and Management of cultural Heritage |

M.Sc. Chemistry

(Under CBCS)

First Year (2019-20)

(Two Semesters each of 15 weeks)

TEACHING AND EXAMINATION SCHEME:

I SEMESTER

| 1. | THEORY PAPERS | Periods/ | No. | of CCA | ESE | Total | | |
|-----------------------------|-----------------------|------------|-------------------|--------|-----|-------|--|--|
| | (Four Papers) | Wk | Credits | | | | | |
| CH-101 | Inorganic Chemistry | 6 | 4 | 30 | 70 | 100 | | |
| CH-102 | Organic Chemistry | 6 | 4 | 30 | 70 | 100 | | |
| CH-103 | Physical Chemistry | 6 | 4 | 30 | 70 | 100 | | |
| CH-104 | Instrumental | 6 | 4 | 30 | 70 | 100 | | |
| | Methods of Analysis | | | | | | | |
| Grand Total | | 400mar | | | rks | | | |
| 2. PRACTICALS EXAMINATIONS: | | | | | | | | |
| Lab Course | · O | Periods/Wk | No. of Credits | CCA | ESE | Total | | |
| CH-105 Inor | rganic Lab | 12 | 4 | 30 | 70 | 100 | | |
| CH-106 Physical Lab | | 12 | 4 | 30 | 70 | 100 | | |
| Тс | otal | | | | | 200 | | |
| Т | otal marks of I Semes | ter | | | | 600 | | |

II SEMESTER

| 1. | THEORY PAPERS | Periods/ | No. | of | CCA | ESE | Total | |
|--|----------------------|------------|-------------------|--------|---------|-----------|-----------|--|
| (Four Papers) | | Wk | Credits | | | | | |
| CH-201 | Inorganic Chemistry | 6 | 4 | | 30 | 70 | 100 | |
| CH-202 | Organic Chemistry | 6 | 4 | | 30 | 70 | 100 | |
| CH-203 | Physical Chemistry | 6 | 4 | | 30 | 70 | 100 | |
| CH-204 | Analytical Chemistry | 6 | 4 | | 30 | 70 | 100 | |
| Gra | and Total | | | | | 400m | arks | |
| 2. PRACTICALS EXAMINATIONS: | | | | | | | | |
| Lab Course | | Periods/Wk | No. of Credits | C | CA | ESE | Total | |
| CH- 205 Orga | nic Lab | 12 | 4 | 30 | D | 70 | 100 | |
| CH- 206 Analy | ytical Lab | 12 | 4 | 30 | 0 | 70 | 100 | |
| Tot | al | | | | | | 200 | |
| Total marks of II Semester | | | | | | 600 | | |
| Total marks of M. Sc. I Year | | | | | | | 1200 | |
| 3.SKILL BASED COURSE | | | | | | | | |
| SK-CH for I Semester 4pd/wk (For students of Chemistry Department or | | | | | | | ent only) | |
| SK-CH for II | Semester 4p | od/wk (| For student | s of (| Other D | epartment | t only) | |
| 14 | | | | | | | | |

M.Sc Chemistry

I YEAR-2019-20

<u>SEMESTER – I</u>

CH-101: INORGANIC CHEMISTRY

Unit I

Stereochemistry and bonding in compounds of main group elements: Mulliken symbols for irreducible representations, Walsh diagram of tri atomic molecules, d π -p π bonds and synergic bonding, equivalent and in equivalent hybridization and Bent-rule. Energetics of hybridization Simple reactions of covalently bonded molecules, atomic inversion. Berry pseudo rotation and Nucleophilic displacement, Free radical reactions. Applications of valence shell election pair repulsion(VSEPR) theory in structure elucidation.

Unit II

Metal Ligand Bonding :Limitations of crystal field theory, Jahn Tellor theorem. And distortion of molecules. molecular orbital theory of hetero triatomic molecules viz . BeH₂, CO₂, NO₂, H₂O, Coulson diagrams of tri atomic molecules CO₂, NO₂, H₂O. Molecular orbital theory(MOT): octahedral, tetrahedral and square planer complexes, π - bonding and molecular orbital theory, Comparison with CFT.

Unit III

Metal Ligand Equilibrium in solution : stepwise and overall formation constant and their interaction, trends in stepwise constants, factors affecting the stability of metal complexes with reference to the nature of metal ion and ligand, Chelate effect and its thermodynamic origin, determination of binary formation constants by pH metry and spectrophotometry.

Unit IV

Correlation diagrams of Transition Metal Complexes: Types of transitions, selection rules for electronic transition, Spectroscopic, ground States, correlation diagrams, Orgel and Tanabe sugano

diagrams for d $_1$ to d $_9$ states in Transitions metal complexes. Calculations of Dq. B and β parameters.

Unit V

Electronic spectra and Magnetic properties of transitions metal

Complexes, Spectroscopic methods of assignment of absolute configuration in optically active, metal chelates and their stereo chemical information, Charge transfer spectra, magnetic exchange coupling and spin crossover.

Books Suggested:

- 1. Advanced Inorganic Chemistry, F.A. Cotton and Wilkinson, John Wiley.
- 2. Inorganic Chemistry, J.E. Huhey, Harpes & Row.
- 3. Chemistry of the Elements, N.N. greenwood and A.Earnshow, Pergamon.
- 4. Inorganic Electronic Spectroscopy, A.B.P. lever, Elsevier.
- 5. Magnetochemistry, R.L.Carlin, Springer Verlag.
- 6. Comprehensive Coordination Chemistry eds., G. Wilkinson, R.D. Gillars and LA McCleverty, Pergamon.



CH -102: ORGANIC CHEMISTRY

UNIT I

Nature of Bonding in Organic Molecules

Delocalized chemical bonding-conjugation, cross conjugation, reasonance hyperconjugation, bonding in fullerenes, tautromerism.

Aromaticity in benzenoid and non-benzenoid compounds, alternate and non-alternate hydrocarbons, Huckel's rule, energy level of π -molecular orbitals, annulenes aromaticity, homoaromaticity, Double aromaticity, excited state aromaticity, PMO (approach).

Bonds weaker than covalent- addition compounds, crown ether complexes, cryptands inclusion compounds, cyclodextrins, catenanes and rotaxanes.

UNIT II

Stereochemistry I

Conformational analysis of cycloalkanes, decalins, effect of conformation on reactivity conformation of sugars, steric strain due to unavoidable crowding. Stereochemistry of the compounds containing nitrogen, sulphur and phosphorus.

UNIT III

Stereochemistry II

Elements of symmetry, chirality, molecules with more than one chiral center, threo and erythro isomers, methods of resolution, optical purity, enantiotopic and diastereotopic atoms, groups and faces, stereospecific and stereoselective synthesis. Asymmetric synthesis. Optical activity in the absence of chiral carbon (biphenyls, allenes and spiranes), chirality due to helical shape.

UNIT IV

Reaction Mechanism: Structure and Reactivity

Types of mechanisms, types of reactions, thermodynamic and kinetic requirements, Kinetic and thermodynamic control. Hammond's postulate, Curtin-Hammett principle, Potential energy diagrams, transition states and intermediates, methods of determining mechanism isotope effects. Hard and Soft acids and bases.

Generation, structure, stability and reactivity of carbocations, carbanions free radicals, carbenes and nitrenes.

Effect of structure on reactivity – resonance and field effects, steric effect, quantitative treatment. The Hammett equation and linear free energy relationship. substituent and reaction constants. Taft equation.

UNIT V

Pericyclic Reactions

Molecular orbital symmetry, Frontier orbitals of ethylene, 1,3- butadiene, 1,3,5-hexatriene and allyl system. Classification of pericyclic reactions. Woodward – Hoffmann correlation diagrams, FMO and PMO approach. Electrocyclic reactions – conrotatory and disrotatory motions, 4n, 4n+2 systems, 2+2 addition of ketenes, 1,3 dipolar cycloadditions and cheleotropic reactions.

Sigmatropic rearrangements – suprafacial and antrafacial shifts of H, sigmatropic shifts involving carbon moieties, 3,3- and 5,5- sigmatropic rearrangements. Claisen, Cope and Aza-Cope rearrangements. Fluxional tautomerism. Ene reaction.

Books Suggested:

- Advanced Organic Chemistry-Reactions, Mechanism and Structure, Jerry March, John Wiley.
- 2. Advanced Organic Chemistry, F.A. Carey and R.J.Sundberg, Plenum.
- 3. A Guide Book to Mechanism in Organic Chemistry, Peter Sykes, Longman.
- 4. Structure and Mechanism in Organic Chemistry, C.K.Ingold, Cornell University Press.
- 5. Organic Chemistry, R.T. Morrison and R.N.Boyd, Prentice-Hall

- 6. Modern Organic Reactions, H.O. House, Benjamin.
- 7. Principles of Organic Synthesis, R.O.C. Norman and J.M. Coxon, Blackie Academic & Professional.
- 8. Pericyclic Reactions, S.M.Mukherji, Macmillan, India.
- 9. Reaction Mechanism in Organic Chemistry S.M.Mukherji and S.P. Singh, Macmillan.
- 10. Stereochemistry Organic Compounds, D.N.asipuri, New Age International.
- 11. Stereochemistry of Organic Compounds, P.S.Kalsi, New Age Internationa.
- 12. Pericyclic Reactions by Jagdama Singh.

CH-103: PHYSICAL CHEMISTRY

UNIT I

Chemical Kinetics-I

Chemical Dynamics: Ionic reactions, kinetic salt effects, steady state kinetics, kinetic and thermodynamic control of reactions.

Dynamic chain (hydrogen-bromine reaction, pyrolysis of acetaldehyde). photochemical (hydrogen-bromine and hydrogen-chlorine reactions).

UNIT II

Chemical Kinetics-II

Homogeneous and heterogeneous catalysis, kinetics of enzyme reactions, general features of fast reactions, study of fast reactions by flow method, relaxation method, and flash photolysis method.

Dynamics of complex Reactions, Collision and Transition state, Theories of Rate Constant, dynamics of unimolecular reaction, Lindemann and Hinshelweed theories of unimolelcular reactions.

UNIT III

Adsorption

Surface tension, capillary action, pressure difference across curved surface (Laplace equation), vapour pressure of droplets (Kelvin equation) Gibbs adsorption isotherm, estimation of surface area (BET equation), surface films on liquids Electro-kinetic phenomenon and quantitative treatment of Zeeta potential.

Micelles: Surface active agents, classification of surface active agents, micellization, types of ionic micelles present in colloidal electrolytes, solubilization of surfactant solutions, critical micellar concentration (CMC), factors affecting the CMC of surfactants,

UNIT IV

Macromolecules

Polymer – definition, types of polymers,, kinetics of polymerization, mechanism of polymerisation.

Molecular mass, number and mass average molecular mass, molecular mass determination (osmometry, viscometry, diffusion and light scattering methods), sedimention, calculation of average dimensions of various chain structures.

UNIT V

Electrochemistry

Electrochemistry of solutions. Debye-Huckel – Onsagar treatment and its extension, Debye-Huckel-Jerrum mode, ion - solvent interactions, Born model.

Thermodynamics of electrified interface; Derivation of electrocapillary Lippmann equation (surface excess), Structure of electrified interfaces. Helmholtz, Guoy-Chapman and Stern models.

Books Suggested :

- 1. Physical Chemistry, P.W. Atkins, ELBS.
- 2. Chemical Kinetics, K.J.Laidler, Megraw-Hill
- 3. Kinetics and Mechanism of Chemical Transformation, J.Rajaraman and J.Kuriacose, McMillan.
- 4. Micelles, Theoretical and Applied Aspects, V.Moroi, Plenum.
- 5. Modern Electrochemistry Vol. I and Vol. II, J.O.M. Bockris and A.K.N.Reddy, Plenum.
- Introduction to Polymer Science, V.R.Gowarkar, N.V.Vishwananathan and J.Sridhar, Wiley Eastern.

CH-104: INSTRUMENTAL METHODS OF ANALYSIS

UNIT I Instrumental analytical methods: Types and range of determination.

Accuracy and minimization of errors

Precision and its determination (Standared deviation, R.S.D, C.V). confidence limit and confidence level significance and tapes of "t" test in analytical chemistry.

Analysis of variance (ANOVA), Correlation coefficient and linear regression.

Numericals based on above concepts

UNIT II UV Visible Spectrophotometry: Colorimetric estimation of metal ion with specific reagents: Iron with 8-Hydroxyquinoline ; Lead with Dithizone, Technique of dual wavelength and derivative spectroscopy and their applications.

Fluorescence Photometry: Theory with partial energy diagram, instrumentation and applications.

Unit III Atomic spectral analytical techniques: Atomic absorption Spectrophotometry: Theory, Chemical and Spectral interferences, Instrumentation and Application.

Emission spectroscopy: Principle and application of Flame photometry; ICPAES- Salient features and application on multielement determination

UNIT IV Chromatography – I Introduction and terms related to chromatography; Classification of Chromatographic techniques ; Selection of mobile phase.

Thin Layer Chramatographic technique (TLC): Principle, methodology and applications.

Gas chromatography (GC): Principle, Layout of instrument and types of columns; Detectors (TCD, FID, and Electron Capture) and applications.

Introduction to GC-MS

UNIT V Chromatography-II High performance liquid chromatography (HPLC)

Principle, Layout of instrument with columns, detectors (UV-Visible, RI and electro chemical) and applications.

Introduction to Super Critical Fluid chromatography (SCFC)

Books:

- 1. Instrumental Analysis: Skoog, Hollar and Crouch, Cengage learning.
- 2. Vogel's Textbook of Quantitative Chemical Analysis, G.H.Jeffery, J.Bassett, J. Mendham and R.C. Denney, Publ ELBS, Longman, UK
- 3. Analytical Chemistry, G.D. Christian, John Willy & Sons.
- 4. Basic Concepts of Analytical Chemistry, S. M. Khopkar, Wiely Eastern.
- Fundamentals of Analytical Chemistry, D.A. Skoog, D.M. West and F.J.Holler. Publ. W B Saunders.

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Laboratory Course- I-Semester

CH -105: Inorganic Chemistry

Qualitative Analysis

Eight component mixture including two less common metal ions (TI, Mo, W, Ti, Zr, Th, V, U in cationic/anionic forms) and insoluble – oxides, sulphates and halides.

Quantitative Analysis

Separation and estimation of metal ions in a binary mixture Cu-Ni, Ni-Zn, Cu-Ag etc. involving volumetric and gravimetric methods.

Chromatography

Separation of cations and anions by

- (a) Paper Chromatography: Separation of chloride, bromide and iodide
- (b) Column Chromatography separation of Cu, Ni, Co by Ion exchange.

Preparations

Preparation of selected inorganic compounds and their studies by I.R., electronic Mossbauer, E.S.R. and magnetic susceptibility measurements. Handling of air and moisture sensitive compounds.

- (1) VO $(acac)_2$
- (2) Cis-K[Cr(C₂O₄)₂(H₂O)₂]
- (3) Na[NH₃)₂(SCN)₄]
- (4) $Mn(acac)_3$

 $(5) K_3[Fe(C_2O_4)_3]$

(6) Prussian Blue, Turnubull's Blue

 $(7) [Co(NH_3)_6] [Co(NO_2)_6]$

(8) Cis-[Co(trine)(NO₂)₂]Cl.H₂O

(9) Hg[Co(SCN)₄]

 $(10) \{Co(Py)_2Cl_2\}$

(11) [Ni(NH₃)₆]Cl₂

(12) Ni (dmg)₂

(13) [Cu(NH₃)₄]SO₄.H₂O

CH - 106: Physical Chemistry

Surface Tension

- (i) To determine the parachor of carbon and hydrogen atoms by drop weight method.
- (ii) To determine the relative efficiencies of different detergents by surface tension measurements.

Chemical Kinetics

- To compare the strengths of HCl and H₂SO₄ by studying the kinetics of hydrolysis of an ester.
- (ii) Determination of the effect of
 - (a) Change of temperature
 - (b) Change of concentration of reactant and catalyst.
 - (c) Ionic strength of the media on the velocity constant of acid hydrolysis of an ester
- (iii) To study the effect of acid strength on the reaction of acetone and iodine.

Adsorption

- (i) To study surface tension-concentration relationship for solutions (Gibbs equation) and hence determine the limiting cross-sectional area of molecule.
- (ii) To study the adsorption of acetic acid/oxalic acid by activated charcoal and verification of Freundlich and Langmuir's isotherms.

Book Suggested:

- Vogel's Textbook of Quantitative Analysis, revised, J.Bassett, R.C. Denney, GH.H. Jeffery and J. mENDHAM, elbs.
- 2. Synthesis and Characterization of Inorganic Compounds, W.L.Jolly, Prentice Hall.
- 3. Practical Physical Chemistry, A.M.James and F.E. Prichard, Longman.
- 4. Findley's Practical Physical Chemistry, B.P.Levitt, Longman.
- 5. Experimental Physical Chemistry, R.C.Das and B.Behera, Tata McGraw Hill.

- 6. Advanced Practical Physical Chemistry, J.B.Yadav, Goel Publishing House.
- Advanced Experimental Chemistry, Vol. I Physical, J.N.Gurtu and R.Kapoor, S.Chand & Co.

Marking Scheme for M.Sc. I Semester Practicals

Inorganic CH-105 Lab Course

1. Gravimetric 20 Marks 2. Inorganic Mixture Eight component 30 Marks 3. Inorganic Preparation 10 Marks 4. Viva-voce 10 Marks Total 70 Marks Physical CH-106 Lab Course **1.** Major Experiment 35 Marks 2. Minor Experiment 25 Marks **3.** Viva-Voce 10 Marks

Total 70 Marks

SYLLABUS

M. Sc. Home Science Semester I, II - 2020-2021

P.G. DEPARTMENT OF HOME SCIENCE, J. N. V UNIVERSITY, JODHPUR

Semester-wise Theory Papers/Practical/Skill component

Teaching and Examination scheme

| Type of course | Cours e code | Title of the course | Lecture- Tutorial- Practical/Wee k | No. of credits | Continuous Comprehensi ve Assessment (CCA) | End- Semester Examinatio n (ESE) [University Examinatio n] | Total |
|---|-----------------|--|---|-------------------|---|--|-------|
| Semester I | | | | | | | |
| Core course – H. Sc 101 | FRM - I | Ergonomics and Institutional Management | 4 | 4 | 30 | 70 | 100 |
| Core course – H. Sc 102 | HD - I | Child Psychology | 4 | 4 | 30 | 70 | 100 |
| Core course - H. Sc 103 | CT - I | Origin, Sociological and Psychological Aspects of Clothing | 4 | 4 | 30 | 70 | 100 |
| Core course - H. Sc 104 | FN - I | Human Nutrition and Problems | 4 | 4 | 30 | 70 | 100 |
| Core course Practical - H. Sc 105 | FN - I | Assessment of Nutritional Status and Food Science | 8 | 4 | 30 | 70 | 100 |
| Core course Practical - H. Sc 106 | HD - I | Methods of Studying Children | 8 | 4 | 30 | 70 | 100 |
| Skill Course I H. Sc 107 | | Gender Studies | 2-0-2 | | | | |
| Skill Course II H. Sc 107 | | Population Education and Community Health | 2-0-2 | | | | |
| Skill Course III H. Sc 107 | | Nutrition Science: Basic Concepts | 2-0-2 | | | | |
| Total | | | | 24 | 180 | 420 | 600 |
| <u>Semester II</u> | F (| | 4 | 4 | 20 | 70 | 100 |
| H. Sc 201 | Ext. Edu I | Extension in Home Science | 4 | 4 | 30 | /0 | 100 |
| Core course - H. Sc 202 | CT - II | Indian Textiles | 4 | 4 | 30 | 70 | 100 |
| Core course - H. Sc 203 | HD - II | Issues in Child Development and Psychology | 4 | 4 | 30 | 70 | 100 |
| Core course - H. Sc 204 | FN - II | Food Microbiology and food Safety | 4 | 4 | 30 | 70 | 100 |
| Core course Practical - H. Sc 205 | CT - I | Textile Designing and Fashion Illustration | 8 | 4 | 30 | 70 | 100 |
| Core course Practical - H. Sc 206 | Ext I | Extension Education and Communication | 8 | 4 | 30 | 70 | 100 |
| Skill Course I H. Sc 207 | | Gender Studies | 2-0-2 | | | | |
| Skill Course II H. Sc 207 | | Population Education and Community Health | 2-0-2 | | | | |
| Skill Course III H. Sc 207 | | Nutrition Science: Basic Concepts | 2-0-2 | | | | |
| Total | | * | | 24 | 180 | 420 | 600 |

M. Sc. Home Science (SEMESTER - I) 2020-2021 ERGONOMICS AND INSTITUTIONAL MANAGEMENT CORE COURSE – H. Sc. - 101

MM-70 Pd/ wk- 4

Unit - 1

1. Definition - Ergonomics, Aim Scope/importance of ergonomics, areas of ergonomics

- 2. Work risk factors
- Unit 2 Ergonomics in work place -
 - 1. Posture: its impact on health and output Remedies Varied work surface - height and posture
 - 2. Anthropometry and some design issues: body shaped, anthropometry Static and dynamic, consideration for sitting, work surfaces and areas, dimensions in different postures for design applications

Unit - 3

- 1. Introduction to food service industry with historical development (in Brief)
- 2. Food service planning
 - a. Layout (Kitchen and store)
 - b. Selection of Equipment
- 3. Food service operations
- 4. Food management
 - a. Menu planning
 - b. Quantity food production
 - c. Quantity and quality control
 - d. Kitchen porduction

Unit - 4

- 1. Financial management in catering
 - a. Principles of Accounting functions
 - b. Food cost control
 - c. Designing for profits
 - d. Pricing the product
- 2. Food purchasing
- 3. Manpower and Personnel Management
 - B. Staff planning and pay roll control
 - C. Administrative leadership

Unit – 5 Management of Dining Room

- 1. Layout and structural feature of dining room
- 2. Table service
- 3. Maiutaiuance & care of linen and floor covering
- 4. Maiutaiuance & care of furniture
- 5. Hostess training
 - a. Table laying in restaurant
 - i. For one person
 - ii. For family
 - iii. For parties
- 6. Manners and etiquette
- 7. Table ware for various occasions

REFERENCES

- Malhan & Sethi: Catering Management: An Integrated Approach, 1989
- Dessler, B.: Personal Management Modern Concept and Techniques, 1978
- Kotshevar, L.N. & Terrekk, M.E.: Food Service Planning Layout and Equipment, 1967
- Anergy, A.C.: Modern Guide of food Service Equipment, C.B. Publishing, 1981

CHILD PSYCHOLOGY CORE COURSE - H. Sc. - 102

MM-70 Pd/ wk- 4

Unit – 1

Introduction to psychology

- 1. Historical perspective and emergence of child psychology as a scientific discipline (in brief).
- 2. Techniques of child study: time span approach (longitudinal, cross sectional and sequential)
- 3. Heredity and environment : influences on physical, psychological and intellectual
- characteristics and personality of children, nature Vs nurture issue.

Unit 2

- 1. Child Development Perspective: Focus on all round development, Individual needs vs Group's needs
- 2. Critical areas of child development: definition, importance and development of-creatiity and concept formation.
- 3. definition, importance and development of gender roles

Unit- 3

- 1. Infancy: definition, importance and development of
 - i. New born characteristics and assessment
 - ii. Reflex action
 - iii. Attachment
- 2. Early childhood: definition, importance and development of
 - i. Play
 - ii. Socialization
 - iii. Self and identification

Unit 4

- 1. Middle childhood: definition, importance and development of
 - i. Family
 - ii. Peers
 - iii. School
- 2. Adolescence: definition, importance and development of
 - i. Physiological changes
 - ii. Issues related to- a) self and identity, b) career and sexuality, c) health and other issues

Unit 5

- 1. Early adulthood: definition, importance and development of
 - i. Physical performance
 - ii. Sexuality
 - iii. Career and work
 - iv. Life style
 - v. Marriage and family
- 2. Middle adulthood: definition, importance and development of
 - i. Nature of middle adulthood
 - ii. Midlife crisis and health
 - iii. Career/ work/ family

REFERENCES

- L. Alan Sroufe, Robert, G. Cooper: Child Development- Its Nature and Course, Ist Ed. 1988
- Boston, Allyn & Bacon: Child Development, 1989
- Peter, K. Smith & Helen Kowie : Understanding Children's Development, Smikow 30077, New York, Basil Block, 1988
- Rober S. Feldman: Understanding Psychology, McGraw Hill Book co., New York, 1987

ORIGIN, SOCIOLOGICAL AND PSYCHOLOGICAL ASPECTS OF CLOTHING CORE COURSE - H. Sc. - 103

MM-70 Pd/ wk- 4

Unit – I

- Origin of Clothing
- Theories of Clothing: Theory of Modesty, immodesty, protection, adornment, combined need and other theories
- Role of clothing in psychological and personality development of human beings

Unit - II

- Psychological effect of clothing on children
- Self concept, personality expressed through clothing
- Values, interests and attitude in relation to clothing.
- Effect of clothing on behaviour& clothing choices.

Unit - III

Sociological aspect of clothes:

- Fashion, fads, role of uniforms, national costumes, occupational clothes, social importance of clothes, impact of society on clothing choices, Fashion Cycle
- Conformity, mobility, Class distinction family and social influences
- Factors influencing choice of clothes, physical, aesthetic, economic and social

Unit - IV

- Clothing and the age of the wearer (Infants, pre-school going children, School going children, adolescents, adults & elderly).
- Clothing and colour and importance of colour for different ceremonies, occasions, occupation, religion etc.
- Influence of culture and religion on clothing.

Unit - V

Contemporary Home Textiles:

Study with reference to fabrics, finishes, detailed design, selection, use and care

- Bedding and bed furnishings bed spread, sheets, pillow and pillow covers, bed skirts, mattresses and mattress covers, quilts, quilts covers, blankets
- Kitchen and table furnishing aprons, kitchen towels, napkins, mats, runners, dish cloths, table cloths, tea cosy covers
- Bathroom furnishing shower curtain, bath, face and hand towels, bath mats
- Floor Coverings mats, durries, rugs, carpets including wall to wall carpets
- Curtain, draperies, blinds, chicks and furnishing fabrics

REFERECES

- Ahury, G.S.: Indian Costumes, Popular Prakashan, Bombay
- Bhushan Brij, J.: Costumes and Textiles of India, D.B. Taraporewala & Co. Bmobay
- Moti Chandra: Costumes, Textiles, Cosmetics and Chiffons in Ancient and Medieval India, Orient Publisher, New Delhi, 1973
- Akazi Roahan; Ancient Indian Costumes. Art Heritage, New Delhi
- Mary Shawn Rayan: The study in Human Behavior
- Flugel, J.G.: Psychology of Clothes
- Horn, H.J.: Second Skin
- Mary, Rose & Cranz: Concepts of Clothing
- Doongaji Sherie & Deshpande, R.: Basic Processes and Clothing construction
- Bane, A.: Creative Sewing
- Tate, M.I. and Glisson, D.: Family Clothing
- Lewis, D. S. Brawes: Clothing Construction and Wardrobe Planning

HUMAN NUTRITION AND PROBLEMS CORE COURSE - H. Sc. - 104

MM – 70 Pd/WK – 4

Unit – I

- 1. Body Composition: Normal body composition, Changes through the life cycle, influence of nutritional status, Methods of assessing body composition
- 2. Public nutrition definition, concept, scope
 - Role of public nutritionist in health care delivery
- 3. Food and nutrition security
 - Concept of food security and nutrition security
 - Determinants or approaches of food security Availability, access, absorption and stability
 - Factors affecting food security
 - Effects of food insecurity
 - Food security in India

Unit – II

- 1. Nutritional problems introduction
 - Protein energy malnutrition. Prevalence, etiology consequences
 - Bio-chemical and metabolic abnormalities protein carbohydrate, fat, water and electrolyte metabolism
 - Clinical features of PEM forms kwashiorkor, marasmus, marasmic- kwashiorkor, subclinical PEM
 - Haematological changes
 - Pathological changes
 - Complications, long term effects
 - Management or treatment of PE
 - o Hospital based management
 - o Community based management
 - Prevention and control of PEM

UNIT – III

- 1. Micronutrient deficiencies-
 - Vitamin A deficiency (VAD)
 - Iron deficiency anemia (IDA)
 - Iodine deficiency disorder (IDD)
 - Zinc deficiency
 - Fluorosis
 - Their clinical features/signs and symptoms, prevalence, causes, consequences, treatment and prevention

Unit – IV

Assessment of nutrition status

- 1. Introduction, importance- purpose
 - Methods of nutritional assessment- indirect and direct methods
- 2. Nutritional anthropometry uses, measurements
 - Methods of assessing nutritional status using MUAC and using weight and height
- 3. Clinical assessment- training and standardization
 - Clinical signs of nutritional disorders- PEM, Vit A deficiency, Anamia, Goitre
 - Vit- B complex deficiency riboflavin and niacin deficiency
 - Vit.- C deficiency
 - Active rickets, Essential fatty acids, fluorosis
- 4. Bio-chemical Assessment- over view
 - Bio chemical tests for nutritional deficiencies- PEM, VAD, Anamia, Iodine def. Vit D def. and other nutrients like riboflavin, niacin, folic acid, B 12 and zinc
- 5. Dietary assessment methods of diet survey, strengths and limitations

Unit – V

- 1. Strategies to combat public nutrition problems-Introduction
- 2. Strategies
- 3. Diet or food based strategies
 - Dietary diversification/modification
 - Horticulture intervention
 - Food fortification
 - Nutrition and health education
- 4. Nutrient based approach The medicinal approach
 - Supplementation A short term preventive strategy
- 5. Selecting/implementing on intervention strategy

PRACTICAL – 1 ASSESSMENT OF NUTRITIONAL STATUS AND FOOD SCIENCE CORE COURSE - H. Sc. - 105

CCA-30 ESE-70 Pd/ wk- 8

- 1. Assessment of Nutritional Status:
 - Nutritional anthropometry : Recording and interpretation of weight, height and chest, head and mid arm circumference and skin fold thickness data
 - Clinical assessment : Identifying the clinical manifestation of the various deficiency diseases and excesses
 - Biochemical assessment-Biochemical estimation to identify the deficiency diseases namely protein energy malnutrition and anemia
 - Dietary survey
- 2. Seminar on recent advances in Nutrition
- 3. Study of Stains and staining reactions-Gram staining, negative staining, Capsule staining, acid fast staining
- 4. Bacteriological analysis of different foods- MBRT curd, vegetables, fruits, ice-cream, cereals sugar, salt, spices soft drinks, pastries and canned foods
- 5. Standardization of recipes- Low cost recipes suitable for various vulnerable Sections of Population

PRACTICAL – 2 METHODS OF STUDYING CHILDREN CORE COURSE - H. Sc. - 106

CCA-30 ESE-70 Pd/ wk- 8

1. Methods of Child Study

- Interview method
 - Structured or standardized interview
 - Unstructured or free interview
- Questionnaire method
 - Open ended
 - Close ended
- Observation method

- Participant observation
- Non participant observation
- Anecdotal records
- Rating scales
- Case study method
- 2. Psychometric Testing
 - Intelligence testing
 - a. Wechsler's Intelligence scale for children (WISC)
 - Projective techniques
 - a. Children's apperception test (CAT)
- 3. Activities for fastening development (power point presentations)

 - o Creativityo Physical & motor development
 - Social emotional development
 - Language development
 - o Cognitive development
 - Story telling techniques & aids
 - Role play
 - Program planning in balwadis

GENDER STUDIES SKILL COURSE - H. Sc. - 107

MM-50 Pd/ wk- 2

Unit – 1 Gender and Development:

1. Concept of gender, gender roles, changing trends, gender analysis matrix gender and development. Unit – 2

1. National and international efforts for gender empowerment.

Unit – 3

- 1. Meaning of status of women A situational analysis demographic, education, employment, political and health (general, occupational, and reproductive)
- 2. Violence against Women- Dowry, divorce, female feticide and infanticide, domestic violence.

Unit – 4

- 1. Sexual harassment and exploitation, trafficking, portrayal of women in mass media. Efforts for elimination of all forms of discrimination
- 2. Policies and Programmes for Women's Development:

Unit – 5

- 1. Economic empowerment- Poverty eradication, micro finance and self-help groups,
- 2. Introduction of laws for domestic violence against women (2005) and sexual harassment (2013)

PRACTICAL COURSE

MM-50 Pd/ wk-2

- 1. Preparation of E-content for gender sensitization
- 2. Identification and assessment of gender issues in current print and electronic media
- 3. Collection and evaluation of Ten articles on gender issues

POPULATION EDUCATION AND COMMUNITY HEALTH SKILL COURSE - H. Sc. - 107

MM-50 Pd/ wk- 2

Unit – 1: Health and Health Care

- 1. Concepts of health and positive health, Health- disease continuum, factors affecting health, health as a human right.
- 2. Concept of community health, global health, health for all.

Unit – 2

- 1. Primary health care- definitions, principles components, comprehensive health care, levels of prevention, Concept of reproductive health for adolescent girls and boys.
- 2. Health and Development indices
- 3. Health indices and related indices in community health, fertility indicators, vital statistics, mortality, morbidity indicators, demographic indicators - sex ratio

Unit – 3

- 1. Indicators for social and mental health, Human Development index, Disability adjusted life years (DALY). Reproductive Health index. Major Health Problems in India
- 2. Health administrative set up, Peripheral, state, National, urban-rural(Introduction to National Rural Health Mission), National family Health surveys

Unit – 4

1. National Health Programmes- ICDS, AIDS prevention Programme, Reproductive Child Health (RCH) birth control methods, population education

1. Concept of population education: Various definitions Significance and scope of population education, Family life education, Sex education, Causes and consequences of population Blast. Trends in population growth terms related to population dynamics

PRACTICAL COURSE

MM-50 Pd/ wk- 2

- 1. Preparation of teaching Aids on population dynamics
- 2. First Aid and home nursing
 - i. Bandages
 - 1. Roller-finger, arm, leg, elbow, knee, cap line
 - 2. Triangular head, palm/foot, slingh
- 2. Bed making
- 3. Recording of temperature
- 4. Use of kidney tray, spittoon, eye glass, thermometer, hot water bag, ice cap, blood pressure estimations, blood sugar testing

NUTRITION SCIENCE: BASIC CONCEPTS SKILL COURSE - H. Sc. - 107

MM-50 Pd/ wk- 2

Unit – I

Food and nutrition – meaning, functions, classification nutrition and health (Basic concepts) Unit – II

Food groups – Characteristics of food groups, classification of food groups, Balanced diet, nutrient requirements for various age groups

- Unit II
 - Anthropometric assessment of nutritional status

Unit – IV

• Therapeutic modification of normal diet and reasons for dietary changes in – Obesity, congestive heart disease, diabetes, hypertension.

• Dietary counseling

Unit – V

Food adulteration – Introduction, common adulterants in foods

PRACTICAL COURSE

MM-50

Pd/ wk- 2

1. Assessment of nutritional status of individual and for community group using - weight, height MUAC waist and hip circumferences

2. Qualitative testing of some foods for adulteration

(SEMESTER - II) COMMUNICATION AND EXTENSION IN HOME SCIENCE CORE COURSE - H. Sc. - 201

MM-70 Pd/ wk- 4

Unit 1 : Introduction to communication

- Origin, Concept, definition, nature of communication
- Models of communication
- Levels of communication
- Effective communication- Frame of reference, perception, fidelity, communication gap, time lag, empathy, homophily, hetrophily
- Functions of communication

Unit – 5

Unit 2 : Communication media and Technology

- Classification of media
- Selection of appropriate media
- Production and use of selected media in Home Science
- Writing scripts for radio talk, television talk, puppet play, street play
- Writing for newspapers, magazine
- Unit 3 : Developmental communication
 - Problems in Development and grass root participation (need and participation)
 - Development communication strategies for grass root mobilization
 - Importance of leadership in developmental communication.
 - Understanding the role of traditional and modern media in developmental communication
 - Participatory approach in developmental communication
- Unit -4 Communication process
 - Elements of communication.
 - Principle of effective communication
 - Channels of communication
 - Problems of communication (related to the communicator, message receiver and other factors)

Unit 5 : Appropriate technology for women

- Role and status of women in rural development
- Approach and methods of socio economic analysis- PRA and RRA
- Need of appropriate technology for women
- Transfer of technology and factors affecting TOT
- TOT process and improvement

REFERENCES

- Benjamin James : Communication Concepts and Contexts, 1986
- Berlo, D.K.: The Process of Communicating –An Introduction to Theory and Practical, 1960, New York, Henry Holt and Company
- Chopra, K., Kaukodi, G.K., & Murty, M.N.: Participatory Development, 1990. Sagar Publication
- Dhama, O.P. & Bhatnagar, O.P. : Education and Communication for Development, 1987
- Dhama, O.P. & Bhatnagar, O.P. : Communication for Development, 1991
- Kumar Keval J.: Mass Communication in India: A Comprehensive and Critical Look at the Mass Media in India, 1987
- Ray, G.L., Extension Communication and management, 1999, Nays Prakashan, Calcutta
- Tiwari, LP : Communication, Technology and Development, 1987
- Indian Ministry of Information & Broad Casting : Mass Media in India, 1985

INDIAN TEXTILES CORE COURSE – H. Sc. - 202

MM-70 Pd/ wk- 4

Unit - I

Study of Historical textiles with special emphasis on traditional carpets, rugs and Durries of India **Unit - II**

Woven Textile-Study of woven textiles with reference to construction techniques, colour and motif

- Jamdani of Bengal
- Baluchri of Bengal
- Brocade of Varanasi
- Paithani of Maharasthra
- Tanchoi of Guirat
- Munga Silk of Assam
- Tassar of Bihar
- Chanderi of Madhya Pradesh
- Kota Doria of Rajasthan
- Shawls of Kashmir

Unit - III

Indian Embroidery –Study of Indian Embroidered textiles with special reference to stitches, colours and motifs

- Kashida of Kashmir
- Phulkari of Punjab
- Chamba Rumal of Himachal
- Chikankari of Uttar Pradesh
- Sindhi Embroidery of Kutch
- Kantha of Bengal
- Kasuti of Karnataka
- Appliqué work of Orissa
- Metal wire and leather embroidery

Printed and Painted Textiles-Study of printed and painted textiles in reference to historical significance, styles, colour and motif

- Fabric resist dyeing Bandhani of Rajasthan
- Yarn resist dyeing Gujarat, Orissa and Andhra Pradesh
- Printed textiles Sanganer and Bagru
- Painted textiles Kalamkari and Madhubani

Unit - IV

A) Indian costumes: Historic approach from ancient period to 20th Century:

- Dress in Harappa and Mohan Jodaro
- Dress of Aryans
- Dress of 600 BC -320 BC (Buddhist, Jains)
- Islamic influence
- British period
- B) Study of regional costumes of India (Men/Women) Punjab, Himachal, Kashmir, U.P, M.P., Bengal, Tamilnadu, Rajasthan, Gujarat, and Maharashtra

Unit - V

- 1. Importance of textile conservation; Various methods for analysis of textiles -fibre content, yarn & fabric structure.
- 2. Damage to textiles pests, micro organisms etc.; Condition assessment, repair, and stabilization of textile and apparel designing in museum collections; Dry, aqueous and solvent cleaning.
- 3. Principles of cleaning fragile textiles; Proper conditions for storing and display of various textiles.

ISSUES IN CHILD DEVELOPMENT AND PSYCHOLOGY CORE COURSE - H. Sc. - 203

MM-70 Pd/ wk- 4

Unit – 1

- 1. Methods of preschool education: a) play way method, b) Montessori method, c) kinder garten method.
- 2. Parental involvement: importance and methods
- 3. Behavioural problems of children: causes and management
 - a. Truancy, telling lies and stealing
 - b. Temper tantrum and aggression
 - c. Eating problem, nail biting and bedwetting

Unit –2

- 1. Importance of school: the physical environment, school philosophy, teacher pupil interaction, effective schools.
- 2. Psychological effects of pressure on children for academic achievement
- 3. Peer relation: the development of peer sociability, peer acceptance and popularity.

Unit –3

- 1. Ethnographical approach, correlational and experiment approach to studying human behavior
- 2. Qualitative research in human development: definition and importance
- **3.** Types of qualitative methods: informal discussion, observation, social mapping, Focus group discussion

Unit –4

- 1. Survey : Questionnaire, interview case study, cheek list, rating scale and field studies (scope, meaning preparation, administration, advantages and limitations of each)
- 2. Psychometric: meaning, characteristics of a good test. Reliability, validity and discrimination power. Standardization of a psychological test
- 3. Report writing: general structure and formal of report

Unit –5

Aging:

- 1. Issues and concerns in aging:
 - i. Longevity
 - ii. Health
 - iii. Work and retirement
- 2. Socio emotional issues:
 - i. Self

- ii. Family
- iii. Society
- 3. Death and dying:
 - i. Preparation for death
 - ii. Stages of death.

REFERENCES

- Michael, Lam Marc Bornstein: Development an Introduction, 2nd, Random Hall, New York, 1987
- Grace, L. Craig: Human Development, 3rd ed. Prentice Hall, New Jersey, 1983
- Jindel, S.K.: Intellectual Development, Mittal Publication, Dehli, 1988
- Mutlidharan, N.: The systems of preschool education in India, Indian association for preschool education, 1968
- Kennedy, A.W.: Psychology, prentice Hall, New jersey, 1971 Thorpe, L. Child Psychology Development (Latest), the Ronald press Co. new York
- Berk. L.: Child Development, Boston Allyn & Bacon International edition, (Latest), 1994
- Olds, S.W. and Papalia, D.E.: Human Development, McGraw Hill Book Co., New York, 1986

FOOD MICROBIOLOGY AND FOOD SAFETY CORE COURSE - H. Sc. - 204

MM-70 Pd/ wk- 4

Unit – I

Microbiology of foods – Introduction, basic concepts, role of micro organisms in fermented foods microbiology of air, water and soil

Unit - II

- 1. Food safety and importance of safe food
- 2. Factors effecting food safety physical, chemical, biological hazards
- 3. Factors effecting the growth of micro organism in foods
- 4. Sources of food contamination

Unit – III

- Food toxins introduction, significance of food toxins and food safety
- Main groups of food toxins
- 1. Naturally occurring toxicants inherently present in foods Toxic amino acids, toxic alkaloids, siynogenic glycosides, trypsin inhibitors, haemagglutins, flatulence factors
- 2. Naturally occurring toxicants due to activity of bacterial, algae and fungi- phycotoxins or algae toxins, mycotoxins, mycotoxicoses in humans, prevention and control.
- 3. Environmental contaminants Pesticide residue, veterinary drug residues, heavy metals, nitrates and nitrites, and adulterants
- Emerging problems of food safety

Unit – IV

Food additives and safety issues- Introduction, classification, functional role and safety issues Unit-V

Food spoilage -

- Introduction, factors, chemical changes due to spoilage
- Control and destruction of micro organism in foods physical and chemical methods

PRACTICAL – 3 TEXTILE DESIGNING AND FASHION ILLUSTRATION CORE COURSE - H. Sc. - 205

CCA-30 ESE-70 Pd/ wk- 8

- 1. Drawing a collection of traditional designs given on fabrics
- 2. Sketching designs for various textures and prints to suit the figures, sizes and type of fabrics
- 3. Adaptation by flat pattern using half scale bodice block making samples on fabric
 - Part basic darts
 - Yokes
 - Fullness
 - Sleeves
 - Collars
 - Pockets

- Neck lines
- 4. Focus on design details of style and rendering techniques using different medias
 - Sketching of different action croquet (front, back and side view)
 - Sketching of garments and accessories
 - Basic rendering techniques
 - Colour matching using different medias charcoal, brushes, colours and paper

• Pattern and texture (checks, line)

- 5. Theme rendering Developing a line of garments based on theme and fabric selected
 - Casual wear
 - Sports wear
 - Formal (Business wear)
- 6. Samples of Fancy embroidery stitches and applique work.
- 7. Illustration of Dresses depicting various textures, prints and drapes.

PRACTICAL – 4 EXTENSION EDUCATION AND COMMUNICATION CORE COURSE - H. Sc. - 206

CCA-30 ESE-70 Pd/ wk- 8

- 1. Writing script for one of the media referred in theory
- 2. Production of selected media in Home Science Extension education and communication
- 3. Pre testing of the selected media
- 4. Use of Selected media in the field
- 5. Developing skill in any of the folk media
- 6. News and report writing of programme for farm/ slum women

GENDER STUDIES SKILL COURSE - H. Sc. - 207

MM-50 Pd/ wk- 2

- Unit 1 Gender and Development:
 - 1. Concept of gender, gender roles, changing trends, gender analysis matrix.
 - 2. Shift from welfare to development and empowerment, gender in development, gender and development.

Unit – 2

1. National and international efforts for gender empowerment.

Unit – 3

- 1. Meaning of status of women A situational analysis demographic, education, employment, political and health (general, occupational, and reproductive)
- 2. Violence against Women- Dowry, divorce, female feticide and infanticide, domestic violence.

Unit – 4

- 1. Sexual harassment and exploitation, trafficking, portrayal of women in mass media. Efforts for elimination of all forms of discrimination
- 2. Policies and Programmes for Women's Development:
- 3. National policy for Empowerment of women, policy perspectives, mainstreaming

Unit – 5

- 1. Economic empowerment- Poverty eradication, micro finance and self-help groups,
- 2. Introduction of laws for domestic violence against women (2005) and sexual harassment (2013)

PRACTICAL COURSE

MM-50 Pd/ wk- 2

- 1. Preparation of E-content for gender sensitization
- 2. Identification and assessment of gender issues in current print and electronic media
- 3. Collection and evaluation of Ten articles on gender issues

POPULATION EDUCATION AND COMMUNITY HEALTH SKILL COURSE - H. Sc. - 207

MM-50 Pd/ wk- 2

Unit – 1: Health and Health Care

1. Concepts of health and positive health, Health- disease continuum, factors affecting health, health as a human right.

2. Concept of community health, global health, health for all.

Unit – 2

- 1. Primary health care- definitions, principles components, comprehensive health care, levels of prevention, Concept of reproductive health for adolescent girls and boys.
- 2. Health and Development indices
- 3. Health indices and related indices in community health, fertility indicators, vital statistics, mortality, morbidity indicators, demographic indicators sex ratio

Unit – 3

- 1. Indicators for social and mental health, Human Development index, Disability adjusted life years (DALY). Reproductive Health index. Major Health Problems in India
- 2. Health administrative set up, Peripheral, state, National, urban-rural(Introduction to National Rural Health Mission), National family Health surveys

Unit – 4

1. National Health Programmes- ICDS, AIDS prevention Programme, Reproductive Child Health (RCH) birth control methods, population education

Unit – 5

1. Concept of population education: Various definitions Significance and scope of population education, Family life education, Sex education, Causes and consequences of population Blast. Trends in population growth terms related to population dynamics

PRACTICAL COURSE

MM-50 Pd/ wk- 2

- 1. Preparation of teaching Aids on population dynamics
- 2. First Aid and home nursing
 - 1. Bandages
 - Roller-finger, arm, leg, elbow, knee, cap line
 - Triangular head, palm/foot, slingh
- 3. Bed making
- 4. Recording of temperature
- 5. Use of kidney tray, spittoon, eye glass, thermometer, hot water bag, ice cap, blood pressure estimations, blood sugar testing

NUTRITION SCIENCE: BASIC CONCEPTS SKILL COURSE - H. Sc. - 207

MM-50 Pd/ wk- 2

UNIT – I

Food and nutrition – meaning, functions, classification nutrition and health (Basic concepts) UNIT – II

Food groups – Characteristics of food groups, classification of food groups, Balanced diet, nutrient requirements for various age groups

UNIT – II

Anthropometric assessment of nutritional status

UNIT – IV

- Therapeutic modification of normal diet and reasons for dietary changes in Obesity, congestive heart disease, diabetes, hypertension.
- Dietary counseling

UNIT – V

Food adulteration – Introduction, common adulterants in foods

PRACTICAL COURSE

MM-50

Pd/ wk- 2

- 1. Assessment of nutritional status of individual and for community group using weight, height MUAC waist and hip circumferences
- 2. Qualitative testing of some foods for adulteration