INVITATION FOR QUOTATION

TEQIP-III/2018/mecj/Shopping/41 **28-Nov-2018**

To,

Apex Innovations Pvt. Ltd.

E9/1, MIDC, Kupwad, Sangli - 416 436, Maharashtra,

India., Sngli, Maharashtra, 416436

Sub: Invitation for Quotations for supply of Goods

Dear Sir,

1. You are invited to submit your most competitive quotation for the following goods with item wise detailed specifications given at Annexure I,

Sr. No	Brief Description	Quantity	Delivery Period(In days)	Place of Delivery	Installation Requirement (if any)
1	Four Stroke Four Cylinder Water Cooled CRDI Diesel Engine Test Rig with sluice gate type hydraulic dynamometer to measure engine performance parameters.	1	45	Department of Mechanical Engineering, MBM Engineering College, Residency Road, Ratanada, Jodhpur, Rajasthan, 342011	Installation & commissioning including all civil and electrical works.
2	MPFI four cylinder four stroke water cooled, petrol engine test rig with sluice gate type hydraulic	1	45	Department of Mechanical Engineering, MBM Engineering College,	Installation & commissioning including all civil

	dynamometer to measure engine performance parameters and to conduct Morse test.			Residency Road, Ratanada, Jodhpur, Rajasthan, 342011	and electrical works.

2. Government of India has received a credit from the International Development Association (IDA) towards the cost of the **Technical Education Quality Improvement Programme[TEQIP]-Phase III** Project and intends to apply part of the proceeds of this credit to eligible payments under the contract for which this invitation for quotations is issued.
3. Quotation,
   3.1 The contract shall be for the full quantity as described above.
   3.2 Corrections, if any, shall be made by crossing out, initialing, dating and re writing.
   3.3 All duties and other levies payable by the supplier under the contract shall be included in the unit price.
   3.4 Applicable taxes shall be quoted separately for all items.
   3.5 The prices quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
   3.6 The Prices should be quoted in Indian Rupees only.
4. Each bidder shall submit only one quotation.
5. Quotation shall remain valid for a period not less than **55** days after the last date of quotation submission.
6. Evaluation of Quotations,

   The Purchaser will evaluate and compare the quotations determined to be substantially responsive i.e. which
   6.1 are properly signed ; and
   6.2 confirm to the terms and conditions, and specifications.
7. The Quotations would be evaluated for all items together.
8. Award of contract:

The Purchaser will award the contract to the bidder whose quotation has been determined to be substantially responsive and who has offered the lowest evaluated quotation price.

8.1 Notwithstanding the above, the Purchaser reserves the right to accept or reject any quotations and to cancel the bidding process and reject all quotations at any time prior to the award of contract.

8.2 The bidder whose bid is accepted will be notified of the award of contract by the Purchaser prior to expiration of the quotation validity period. The terms of the accepted offer shall be incorporated in the purchase order.

9. Payment shall be made in Indian Rupees as follows:

Delivery and Installation - 0% of total cost

Satisfactory Acceptance - 100% of total cost

10. All supplied items are under warranty of **12** months from the date of successful acceptance of items.
11. You are requested to provide your offer latest by **11:00** hours on **15-Jan-2019 .**
12. Detailed specifications of the items are at Annexure I.
13. Training Clause (if any) **Operation & maintenance training**
14. Testing/Installation Clause (if any) **Experiments are to be demonstrated at college site and results should be matched with sample calculation provided.**
15. Information brochures/ Product catalogue, if any must be accompanied with the quotation clearly indicating the model quoted for.
16. Sealed quotation to be submitted/ delivered at the address mentioned below,
    TEQIP-III Office, Department of Computer Science & Engineering, M.B.M. Engineering College, Residency Road, Ratanada, Jodhpur.
17. We look forward to receiving your quotation and thank you for your interest in this project.

(Authorized Signatory)

Name & Designation

Annexure I

Sr. No	Item Name	Specifications
1	Four Stroke Four Cylinder Water Cooled CRDI Diesel Engine Test Rig with sluice gate type hydraulic dynamometer to measure engine performance parameters.	The setup should consist of Diesel engine connected to hydraulic dynamometer for engine loading and assembly should be mounted on a strong base frame. The setup should consist of measurement systems, as per detailed specification below. Experimental Capabilities • To determine Brake Power, fuel consumption and calculate specific fuel consumption, BMEP, Brake Thermal Efficiency at various loads. • To determine Air consumption and calculate volumetric efficiency, A/F ratio • To calculate heat balance sheet of engine. DETAILED SPECIFICATIONS Engine: Make – Maruti Udyog Ltd, Model–Dzire, BS IV CRDI Diesel, 4 cylinder,4 stroke, water cooled, power 55 KW@4000 rpm, torque 190Nm @ 2000 rpm, capacity-1248cc, Bore 69.6 mm, stroke 82 mm, forced lubrication, turbocharged with intercooler (Brand New, The Engine Purchase Bill with date and Engine Number should be provided at the time of inspection) Dynamometer: Make Technomech, Model TM50, Sluice gate type hydraulic dynamometer. Propeller shaft With universal joints, Make Hindustan Hardy Spicer, Model 1260, Type A. The Dynamometer would be capable of absorbing power with its Power-speed characteristics e.g 50 HP Power at 1500 rpm and a maximum power capacity of 150 HP. The dynamometer should be suitable for manual load operation by changing water volume by sluice gate mechanism. MS fabricated guard has to be supplied for protection against rotating shaft. Air Intake Measuring System: should consist of an air tank MS fabricated of suitable size mounted on an iron stand and fitted with a suitable brass orifice plate and

		water manometer (exact dimensions of the air box and orifice plate should be provided otherwise quotation will be liable for rejection) Manometer: Range 100-0-100 mm, resolution 1mm, Type U tube water, Connection. 1/4`` BSP hose. Fuel Measuring Arrangement should consists of fuel tank of Capacity 15-20 litre with glass fuel metering column and suitable cock and fuel piping from fuel tank to Engine. Exhaust Gas Calorimeter: Double pipe heat exchanger made of stainless steel to measure heat loss through exhaust gases and designed to get maximum temperature difference. The body of the calorimeter should be insulated on all sides with ceramic wool and aluminium cladding to prevent heat losses. It should consist of inlet and outlet piping with cooling water flow control gate valve. Temperature Measurement: Multi channel digital Temperature Indicator with or switch, Make ESD, model ESD 9043, 230VAC, Input: Type K Thermocouple, 6 point, Range 0-1200deg.C. Temperature sensors: Thermocouple, Type K make Radix, Ungrounded, Sheath Dia.6mmX110mmL, material: SS316, Connection 1/4"BSP (M) adjustable compression fitting. Number of Temperature sensors in test rig should be six e.g at the inlet water to engine /calorimeter (i.e. at pump outlet), at the Engine jacket cooling water outlet, at calorimeter water outlet., at Exhaust gas inlet of calorimeter, at exhaust gas outlet of calorimeter and ambient air temperature. Speed indicator Digital Speed indicator Make ron, model RC 100, Range 6000 RPM, with Photoelectric sensor, NPN (5-30 volt DC). Load sensor Load cell, Make Sensotronics, Model 60001,Type S beam, Universal, Capacity 0-50 kg. Load indicator Digital, Make ABUS, model SV8 DC10, Input - Load cell, Range 0-50 Kg. Rotameter: For Engine cooling water flow rate, Make Eureka, Model PG 9, 100-1000 LPH; Connection 1” BSP vertical, screwed, Packing neoprene. For Calorimeter water flow rate, Make Eureka, Model PG 5, 25-250 LPH

		Connection ¾” BSP vertical, screwed, Packing neoprene. Pump Centrifugal Monoblock Pump, Make Kirloskar, Head 20m., HP 1.5, Single phase, Size inlet/outlet 32x25. (Exact model no. of the pump should be specified otherwise quotation will be liable for rejection). Pump should be connected with suitable inlet and outlet piping to engine cooling water, hydraulic dynamometer and calorimeter cooling water with suitable flow control gate valves. Battery: for self-starter system, Make Exide, Capacity 12 V DC, (Exact model no. of the battery should be specified otherwise quotation will be liable for rejection). The following instrumentation should be also provided e.g. pressure gauge, Ignition switch, self starter, battery ammeter, throttle control with graduation scale showing zero to full throttle. A Dash board panel with support structure should be provided. Instruction manual for engine, Dynamometer, and Calibration sheets for load cell should be provided. An ENGLISH instruction manual consisting of experimental procedures, block diagram etc. will also be provided. Installation and commissioning including all civil and electrical works will be in scope of supplier. Experiments are to be demonstrated at college site and results should be matched with sample calculation provided.
2	MPFI four cylinder four stroke water cooled, petrol engine test rig with sluice gate type hydraulic dynamometer to measure engine performance parameters and to conduct Morse test.	The setup should consist of petrol engine connected to hydraulic dynamometer for engine loading and assembly should be mounted on a strong base frame. The setup should consist of measurement systems as per detailed specifications. Experimental Capabilities • To determine Brake Power, fuel consumption and calculate specific fuel consumption, BMEP, Brake Thermal Efficiency at various loads. • To determine Air consumption and calculate volumetric efficiency, A/F ratio • To conduct Morse test on petrol engine • To calculate heat balance sheet of engine. DETAILED SPECIFICATIONS Engine: Make –

		Maruti Udyog Ltd, Model–Dzire engine (K12M) Four cylinder, four stroke, petrol engine with multipoint fuel injection system, displacement: 1197 cc, maximum power:61kw@6000 rpm, maximum torque:113Nm@4200rpm, compression ratio: 11:1, Bore: 73mm, Stroke: 71.5mm, water cooled, forced lubrication. (Brand New, The Engine Purchase Bill with date and Engine Number should be provided at the time of inspection). Dynamometer: Make Technomech, Model TM50, Sluice gate type hydraulic dynamometer. Propeller shaft With universal joints, Make Hindustan Hardy Spicer, Model 1260, Type A. The Dynamometer would be capable of absorbing power with its Power-speed characteristics e.g 50 HP Power at 1500 rpm and a maximum power capacity of 150 HP. The dynamometer should be suitable for manual load operation by changing water volume by sluice gate mechanism. MS fabricated guard has to be supplied for protection against rotating shaft. Air Intake Measuring System: should consist of an air tank MS fabricated of suitable size mounted on an iron stand and fitted with a suitable brass orifice plate and water manometer (exact dimensions of the air box and orifice plat should be provided otherwise quotation will be liable for rejection). Manometer: Range 100-0-100 mm, resolution 1mm, Type U tube water, Connection. 1/4`` BSP hose. Fuel Measuring Arrangement should consists of fuel tank of Capacity 15-20 litre with glass fuel metering column and suitable cock and fuel piping from fuel tank to Engine. Exhaust Gas Calorimeter: Double pipe heat exchanger made of stainless steel to measure heat loss through exhaust gases and designed to get maximum temperature difference. The body of the calorimeter should be insulated on all sides with ceramic wool and aluminium cladding to prevent heat losses. It should consist of inlet and outlet piping with cooling water flow control gate valves. Temperature Measurement:

		Multi channel digital Temperature Indicator with or switch, Make ESD, model ESD 9043, 230VAC, Input: Type K Thermocouple, 6 point, Range 0-1200deg.C. Temperature sensors: Thermocouple, Type K make Radix, Ungrounded, Sheath Dia.6mmX110mmL, material: SS316, Connection 1/4"BSP (M) adjustable compression fitting. Number of Temperature sensors in test rig should be six e.g at the inlet water to engine /calorimeter (i.e. at pump outlet), at the Engine jacket cooling water outlet, at calorimeter water outlet., at Exhaust gas inlet of calorimeter, at exhaust gas outlet of calorimeter and ambient air temperature. Speed indicator Digital Speed indicator Make ron, model RC 100, Range 6000 RPM, with Photoelectric sensor, NPN (5-30 volt DC). Load sensor Load cell, Make Sensotronics, Model 60001,Type S beam, Universal, Capacity 0-50 kg. Load indicator Digital, Make ABUS, model SV8 DC10, Input - Load cell, Range 0-50 Kg. Rotameter: For Engine cooling water flow rate, Make Eureka, Model PG 9, 100-1000 LPH; Connection 1” BSP vertical, screwed, Packing neoprene. For Calorimeter water flow rate, Make Eureka, Model PG 5, 25-250 LPH Connection ¾” BSP vertical, screwed, Packing neoprene. Pump Centrifugal Monoblock Pump, Make Kirloskar, Head 20m., HP 1.5, Single phase, Size inlet/outlet 32x25. (Exact model no. of the pump should be specified otherwise quotation will be liable for rejection). Pump should be connected with suitable inlet and outlet piping to engine cooling water, hydraulic dynamometer and calorimeter cooling water with suitable flow control gate valves. Battery: for self-starter system, Make Exide, Capacity 12 V DC, (Exact model no. of the battery should be specified otherwise quotation will be liable for rejection). The following instrumentation should be also provided e.g. pressure gauge, Ignition switch, self starter, battery ammeter, throttle control with graduation scale showing zero to full throttle. A Dash board panel with support structure

		should be provided. A high voltage knife switch assembly for cutting off each cylinder for Morse test should be provided. Instruction manual for engine, Dynamometer, and Calibration sheets for load cell and for experimental procedures, block diagram etc. should be provided. Installation and commissioning including all civil and electrical works will be in scope of supplier. Experiments are to be demonstrated at college site and results should be matched with sample calculation provi

FORMAT FOR QUOTATION SUBMISSION

(In letterhead of the supplier with seal)

Date: _____

To:

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Sl. No.	Description of goods (with full Specifications)	Qty.	Unit	Quoted Unit rate in Rs. (Including Ex Factory price, excise duty, packing and forwarding, transportation, insurance, other local costs incidental to delivery and warranty/ guaranty commitments)	Total Price (A)	Sales tax and other taxes payable	
						In %	In figures (B)
Total Cost							

Gross Total Cost (A+B): Rs. _____

We agree to supply the above goods in accordance with the technical specifications for a total contract price of Rs. ———————— (Amount in figures) (Rupees ————————amount in words) within the period specified in the Invitation for Quotations.

We confirm that the normal commercial warranty/ guarantee of ——————— months shall apply to the offered items and we also confirm to agree with terms and conditions as mentioned in the Invitation Letter.

We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

Signature of Supplier

Name: _____

Address: _____

Contact No: _____