INVITATION FOR QUOTATION

TEQIP-III/2019/dced/Shopping/_____ **15-Feb-2019**

To,

WHOMSOEVER IT MAY CONCERN

Sub: Invitation for Quotations for supply of Goods

Dear Sir,

1. You are invited to submit your most competitive quotation **(in hard copy only)** for the following packages **(one quotation for one package)** with item wise detailed specifications given at annexure I,

Sr. no.	Tender ID	Package Code	Package Name
1	TEQIP-III/2019/dced/Shopping/86	TEQIP- III/BH/dced/139	MECH P1
2	TEQIP-III/2019/dced/Shopping/87	TEQIP- III/BH/dced/140	MECH P2
3	TEQIP-III/2019/dced/Shopping/88	TEQIP- III/BH/dced/141	MECH P3
4	TEQIP-III/2019/dced/Shopping/89	TEQIP- III/BH/dced/142	MECH P4
5	TEQIP-III/2019/dced/Shopping/90	TEQIP- III/BH/dced/143	MECH P5
6	TEQIP-III/2019/dced/Shopping/91	TEQIP- III/BH/dced/144	MECH P6
7	TEQIP-III/2019/dced/Shopping/92	TEQIP- III/BH/dced/145	MECH P7
8	TEQIP-III/2019/dced/Shopping/93	TEQIP- III/BH/dced/146	MECH P8
9	TEQIP-III/2019/dced/Shopping/94	TEQIP- III/BH/dced/147	MECH P9
10	TEQIP-III/2019/dced/Shopping/95	TEQIP- III/BH/dced/148	MECH P10
11	TEQIP-III/2019/dced/Shopping/96	TEQIP- III/BH/dced/149	MECH P11
12	TEQIP-III/2019/dced/Shopping/97	TEQIP- III/BH/dced/150	MECH P12
13	TEQIP-III/2019/dced/Shopping/98	TEQIP- III/BH/dced/152	MECH P14
14	TEQIP-III/2019/dced/Shopping/99	TEQIP- III/BH/dced/153	MECH P15
15	TEQIP-III/2019/dced/Shopping/100	TEQIP- III/BH/dced/155	MECH P16

16	**TEQIP-III/2019/dced/Shopping/101**	**TEQIP- III/BH/dced/156**	**MECH P17**
17	**TEQIP-III/2019/dced/Shopping/102**	**TEQIP- III/BH/dced/157**	**MECH P18**
18	**TEQIP-III/2019/dced/Shopping/153**	**TEQIP- III/BH/dced/227**	**MECH P19 Design Lab**
19	**TEQIP-III/2019/dced/Shopping/154**	**TEQIP- III/BH/dced/228**	**MECH P20 Production Lab**
20	**TEQIP-III/2019/dced/Shopping/155**	**TEQIP- III/BH/dced/229**	**MECH P21 Production Lab**
21	**TEQIP-III/2019/dced/Shopping/151**	**TEQIP- III/BH/dced/230**	**MECH P22 Thermal Lab**
22	**TEQIP-III/2019/dced/Shopping/152**	**TEQIP- III/BH/dced/231**	**MECH P23**

Note: Package wise detailed specification is attached (annexure-I) with this invitation letter and also made available on the institute website.

2. You must also submit the following information along with the bid.
   i. Supplier Name:
   ii. Address (with Pin Code):
   iii. Contact person Name:
   iv. Email ID:
   v. Mobile No.
   vi. GST No.
   vii. PAN No.
3. 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.
4. Quotation,

   4.1 The contract shall be for the full quantity as described above.

   4.2 Corrections, if any, shall be made by crossing out, initialing, dating and re writing.

   4.3 All duties and other levies payable by the supplier under the contract shall be included in the unit price.

   4.4 Applicable taxes shall be quoted separately for all items.

   4.5 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.

   4.6 The Prices should be quoted in Indian Rupees only.
5. Each bidder shall submit only one quotation **for one complete package.**

The bidder may submit separate quotation (as separate bid document) for each of the package advertised. The package wise detailed specification is available on the institute website https://www.dce-darbhanga.org/teqip-iii/tenders/ **and also attached here for the reference.**

6. Quotation shall remain valid for a period not less than **55** days after the last date of quotation submission.
7. Evaluation of Quotations,

   The Purchaser will evaluate and compare the quotations determined to be substantially responsive i.e. which

   7.1 are properly signed ; and

   7.2 confirm to the terms and conditions, and specifications.
8. The Quotations would be evaluated for all items together.
9. 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.

   9.1 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.

   9.2 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.
10. Payment shall be made in Indian Rupees as follows:

    Delivery and Installation - 90% of total cost

    Satisfactory Acceptance - 10% of total cost
11. All supplied items are under warranty of **minimum 12** months from the date of successful acceptance of items.
12. You are requested to provide your offer latest by **16:00** hours on **30-Mar-2019.**
13. Detailed specifications of the items are at Annexure I.

14. Training Clause (if any): **Yes, as per the requirements of individual item that will be notified in PO while awarding the contract.**
15. Testing/Installation Clause (if any) **Yes.**
16. Information brochures/ Product catalogue, if any must be accompanied with the quotation clearly indicating the model quoted for.
17. Sealed quotation to be sent through speed post/registered post/courier only to the following address:

    Darbhanga College of Engineering, Darbhanga, Mabbi, Post - Lal Sahpur, VIA - PTC, Darbhanga – 846005, Bihar.

    The Tender ID, Package code and Package name must be written on top of the envelop of the bid document.
18. **The bidder must mention the details of prior requirement for the installation and commissioning of the items quoted. A separate sheet with item wise requirements in a tabular form may be submitted.**
19. **Payment will be made only after the successful completion of set milestones and the adequate fund allocation from NPIU under TEQIP-III project.**
20. **Principal, Darbhanga College of Engineering, Darbhanga, reserves the rights to accept the lowest or any tender and also of rejecting all or any tender without assigning any reason for the same.**
21. **The entire dispute with regard to the contract of purchase of items/packages will be subject to Legal jurisdiction of Darbhanga only.**
22. **The Dealer must have Annual Turnover of Rs. 1 (One) Crore or more for last 3 consecutive years. Copy of Balance Sheets and PL statements must be submitted with the Bid.**
23. **The Bidder / Authorised Dealer / Manufacturer whosoever is submitting the tender must have at least 3 years' experience of successful execution of contracts of similar nature to Central / State Govt. Departments / Organizations / Technical Institutions / TEQIP-III Institutions. Relevant Proofs (Order Copies) must be attached with the Bid.**
24. **The Bidder must have valid PAN / GST No., Copy of which must be attached.**
25. **The Bidder must submit last 3 years ITR.**

26. **The Bidder has to submit an Affidavit that his firm has not been blacklisted by State Govt. / Central Govt.**

27. **The Bidder must give warranty of at least 12 months of the products/items supplied.**

28. **The quotation submitted must contain mandatory information such as GSTIN, HSN code, Bifurcation of CGST & SGST, Taxable value and Invoice value, etc.**

29. **Preference will be given to:**

- **The Bidders possessing relevant certification by an authorized body such as ISO etc.**
- **The bids that have quoted the items certified for standard, quality and safety such as BIS, ISI etc.**
- **The Bidders having dealer/supplier base in Bihar to prove its capability to provide after sales services as and when required.**

30. We look forward to receiving your quotation and thank you for your interest in this project.

15/2/19

(Dr. A K Rai)
Principal – cum – IPD
TEQIP-III, DCE, Darbhanga

15/2/19

FORMAT FOR QUOTATION SUBMISSION

(In letterhead of the supplier with seal)

Date: _____

To:

_____

_____

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: _____

DARBHANGA COLLEGE OF ENGINEERING

MECHANICAL ENGINEERING DEPARTMENT

DESIGN LAB

1. **Package Name: Mech P1**

   Package Code: TEQIP- III/BH/dced/139

S. No.	Detailed specification of the instruments / equipment	Qty.
1.	**Brinnel and Rockwell hardness testing machine** **i)** **BRINELL:** Initial load- Nil, max. load: 2500- 3500 Kgf, Net weight- 500 Kg(approx.), depth of throat (mm): 200 (approx.) maximum test height- up to 500 mm, machine height- 1100- 1200 mm, **ii)** **ROCKWELL:** initial load- 10 kgf Max. Test Height (mm) – 295 Depth of Throat (mm)-150 (approx.). Depth of Elevating Screw Below Base (mm) – 295 Size of Base (mm) (Approx.) 430 x 180 Machine Height (mm) – 865 Net Weigth (kg.) (Approx.) - 106	2
2.	**Universal Testing Machine** Servo drive, Load Capacity: 200 - 500kN; displacement of jaw: 5- 100 cm; takes static load dynamic load and cyclic load; capable of tension, compression, shear and bending tests; safety factor: short circuit protection, data required: automatic.	1

2. **Package Name: Mech P2**

   Package Code: TEQIP- III/BH/dced/140

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**Bending and Deflection Apparatus** Cross section of the beam: rectangular and length about 50- 60 cm. Dial indicator (Series 2: .01mm & 0.001 mm graduation)	01
2.	**Strain Measurement using strain gauge** Strain range: up to 3%, nominal resistance value:120,350,700 and 1000Ω; power requirements: 230 V ± 10% AC	01

3. Package Name: Mech P3

Package Code: TEQIP- III/BH/dced/141

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**Models of different Mechanisms** (single slider crank inversion, double slider crank inversion and all types of links and pairs) Medium size ceramic Models showing all links and pairs	2 Set

PRODUCTION LAB

4. Package Name: Mech P4

Package Code: TEQIP- III/BH/dced/142

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**Optical Microscope** Architecture-Inverted Observation Method-Bright field, Dark field, Differential Interface Contrast (DIC), Simple Polarizing Eyepiece-Magnification 10X and FOV minimum22mm, one eyepiece must have equipped with cross hair reticule Nosepiece-5-fold revolving nosepiece Objective magnification-5x,10x,20x,50x,100x Focus-two step focusing, coarse & fine to 2000X ; Illumination light Halogen or LED	01
2.	**Surface Roughness Tester** Measuring range-17.5mm Measuring speed-0.25, 0.5, 0.75mm/s 1mm/s Detector range-360µm (-200µm to +160µm) Measuring Force-4mN Stylus tip radius-5 µm External I/O -USB I/F. Digital output, Printer output, RS-232C I/F, Foot SW I/F Power Supply-Two-way power supply: battery (rechargeable Ni-MH battery) and AC adapter Data -Storage Memory card	02
3.	**Micrometer And Telescopic Gauge**	06

	Micrometer: Range 0 to 25 mm, accuracy: ±2µm, graduation: .010mm, measuring faces: carbide, .6 µm flatness and 2.4 µm parallelism **Telescopic gauge**: Range 5 mm to 150mm Constant spring force on measuring surface	

5. Package Name: Mech P5

Package Code: TEQIP- III/BH/dced/143

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**TIG Welding Apparatus** Current = 4-600 amp, Input Voltage (V) 415± 15% , 3 phase , 50 hz, max. input KVA@100% duty cycle: 20- 22V; open circuit voltage DC: 80± 10%, efficiency: 80 – 90%, welding current@ 60% duty cycle(A): 620- 640: welding current @100% duty cycle (A) : 500-520: weight (approx.) : 50 Kg **TIG torch** Hand held torch adjustable with suitable angle, Power and gas connection enabled , Mode of cooling : Water cooling, Electrode diameter : 1 to 4 mm, Cable length: 8 to 10 m, Output current at 100% DC: 200 A or above, Lens head : 10 mm diameter (Lens head is essential) **Foot pedal** 4-step control to ignite and stop the arc and gas, Cable length : 8 to 10 m **Trolley** Should accommodate welding power source, cooling unit and gas cylinder	01
2.	**MIG Welding Apparatus** Current = 4-600 amp, Input Voltage (V) 415± 15%, 3 phase, 50 hz, max. input KVA@100% duty cycle: 18- 20V; open circuit voltage DC: 70± 10%, rated voltage range: 16- 45 V welding current@ 60% duty cycle(A): 620- 640; weight(approx.) : 50 Kg **MIG torch** Hand held torch adjustable with suitable angle, Power and gas connection enabled , Mode of cooling : Water cooling, Electrode diameter : 1 to 4 mm, Cable length: 8 to 10 m, Output current at 100% DC: 200 A or above, Lens head : 10 mm diameter (Lens head is essential) **Foot pedal** 4-step control to ignite and stop the arc and gas, Cable length : 8 to 10 m **Trolley** Should accommodate welding power source, cooling unit and gas cylinder	01

6. Package Name: Mech P6

Package Code: TEQIP- III/BH/dced/144

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**Surface Grinder** Grinding wheel 200x13x32mm x mm x mm Power 2 HP, working surface of the table(approx.): 175mm x 350 mm, maximum height from table of grinding wheel(approx.): 270 mm, vertical feed graduation: 0.01mm; cross feed graduation: 0.05mm; net weight (approx.): 600- 700 Kg	01
2.	**Pedastal Grinder** Grinding wheel 250x25x32mm x mm x mm Speed 2800 rpm, diameter 200- 400 mm, Voltage 220V Net Weight (approx.): 400 kg	02
3.	**Dynamometer(Cutting Force Measurements)** Capacity: X,Y,Z - Force 500 Kg Excitation : 10V DC Linearity : 2% Accuracy : 2% Cross- sensitivity : 5% Max overload : 150 %	02
4.	**Radial Drilling Machine** Drill depth 350 mm, rpm 40-1800, Power 5 – 7 kw, Maximum drilling diameter 80 mm , Table size 800x600 mm^2 to 1000x 800mm^2 , Range of spindle speed 10 to 1400 rpm, Number of spindle speed 14-25 steps	01

THERMAL LAB

7. Package Name: Mech P7

Package Code:TEQIP- III/BH/dced/145

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**Redwood Viscometer (Density and Viscosity)** Heater: SS tubular immersion heater., Heating load: 1kW. Accuracy: ± 3°C. Flask receiver: 50 mL capacity. Double walled construction, thermally insulated with inside body made of stainless steel outside GI. Accessories: Digital stop watch, Thermometer, Glass redwood cup.	01

2.	**Pipe Friction Apparatus** Supply Pump set: 0.5 HP – Single phase to pump water from sump. Piping system: 2 GI pipes of diameter range 20mm to 30mm with Tapings from 1m to 3m of individual gate valves with Isolating cocks. Head loss: Differential Mercury manometer. Sump tank: M.S FRP lining - 0.3m × 0.3m × 1.0m to 0.6m × 0.6m × 2.0m. Measuring tank: M.S FRP lining with non-corrosive valves and fittings, Size range - 0.3m × 0.3m × 0.5m to 0.6m × 0.6m × 1.0m Power supply: Single phase main switch. Frame work: All accessories are mounted on frame work as a single unit	01

8. Package Name: Mech P8

Package Code: TEQIP- III/BH/dced/146

S.No.	**Detailed specification of the instruments / equipment**	**Qty.**
1.	**Composite Wall Apparatus** Type of heater : Ni-Cr wire Auto transformer : 0-230 V (min.), 2 Amp. (min.) Temp. indicator with selector switch :0-250°C Temperature sensors : RTD/thermocouple Instrument for the measurement of voltmeter (0-250 V) and ammeter (0-2 Amp) Slab assembly of three different type of material arranged symmetrically on both sides of heater. 1. Cast iron / stainless steel: 200 mm (min.) dia. and 15 mm (min.) thickness 2. Bakelite / asbestos: 200 mm (min.) dia. and 10 mm (min.) thickness 3. Press wood: 200 mm (min.) dia. and 10 mm (min.) thickness Service required: 230V AC, 1 Phase, 50 Hz Calibration certificates traceable to National/ International standards.	01
2.	**Heat Transfer in Natural Convection** Diameter of the tube : 35-45 mm Length of the tube : 500 mm Duct size : 200 mm × 200 mm × 800 mm	01

	Multichannel Digital Temperature Indicator : 0-300°C using Chromel/ Alumel thermocouple (8 nos.) Ammeter : 0-2 Amp. and Voltmeter : 0-200 Volts Dimmerstat : 2 Amp. 240 Volts.	
3.	**Flash and Fire Point APPARATUS** Power Source : Electric, 230 V, 1.5 kW Temperature range: upto 400°C Automation Type: Semi-Automatic Type electrically heated with temperature controller cum indicator with FHP motor stirrer	01

9. Package Name: Mech P9

Package Code: TEQIP- III/BH/dced/147

S.No.	**Detailed specification of the instruments / equipment**	**Qty.**
1.	**2 Stroke Petrol Engine Model** Engineering Cut Section Model: Representing internal structure and operating principles of an air-cooled two stroke engine. All parts in aluminium alloy. Ignition is shown by means of a miniature bulb. Carburetor and fuel supply also sectioned. Mounted on base, with printed diagram showing working.	03
2.	**4 Stroke Engine Model (Petrol)** Engineering Cut Section Model: A model of four stroke water -cooled diesel engine. This is of the chain-driven overhead camshaft type and all functional components like camshaft, rock-arms, tappets etc. are clearly demonstrated. The functioning of fuel injection system is also represented. Ignition is shown by means of a miniature bulb, Mounted on base.	03

10. Package Name: Mech P10

Package Code: TEQIP- III/BH/dced/148

S.No.	**Detailed specification of the instruments / equipment**	Qty.
1.	**2-Stroke Petrol Engine Test rig** Engine: 2-stroke,single cylinder, air cooled petrol engine of about 150 CC capacity. Loading : Electrical loading or eddy current dynamo meter with 3-5 HP capacity. Fuel measuring device : Fuel tank mounted on sturdy iron stand, burette tube, three way cock, connecting tube & a stop clock. Air intake measurement : Air intake reservoir of size 0.3m × 0.3m ×0.5m with orifice plate, U-Tube manometer for the measurement of air flow rate. Exhaust gas Calorimeter : Shell and tube heat exchanger to measure the heat goes through exhaust gases. Temperature measurement: Digital temperature indicator with 6 no. of temperature measuring point for calorimeter inlet-outlet conditions and ambient temperature.	01
2.	**Two Stage Air Compressor Test rig** Air Compressor : 2 HP Twin Cylinder, Two Stage Reciprocating Air Compressor mounted on air receiver tank with air cooled intercooler provided between the first and second stage. Motor : 2 -3 HP Three Phase AC Air Tank : Size about 300mm × 300mm × 600mm mounted with orifice plate and water manometer for air intake Measurement Temperature Indicator : Digital Temperature Indicator , "K" Type thermocouples with range 0-1200°C Locations : Temperature before intercooler, Temperature after intercooler and Ambient Air Flow Measurement : An "U" tube Manometer is connected across an orifice(0-300 mm WC) Energy Meter : Electronic (For Measuring the input power for Air Compressor Test rig) Speed : A non-contact type proximity sensor with digital indicator(0-9999 rpm) Pressure : Two pressure gauges (Bourdon type) to measure pressure at LP & HP side.	01

11. Package Name: Mech P11

Package Code: TEQIP- III/BH/dced/149

S.No.	Detailed specification of the instruments / equipment		Qty.
1.	**Vapour Absorption Test rig** Refrigerant : $NH_3 + H_2O$ Voltmeter : 0- 300 V AC Ammeter : 0-20 A AC Temp. indicator: -50°C to +150°C	Thermocouple: K type (Cr-Al) Toggle switches for heater & condenser fan Gross volume: 40-45 ltrs TSS: Thermocouple selection switch (9 way)	01
2.	**Recirculating A C Trainner** Air Flow : Variable speed centrifugal fan with speeds up to 680 m^3/Hr (0.18 m^3/s) Air Ventilation duct: Ducting is made from Polypropylene with transparent plexiglass covers. Preheters: 1 unit (1.0 kW), 1 unit (2.0 kW) with selector switch for 1.0,2.0,3.0 kW configuration. Reheters: 1 unit (1.0 kW), 1 unit (0.5 kW) with selector switch for 0.5,1.0,1.5 kW configuration. Condensing unit: 1.5 Hp Hermetic Compressor, Air cooled condenser, Thermostatic expansion device, high/low pressure control. Instrumentation and controls : Temperature indicator, Humidity meter, Pressure gauges, Refrigerant flow meter, Air flow meter , Condensate meter.		01

12. Package Name: Mech P12

Package Code: TEQIP- III/BH/dced/150

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**Francis Turbine** Rated Speed: 1000 to 2000 RPM Supply head: Approximately 20m. Loading: Eddy current or Rope brake Dynamometer Material: Cast iron Supply pump: 4.5-6 HP Total head: Approximately less than 30m Flow measurement: Venturimeter / Orificemeter and Manometer Pressure measurement: Pressure and Vacuum gauges Sump tank : M.S FRP lining, non corrosive valves Electrical supply : 3 Phase, 440 V. Speed : Digital RPM indicator.	01

WORKSHOP LAB

13. Package Name: Mech P14

Package Code: TEQIP- III/BH/dced/152

S.No.	**Detailed specification of the instruments / equipment**	**Qty.**
1.	**Solder Torch** Power 60 watt weight 2 kg voltage 240 DC, temp: 300- 840 ºF	01
2.	**Brazing Torch** Voltage upto 80 DC, Current 500 amp	01
3.	**Gas Welding Apparatus** Oxy acetylene fuel , 200 amp , 50Hz **Equipment for oxyacetylene welding** 1. Oxygen cylinder 7 cubic meter with test certificate from GOI 2. Acetylene cylinder 5 cubic meter with test certificate from GOI 3. Pressure regulator oxygen two stage brass max. inlet pressure 200 bar, max. outlet pressure 02 bar, max. flow 450 litre/min. inlet and outlet connection B.S.P Right hand thread and pressure adjusting key as per IS. 4. Pressure regulator acetylene two stage brass max. inlet pressure 20 bar, max. outlet pressure 01 bar, max. flow 250 litre/min. inlet and outlet connection B.S.P left hand thread and pressure adjusting key as per IS. **5.** Welding torches with different nozzles small and big ISI mark. torch body(handle), two separate gas tubes (through the handle connected to the hoses), separate control valves, mixed chamber, flame tube, welding tip) **6.** Gas cylinder trolley for two cylinders(oxygen & acetylene) of size 1350*650 mm M.S.pipe 'C' class of diameter 25 mm with basement sheet of 650*360*4 mm having 200*50 mm solid rubber tyre wheel to move trolley. Trolley divided into two sections with 275 mm gap for oxygen cylinder and 350 mm gap for acetylene cylinder with support of M.S strip 25*6 mm in half circle shape and having chain made from 10SWG with provision to lock the cylinder **7.** Hoses: Hose pipe 8mm ISI mark Marrun and black 7 meter. Each with Hose clamp, Unit with flash back arrester for oxygen and acetylene. Regulator tasted & certified with principal manufacturers and ISI marked.	01

14. Package Name: Mech P15

Package Code: TEQIP- III/BH/dced/153

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**Hand Blower** Material Cast iron; weight approximately 4 kg	01
2.	**Muffle Furnace** Maximum temperature 1200 C ; Weight 6 kg, temp accuracy: ± 1%; size (approx.) : 300mm x 150mm x 150 mm Temperature Controller: Microprocessor based PID controller for automatic time and temperature; Furnace should be fitted with on/off switch, M.C.B, fuse, indicating lamp suitable for 220 V AC. Furnace should be insulated with ceramic blanket & high temperature insulating bricks.	01

15. Package Name: Mech P16

Package Code: TEQIP- III/BH/dced/155

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**Autocollimeter** Precision 1mm per 10m ; Magnification 10 X	01

16. Package Name: Mech P17

Package Code: TEQIP- III/BH/dced/156

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**Power Hacksaw** Hydraulic ,Capacity 300 mm; Length of workpiece 300 mm, Number of strokes per mm 70- 90, Blade size 300- 350 mm, Motor 1200- 1500 rpm	01

17. Package Name: Mech P18

Package Code: TEQIP- III/BH/dced/157

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**Injection Moulding** Voltage 440V Clamping force 1000 KN, Pump motor 7.5 to 11 KW, Screw diameter 120 – 150 mm, Injection Pressure 2200 to 1300 bar, Max injected weight 75 to 150 gms, Moulding height 100 -450 mm	01

DESIGN LAB

18. Package Name: Mech P19

Package Code: TEQIP- III/BH/dced/227

S. No.	Detailed specification of the instruments / equipment	Qty.
1	**Universal speed governor apparatus** **(Watt, Porter, Proell and Hartnell governor)** Types: 4 types(Watt, Porter, Proell and Hartnell governor) height of governor: 10 to 15 cm, DC speed: 1000- 2000 rpm, HP: 0.5, variac: DC drive with digital rpm indicator,	1 set
2	**Static and Dynamic Balancing apparatus** Weight: 0.2- 10 Kg, balancing speed range: 500- 3000 rpm Variac with dimmer speed :5000 rpm(approx.)(Max), Disc: 4 discs masses of 60, 90, 115 and 150 gm. Overall weight: 20 Kg(approx.)	1

PRODUCTION LAB

19. Package Name: Mech P20

Package Code: TEQIP- III/BH/dced/228

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**Wire EDM** Mo- wire 0.15-0.30 mm, Voltage Range: 30- 300, Maximum dimension of workpiece 650*450*300 mm^3, Table travel (minimum) 400x300 mm, Max work piece weight 450 kg, Maximum cutting angle 5 -15 degree, Wire moving speed, 8-14 m/s, Display of cutting rate, Display of spark gap, No. of range for pressure of Dielectric(minimum) 3	01

20. Package Name: Mech P21

Package Code: TEQIP- III/BH/dced/229

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**Robot** Pick and place type, Atmega- 16 microcontroller with servo motor and magnetic pick up senser , 4 motors to control the movement of the vehicle via RF remote	01

THERMAL LAB

21. **Package Name: Mech P22**

Package Code: TEQIP- III/BH/dced/230

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**Model of Cochran Boiler** Cochran Boiler Model: Vertical type fire tube boiler. Shell diameter 25-30 cm and height 60 -70 cm. Cylindrical fire box with a door and grate at its bottom. Model should have feed check valve, steam and water gauges, Stop valve, safety valve and manhole etc.	01
2.	**Model of Lancashire Boiler** Lancashire boiler model: Model length (1-1.5) m, breath (35-40) cm, height (40-45) cm attached with dead weight safety valve, manhole, mud hole, Chock valve, high steam and low water safety valve, steam and water gauges etc.	01
3.	**Model of Babcock Boiler** Model of Babcock Boiler: Model Length (75-80) cm, breath (25-30) cm equipped with stop valve, safety valve, water gauge, steam gauge, Manhole, mud hole, regulating draught door, damper with counter weight and chimney etc.	01
4.	**Model of Wilcox Boiler** Wilcox boiler model: Model Length (75-80) cm, breath (25-30) cm shell diameter (15-20) cm fitted with a super heater and with inclined water tubes over the furnace connected with headers with stop valve, safety valve, water gauge, steam gauge. Manhole, mud hole, regulating draught door, damper with counter weight and chimney.	01
5.	**Model of Impulse steam turbine** Medium size model equipped with all necessary elements	01
6.	**Model of Reaction steam turbine** Medium size model equipped with all necessary elements	01

22. Package Name: Mech P23

Package Code: TEQIP- III/BH/dced/231

S.No.	Detailed specification of the instruments / equipment	Qty.
1.	**Reciprocating Pump Test Rig.** Electric supply: Provide 230 +/- 10 VAC, 50 Hz, single phase electric supply with proper earthling. (Neutral – Earth voltage less than 5 VAC.), 5A. Pump: Double acting, single cylinder, 1 HP capacity, 250 rpm speed, head 5 kg/cm2 (max). Drive: 1 HP motor, having step cone pulley for three different speeds. Sump Tank: Capacity 120 Ltrs. (approx.), (Stainless Steel) Measuring Tank: Capacity 60 Ltrs. (approx.), (Stainless Steel) with piezometer.	01
2.	**Kaplan Turbine** Type: Axial Flow Reaction Turbine Capacity: 5 HP Rated Speed: 1500RPM Discharge Capacity: 4500 Ltrs. /Min. Supply Head: 7 Meters Guide Vanes: Gun Metal Vanes (Aerofoil Blade Shaped) B. Loading Rope Brake Material: Cast Iron Drum Size: 300 mm diameter 1. Supply Pump Set Size : 10 X 10 Discharge: 5000 Liters/Minute Total Head: 8 Meters Motor Capacity: 20 HP	01