Indira Gandhi Engineering College, Sagar,Jabalpur Road, Baheriya
Gadgad, Near Makronia Railway Station, Sagar – 470021
Email Id – prinigec.sgr@mp.gov.in

INVITATION FOR QUOTATION

Package Code: TEQIP-III/MP/igec/43 /3097 18/09/2019 **Current Date: 17-Sep-2019**

Package Name: IGEC/EE/EM-1/EQIP/01 to 40 **Method: Shopping Goods**

For uploading on the Institute Website
Subject: INVITATION FOR QUOTATION 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	Item Name	Quantity	Place of Delivery	Installation Requirement (if any)
1	DC Motor Shunt Generator Setup	1	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
2	DC Motor - Generator set (COMPOUND)	1	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
3	DC Series Motor Setup	1	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
4	DC Shunt Motor Setup	1	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
5	DC Compound Motor Setup	1	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
6	Single Phase Transformer Setup	1	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
7	Three Phase Transformer Setup	1	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
8	DC Motor coupled to AC Generator	1	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
9	Squirrel cage Induction Motor (Machines with encoders)	1	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
10	Slip ring Induction Motor	1	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
11	Single Phase Induction Motor Setup	1	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
12	Resistive Load	1	EE Department, I.G. Engineering College, Sagar	
13	Inductive Loads	2	EE Department, I.G. Engineering College, Sagar	
14	Three Phase Auto Transformer	2	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
15	Ammeter-DC	2	EE Department, I.G. Engineering College, Sagar	
16	Voltmeters	2	EE Department, I.G. Engineering College, Sagar	
17	Wire Wound Rheostats	2	EE Department, I.G. Engineering College, Sagar	
18	Double Element Wattmeter	2	EE Department, I.G. Engineering College, Sagar	
19	Power Factor Meter	1	EE Department, I.G. Engineering College, Sagar	
20	Starters	2	EE Department, I.G. Engineering College, Sagar	
21	DC Rectifier	1	EE Department, I.G. Engineering College, Sagar	

22	Item wise Cabling	1	EE Department, I.G. Engineering College, Sagar	
23	Experimental Table	11	EE Department, I.G. Engineering College, Sagar	
24	Resistive Load	1	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
25	Inductive Load	2	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
26	Three Phase Auto Transformer	2	EE Department, I.G. Engineering College, Sagar	Installation should be done free of cost.
27	Ammeter-DC	2	EE Department, I.G. Engineering College, Sagar	
28	Ammeter-AC	2	EE Department, I.G. Engineering College, Sagar	
29	Ammeter-AC	2	EE Department, I.G. Engineering College, Sagar	
30	Ammeter-AC	2	EE Department, I.G. Engineering College, Sagar	
31	Voltmeters	2	EE Department, I.G. Engineering College, Sagar	
32	Voltmeters	2	EE Department, I.G. Engineering College, Sagar	
33	Voltmeters	2	EE Department, I.G. Engineering College, Sagar	
34	Wire Wound Rheostats	2	EE Department, I.G. Engineering College, Sagar	
35	Wire Wound Rheostats	2	EE Department, I.G. Engineering College, Sagar	
36	Double Element Wattmeter	2	EE Department, I.G. Engineering College, Sagar	
37	Double Element Wattmeter	2	EE Department, I.G. Engineering College, Sagar	
38	Double Element Wattmeter	2	EE Department, I.G. Engineering College, Sagar	
39	Starters	1	EE Department, I.G. Engineering College, Sagar	
40	Starters	1	EE Department, I.G. Engineering College, Sagar	

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, initialling, 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 **90** 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:

Payment Description	Expected Delivery Period (in Days)	Payment Percentage
Satisfactory Delivery, Testing, Acceptance & Installation	30	100

10. Liquidated Damages will be applied as per the below:
    Liquidated Damages Per Day Min % : N/A
    Liquidated Damages Max % : N/A
11. All supplied items are under warranty of **24** months from the date of successful acceptance of items and AMC/Others is **No**.
12. You are requested to provide your offer latest by **14:00** hours on **04-Oct-2019.**
13. Detailed specifications of the items are at Annexure I.
14. Training Clause (if any) – **Training on operation and handling of equipments free of cost as per department requirements.**
15. Testing/Installation Clause (if any) – **Full installation and testing/demonstration free of cost.**
16. Performance Security shall be applicable**: 0%**
17. Information brochures/ Product catalogue, if any must be accompanied with the quotation clearly indicating the model quoted for.
18. Sealed quotation to be submitted/ delivered at the address mentioned below, **Indira Gandhi Engineering College, Sagar, Jabalpur Road, Baheriya Gadgad, Near Makronia Railway Station, Sagar – 470021**
19. **Qualification Criteria** : The bidder/supplier should have :
    19.1 A minimum of 3 years experience of supplying similar items.
    19.2 A turnover of Rs. 100 lakhs at least once in three years.
    19.3 Not been blacklisted by any Government Institution/Organization.
20. The quotation should include the following information :
    20.1 The copies of original documents defining the constitution or legal status, place of registration and principal place of business of the company firm or partnership etc. in India.
    20.2 Report on financial status (balance sheet and auditor's report for the past three years).
    20.3 An affidavit for not being blacklisted by any Government Institution/Organization.
    20.4 Authorization Certificate from the OEM/Principal (if bidder/supplier is not an OEM) assuring full guarantee and warranty obligations during the liability period, for the goods offered.
    20.5 The list of clients duly supported by copies of purchase orders, installation and performance report signed by purchasers/users.
21. In case of failure to supply the goods within the prescribed time and in accordance with the specifications given in the contract/purchase order, the institute shall be free to cancel the order and make purchase from the next higher tenderer/from the open market as the case may be.
22. The competent authority reserves the right to increase or decrease the quantity of any item of sale, during the period of contract. The tenderer/bidder will be bound to comply with the order of the competent authority without any claim and compensation.
23. Any controversy will be subject to disposal in Sagar Jurisdiction only.
24. Damaged, defective or substandard material will not be accepted under any circumstances.
25. Preference will be given to :
    25.1 The bidders possessing relevant certification by an authorized body such as ISO etc., copy of which must be enclosed.
    25.2 The bidders that have quoted the item certified for standard, quality and safety such as BIS, ISI etc., copies of which must be enclosed.
26. After the award of contract, firm has to get approved the plan for the complete work including: design of control & distribution panel, cable layout, earthing system, etc. from IGEC, Sagar.
27. The layout plan, details of work of installation & commissioning etc. should be supplied with the tender document.

28. All the items, cables, wires, switches, working benches, motors, generators, transformers etc. should be of standard make
29. Please mention following on top of the sealed quotation submission envelope –
    29.1. TEQIP – III
    29.2 Package Code
    29.3 Don't open before 02:00 PM on 04 Oct, 2019.
30. We look forward to receiving your quotation and thank you for your interest in this project.

(Authorized Signatory)
Name & Designation

Principal / Project Director
TEQIP-III (1.1)
IGEC, Sagar (M.P.)

Annexure I

Sr. No	Item Name	Specifications
1	DC Motor Shunt Generator Setup	Shunt Motor 3HP Coupled to DC Self Excited Shunt generator, 1.8kW, 220 V. The armature assembly of generator should be made from silicon steel laminated core with winding in slots of SE copper wire. Screen Protected Drip proof. a) Motor – 3HP Generator - 1.8 kW, b) Voltage – 220 V, c) Insulation class 'B' type, d) RPM 1500 for maximum output (Approx.), e) Screen protected, horizontal foot mounted, Internal fan cooled, f) Motor Generator should confirm to IS standard 4722 g) Frame : 132 as per BIS. The motor & generator coupled with flexible LOVEJOY coupling & fitted on M.S. channel of size 75 x 40 mm. 6 mm thick on fabricated frame with coated & painted provided with speed sensor and display, Hylem Sheet Panel with Connector & Accessories: MCB Two pole DC16 Amp, 250 Volt – 2 Nos., BTI Terminals, HRC Fuse Bakelite type base with top 16A 440 – 4 Nos., Indicating Lamps LED type 22.5mm size, Hylem sheet with duly printed circuit diagram Poly carbonate, labeling and termination marking etc.3 Point DC starter flush, mounted with no load and over load coils, Meters should be MC/MI Flush type (as required) suitable for, laboratory and field applications good damping, knife edge pointer, with mirror back to avoid parallax error with Accuracy Class 1% , robust Plastic housing, to work well in horizontal as well as 45 degrees inclined. DC Voltmeter Flush type 0-300V – 2 Nos., DC Ammeter Flush type 0-5 A – 2 Nos., DC Ammeter Flush type 0-2 A – 2 Nos., DC Voltmeter Flush type 0-500V – 1 No., Tubular Rheostat with good porcelain tube with chrome plated brass terminals and slider , green thermal resistant coating with metallic casted end supports duly painted, made of Constantan /Eureka Rheostat 300Ω / 2A – 2 Nos. **Experiments to be performed:** 1) Back to back testing of DC Machines (Hopkinson's method), 2) External Characteristics of a DC Shunt Generator, 3) Magnetization characteristics of a DC Shunt Generator
2	DC Motor - Generator set (COMPOUND)	DC Shunt Motor 3HP Coupled to DC Self Excited Compound generator, 2.2kW, 220V. The armature assembly of generator should be made from silicon steel laminated core with winding in slots of SE copper wire. Screen Protected Drip proof. a) Shunt Motor – 3HP Comp. Generator - 2.2 KW, b) Voltage – 220 V, c) Insulation class 'B' type, d) RPM 1500 for maximum output (Approx.), e) Screen protected, horizontal foot mounted, Internal fan cooled, f) Motor Generator should confirm to IS standard 4722, g) Frame : 132 as per BIS. The motor & generator coupled with flexible LOVEJOY coupling & fitted on M.S. channel of size 75 x 40 mm. 6 mm thick on fabricated frame with coated & painted, Provided with speed sensor and display, Hylem Sheet Panel with Connector & Accessories: MCB Two pole DC16 Amp. 250 Volt – 2 Nos., BTI Terminals, HRC Fuse Bakelite type base with top 16A, 440V – 4 Nos. Indicating Lamps LED type 22.5mm size, Hylem sheet with duly printed circuit diagram Poly carbonate, Facia labeling and termination marking etc., 4-Point DC starter flush mounted with no load and over load, coils:01 No., Meters should be MC/MI Flush type (as required) suitable for laboratory and field applications good damping, knife edge pointer with mirror back to avoid parallax error with Accuracy Class 1% , robust Plastic housing, to work well in horizontal as well as 45 degrees inclined, DC Voltmeter Flush type 0-300V – 2 Nos., DC Ammeter Flush type 0-5 A – 2 Nos., DC Ammeter Flush type 0-2 A – 2 Nos., DC Voltmeter Flush type 0-500V – 1 No., Tubular Rheostat with good porcelain tube with chrome plated, brass terminals and slider , green thermal resistant coating with metallic casted end supports duly painted, made of Constantan /Eureka Field Rheostat 300Ω / 2A – 2 Nos. **List of Experiments:** 1) External Characteristics of a DC Compound Generator, 2) Magnetization characteristics of a DC Compound Generator, 3) Long shunt and short shunt DC Compound Generator
3	DC Series Motor Setup	DC Series Motor 3HP provided with drum brake aluminum pulley Friction belt brake loading arrangement with two Round Dial balances. The armature assembly of Motor should be made from silicon steel laminated core with winding in slots of SE copper wire. Screen Protected Drip proof. a) DC Series Motor – 3HP, b) Voltage – 220 V, c) Insulation class 'B' type, d) RPM 1500 for maximum output (Approx.), e) Screen protected, horizontal foot mounted, Internal fan cooled, f) Motor should confirm to IS standard 4722, g) Frame : 132 as per BIS. The motor fitted on M.S. channel of size 75 x 40 mm. 6 mm thick on fabricated frame with coated & painted Provided with speed sensor and display, Hylem Sheet Panel

		with Connector & Accessories: MCB Two pole DC16 Amp. 250 Volt – 1 Nos., BTI Terminals, HRC Fuse Bakelite type base with top 16A, 440V – 2 Nos., Indicating Lamps LED type 22.5mm size, Hylem sheet with duly printed circuit diagram Poly carbonate Facia labeling and termination marking etc., 3 Point DC starter flush mounted with no load and over load coils, Meters should be MC/MI Flush type (as required) suitable for laboratory and field applications good damping, knife edge pointer with mirror back to avoid parallax error with Accuracy Class 1% , robust Plastic housing, to work well in horizontal as well as 45 degrees inclined. DC Voltmeter Flush type 0-300V – 1 Nos., DC Ammeter Flush type 0-5 A – 1 Nos. **List of Experiments:** 1) Starting of DC Series Motor, 2) Load Characteristics of DC Series Motor
4	DC Shunt Motor Setup	DC Shunt Motor 3HP provided with drum brake aluminum pulley Friction belt brake loading arrangement with two Round Dial balances. The armature assembly of Motor should be made from silicon steel laminated core with winding in slots of SE copper wire. Screen Protected Drip proof. a) Shunt Motor – 3HP, b) Voltage – 220 V, c) Insulation class 'B' type, d) RPM 1500 for maximum output (Approx.), e) Screen protected, horizontal foot mounted, Internal fan cooled, f) Motor should confirm to IS standard 4722, g) Frame : 132 as per BIS. The motor fitted on M.S. channel of size 75 x 40 mm. 6 mm thick on fabricated frame with coated & painted Provided with speed sensor and display, Hylem Sheet Panel with Connector & Accessories: MCB Two pole DC16 Amp, 250 Volt – 1 No., BTI Terminals, HRC Fuse Bakelite type base with top 16A 440 – 2 Nos., Indicating Lamps LED type 22.5mm size, Hylem sheet with duly printed circuit diagram Poly carbonate, Facia labeling and termination marking etc., 3-Point DC starter flush mounted with no load and over load coils, Meters should be MC/MI Flush type (as required) suitable for laboratory and field applications good damping, knife edge pointer with mirror back to avoid parallax error with Accuracy Class 1% , robust Plastic housing, to work well in horizontal as well as 45 degrees inclined. DC Voltmeter Flush type 0-300V – 1No., DC Ammeter Flush type 0-5 A – 1No., DC Ammeter Flush type 0-2 A – 1No., Tubular Rheostat with good porcelain tube with chrome plated brass terminals and slider, green thermal resistant coating with metallic casted end supports duly painted, made of Constantan / Eureka Rheostat 50Ω / 5A – 1No., Field Rheostat 300Ω / 2A – 1No. **List of Experiments:** 1) Starting of DC Shunt Motor, 2) Load Characteristics of DC Shunt Motor, 3) Speed Control by armature and field control method
5	DC Compound Motor Setup	DC Compound Motor 3HP provided with drum break aluminum pulley Friction belt brake loading arrangement with two Round Dial balances. The armature assembly of Motor should be made from silicon steel laminated core with winding in slots of SE copper wire. Screen Protected Drip proof. a) Compound Motor – 3HP, b) Voltage – 220V, c) Insulation class 'B' type, d) RPM 1500 for maximum output (Approx.), e) Screen protected, horizontal foot mounted, Internal fan cooled, f) Motor should confirm to IS standard 4722. The motor fitted on M.S. channel of size 75 x 40 mm. 6 mm thick on fabricated frame with coated & painted Provided with speed sensor and display, Hylem Sheet Panel with Connector & Accessories: MCB Two pole DC16 Amp.250 Volt – 1No., BTI Terminals, HRC Fuse Bakelite type base with top 16A 440 – 2Nos., Indicating Lamps LED type 22.5mm size, Hylem sheet with duly printed circuit diagram labeling and, termination marking etc., 3 Point DC starter flush mounted with no load and over load coils, Three Point starter, DC Voltmeter Flush type 0-300V – 1No., DC Ammeter Flush type 0-2 A – 1No., DC Ammeter Flush type 0-5 A – 1No., Field Rheostat 300Ω / 2A – 1No., Rheostat 50Ω / 5A – 1No. **List of Experiments:** 1) Starting of DC Compound Motor, 2) Load Characteristics of DC Compound Motor (long and short shunt), 3) Speed Control by armature and field control method
6	Single Phase Transformer Setup	1 kVA, 220/110V 50Hz, Naturally air cooled, copper double wound Core type. Transformer is housed in MS Sheet Box Enclosure with rubber footing , all the terminals are brought over to Bakelite/Acrylic sheet fitted on the top of the box through insulated terminals, Hylem Sheet Panel with Connector & Accessories: MCB Two pole AC16 Amp, 250 Volt – 1No., BTI Terminals, Indicating Lamps LED type 22.5mm size, Hylem sheet with duly printed circuit diagram Poly carbonate, Facia labeling and termination marking etc., Meters should be MC/MI Flush type (as required) suitable for laboratory and field applications good damping, knife edge pointer with mirror back to avoid parallax error with Accuracy Class

		1% , robust Plastic housing, to work well in horizontal as well as 45 degrees inclined. AC Ampere meter 5A – 1 No. Flush type, AC Ampere meter 1A – 1 No. Flush type, AC Voltmeter 300V – 1 No. Flush type, AC Voltmeter 30V – 1 No. Flush type, Flush Wattmeter Single Phase Single Element, Dual Voltage 75/150 Dual current 2.5/5A UPF, Flush Wattmeter Single Phase Single Element, Dual Voltage 300/600 Dual current any range upto 30A LPF. Resistive Load Specifications - Fully power coated, Loaded with number of Quality rotary switches, Suitable to continuous applications, Durability and safety, Mounted on castor wheels, 4 Amp Single-Phase Continuously variable Autotransformer flush mounted. **List of Experiments:** 1) OC and SC Test of Single Phase Transformer, 2) Polarity check of Single Phase Transformer, 3) Regulation of Single Phase Transformer direct loading method.
7	Three Phase Transformer Setup	1kVA 50Hz Input 0-230V per phase Output 110V-0-110V per phase, Naturally air cooled, copper double wound Shell type. Transformer to be housed in MS Sheet Box Enclosure with rubber footing, all the terminals are brought over to Bakelite/Acrylic sheet fitted on the top of the box through insulated terminals, Hylem Sheet Panel with Connector & Accessories: MCB Three pole AC16 Amp, 415 Volt – 1 No., BTI Terminals, Indicating Lamps LED type 22.5mm size, Hylem sheet with duly printed circuit diagram Poly carbonate Facia labeling and termination marking etc., AC Wattmeter 3-Phase Digital flush type – 1No., Input Voltage Range 600V AC, Input Current Range 10A AC, Applicable for both UPF & LPF load, All meters should have Microcontroller based accurate & reliable, True RMS technology and class 0.2 Accuracy. Meters should be MC/MI Flush type (as required) suitable for laboratory and field applications good damping, knife edge pointer with mirror back to avoid parallax error with Accuracy Class 1% , robust Plastic housing, to work well in horizontal as well as 45 degrees inclined. AC Ampere meter 5A – 1No. flush type, AC Ampere meter 1A – 1No. flush type, AC Voltmeter 500V – 1No. flush type, AC Voltmeter 50V – 1No. flush type, 8 Amp Continuously variable Three-Phase Variac Closed type – 1 No. **List of Experiments**: 1) OC and SC Test on Three-Phase Transformer, 2) Different configurations of Three-Phase transformer, 3) Regulation of Three-Phase Transformer direct loading method
8	DC Motor coupled to AC Generator	DC Shunt Motor 5HP Coupled to AC Synchronous Generator 3-Phase, 3.5kVA, 220 V – 1 Set. The armature assembly of generator should be made from silicon steel laminated core with winding in slots of SE copper wire. DC Motor Specifications Shunt Motor – 5HP, Voltage – 220 V, Insulation class 'B' type, RPM 1500 for maximum output (Approx), Screen protected, horizontal foot mounted, Internal fan cooled, Motor should confirm to IS standard 4722, Frame : 132 as per BIS Synchronous Generator Specifications Capacity 3.5 kVA, Voltage 415V, 3-phase, 4 wire, Frequency 50 Hz, Class "B" type and above insulation, copper wound, Horizontal, foot mounted internal fan cooled, Rated power factor 0.85, Degree of protection IP-55, Conforming to IS -12615:2011, Salient pole type The motor & generator coupled with flexible LOVEJOY coupling & fitted on M.S. channel of size 75 x 40 mm. 6 mm thick on fabricated frame with coated & painted provided with speed sensor and display, Hylem Sheet Panel with Connector & Accessories: MCB Three pole AC16 Amp, 415 Volt – 1No., MCB Two pole AC16 Amp, 250 Volt – 1No., BTI Terminals, Indicating Lamps LED type 22.5mm size, Hylem sheet with duly printed circuit diagram Poly carbonate, Facia labeling and termination marking etc., DC Drive 5 HP linear cosine firing for driving motors – 1No., Variable DC Excitation source for alternator – 1No., Meters should be MC/MI Flush type (as required) suitable for laboratory and field applications good damping, knife edge pointer with mirror back to avoid parallax error with Accuracy Class 1% , robust Plastic housing, to work well in horizontal as well as 45 degrees inclined. AC Ampere meter 5 A – 1No. flush type, AC Volt Meter 500V – 1No. flush type, DC Voltmeter Flush type 0-300V –1No., DC Ammeter Flush type 0-5 A – 1No., DC Ammeter Flush type 0-2A–1No. **List of Experiments:** 1) OCC and SCC of Synchronous Generator, 2) Xd and Xq using Slip Test, 3) Sequence Impedance of Alternator, 4) Regulation efficiency of alternator using direct loading, synchronous impedance method and ZPF method.

9	Squirrel cage Induction Motor (Machines with encoders)	5HP, 415V AC Squirrel Cage Induction motor directly coupled to mechanical load with belt, pulley and round dial balance loading arrangement with brake drum and friction belt, mounted on a MS base Frame - Capacity 5 HP, RPM 1420, Insulation class 'F', AC Squirrel cage induction, 3 phase, Degree of protection IP-55,Conforming to IS -12615:2011, Volt 400/415 AC Hz, Power factor 0.85, Totally enclosed Fan cooled, Continuous duty constant rating, Efficiency at rated load 85%, Energy Efficiency Class IE3 with ISI Marking, Provided with speed sensor and display The supplier should supply motors with CE certification only, Hylem Sheet Panel with Connector & Accessories: MCB Three pole AC 32 Amp.415 Volt – 1 No., BTI Terminals, Indicating Lamps LED type 22.5mm size, Hylem sheet with duly printed circuit diagram Poly carbonate Facia labeling and termination marking etc., DOL Starter with overload protection-01 No., Reversing switch-01 No., AC Wattmeter 3 phase Digital flush type – 1 No., Input Voltage Range 600V AC, Input Current Range 10A AC, Applicable for both UPF & LPF load, Microcontroller based accurate & reliable, True RMS technology Class 0.2 Accuracy, Meters should be MC/MI Flush type (as required) suitable for laboratory and field applications good damping, knife edge pointer with mirror back to avoid parallax error with Accuracy Class 1% , robust Plastic housing, to work well in horizontal as well as 45 degrees inclined. AC Ampere meter 10 A – 1 No. flush type, AC Volt Meter 250/500V – 1 No. flush type, 8 Amp Three-Phase Continuously variable Variac Closed type. **List of Experiments:** 1) Load test on Induction Motor, 2) No load and Blocked Rotor Test, 3) Running and reversing of induction motor, 4) Speed Torque curves of Induction Motor
10	Slip ring Induction Motor	3.5HP, 415V AC Slip ring Induction motor directly coupled to mechanical load with belt, pulley and round dial balance loading arrangement with brake drum, mounted on a MS base Frame supplied with control panel. Three phase Rotor resistance type starter, air break Type, suitable for 5 Hp Slip ring Induction motor. Starter should have provision for DOL Start system, no volt & over load protection .Rotor resistance starter with 3 step resistance including 3 contactor 415 V, 2 timer (on delay) 0-30 seconds. Capacity : 3.5 HP, RPM : 1420, Insulation class : 'F', AC Wound Rotor induction, 3 phase, Degree of protection IP-55,Conforming to IS -12615:2011, Volt 400/415 AC Hz, Power factor 0.85, Totally enclosed Fan cooled, Continuous duty constant rating, Energy Efficiency Class IE3 with ISI Marking, Provided with speed sensor and display, Hylem Sheet Panel with Connector & Accessories: MCB Three pole AC16 Amp.415 Volt – 1 No., BTI Terminals, Indicating Lamps LED type 22.5mm size, Hylem sheet with duly printed circuit diagram Poly carbonate, Facia labeling and termination marking etc., AC Wattmeter 3 phase Digital flush type – 1 No., Input Voltage Range 600V AC, Input Current Range 10A AC, Applicable for both UPF & LPF load, Microcontroller based accurate & reliable, True RMS technology Class 0.2 Accuracy. Meters should be MC/MI Flush type (as required) suitable for laboratory and field applications good damping, knife edge pointer with mirror back to avoid parallax error with Accuracy Class 1% ,robust Plastic housing, to work well in horizontal as well as 45 degrees inclined. AC Ampere meter 10 A – 1 No. flush type, AC Voltmeter 250/500V – 1 No. flush type. **List of Experiments:** 1) Load test on Induction Motor, 2) No load and Blocked Rotor Test, 3) Speed Torque curves of Induction Motor, 4) Starting of Slip ring Motor
11	Single Phase Induction Motor Setup	3HP, 230V AC Squirrel Cage Capacitor start Induction motor directly coupled to mechanical load with belt, pulley and round dial balance loading arrangement with brake drum, mounted on a MS base Frame supplied with control panel. Capacity : 3HP, RPM : 1420, Insulation class : 'F', AC Squirrel cage Induction Motor, 1- Phase, Volt 230 AC Hz, Totally enclosed Fan cooled, Continuous duty constant rating, Energy Efficiency Class IE3 with ISI Marking Provided with speed sensor and display, Hylem Sheet Panel with Connector & Accessories: MCB Single pole AC16 Amp, 250 Volt – 1 No., BTI Terminals, Indicating Lamps LED type 22.5mm size, Hylem sheet with duly printed circuit diagram Poly carbonate, Facia labeling and termination marking etc., DOL Starter with overload protection, AC Wattmeter 1 phase Digital flush type – 1 No., Input Voltage Range 300V AC, Input Current Range 10A AC, Applicable for both UPF & LPF load, Microcontroller based accurate & reliable, True RMS technology Class 0.2 Accuracy, Meters should be MC/MI Flush type (as required) suitable for laboratory and field applications good damping, knife edge pointer with mirror back to avoid parallax error with Accuracy Class 1% , robust

		Plastic housing, to work well in horizontal as well as 45 degrees inclined. AC Ampere meter 10 A – 1 No. flush type, AC Volt Meter 250/ 500V – 1 No. flush type, 15 Amp Single-Phase Continuously Variable Variac Flush Mounted. **List of Experiments:** 1) Load test on Induction motor, 2) No load and blocked rotor test, 3) Speed torque curves of Induction motor.
12	Resistive Load	**Resistive Load 1-Ph 3kW 10 steps Resistive Load Specifications** Fully power coated, Loaded with number of Quality rotary switches, Suitable to continuous applications, Durability and safety, Mounted on castor wheels.
13	Inductive Loads	Inductive load 1-phase, 15A Continuously variable type mounted on castor wheels for easy movement housed in duly powder coated box and provided with MCB and protection. One driving handles to vary the air core gap inside the inductor with same rate of change of magnetic flux in all the three coils.
14	Three Phase Auto Transformer	Three-phase Auto transformer - Rating 1kVA
15	Ammeter-DC	Portable DC Ammeter - Single Range up to 5A.
16	Voltmeters	Portable DC Voltmeter - Single Range up to 500V
17	Wire Wound Rheostats	300 ohm/2A Rheostat
18	Double Element Wattmeter	Measuring Instrument, Portable Wattmeter single phase single element Dual Voltage 75/150V Dual current any range upto 2.5/5A UPF (1-phase)
19	Power Factor Meter	Measuring instrument, Portable PF Meter Single Range 300V/600V, 5/10A
20	Starters	Three Point starter
21	DC Rectifier	Variable DC excitation Source 220V DC, 100A
22	Item wise Cabling	**Cabling** Item wise Cabling earthing of motors and panel, Cabling and earthing of panels and motors is required to be done by the supplier Connections of Motors to the panels, panels to the MCB Boxes and cabling necessary to mains supply box of the lab, this will include supply of MCB's with proper ratings and box cabling using conduits and flexible pipes as and where necessary Proper earthing of panels, motors etc to earth using aluminum flat and GI wire of proper thickness and resistance. **Installation & Commissioning of Machine Lab Equipments** The Machines & panels should be interconnected from AC panel through UG Cable of size 20 /4 sq mm for 32 Amps switches and 10 / 4 sq mm for 16 Amps switches (depending upon rating of the machine as indicated in the schedule). The make of the underground cable should be of well known standard quality. **Grounding/Earthing** At least two points of Rod and Plate type of grounding of proper rating as per National Electrical Code, to keep the earth resistance less than 5 ohms are to be provided. In case the earth resistance is more than 5 ohm, Bentonite should be added to each point to keep earth resistance with in 5 ohms. Funnel type of cups should be provided for water injection. All the Machines & Panels should be properly connected to these ground/ earth points. **Meters and Switch Gears** All digital meters used should be of well-known standard quality. The Switch gears connected should be of well-known standard quality make. Where ever possible Multi Data Monitoring unit should be connected for Machines. **Electrical Power Distribution Panel (415V, 100A, 50Hz)**
23	Experimental Table	**Experimental Table** 1. Experimental Table to fix panel with required instrumentation for related experiment and to fix machine/ apparatus under it. 2. The Table should have heavy MS channel base and have the provision to mount machines under it with necessary gear and firmly fixed. 3. The loading arrangements (Drum brake pulley type) wherever necessary should be provided along with fitted itself in the Experimental Table. 4. A cabinet closet with 2 or more shelves for storing accessories. 5. Table top should be wooden /plywood sun-mica coated. 6. The tenderer should enclose the detailed design of the Experimental Table.

24	Resistive Load	**Resistive Load 3-Ph 5kW Resistive Load Specifications** Fully power coated, Loaded with number of Quality rotary switches, Suitable to continuous applications, Durability and safety, Mounted on castor wheels.
25	Inductive Load	Inductive load 3-phase, 5A Continuously variable type mounted on castor wheels for easy movement housed in duly powder coated box and provided with MCB and protection. One driving handles to vary the air core gap inside the inductor with same rate of change of magnetic flux in all the three coils.
26	Three Phase Auto Transformer	Three phase Auto transformer - Rating 3kVA
27	Ammeter-DC	Portable DC Ammeter - Single Range up to 2A
28	Ammeter-AC	Portable AC Ammeter - Single Range up to 5A
29	Ammeter-AC	Portable AC Ammeter - Single Range up to 2A
30	Ammeter-AC	Portable AC Ammeter - Double Range up to 5A/10A or 10A/20A
31	Voltmeters	Portable DC Voltmeter - Double Range up to 250/500V or 300/600V
32	Voltmeters	Portable AC Voltmeter - Single Range up to 100V
33	Voltmeters	Portable AC Voltmeter - Triple Range up to 125/250V or 250/500V
34	Wire Wound Rheostats	50 ohm/5A Rheostat
35	Wire Wound Rheostats	300 ohm/3A Rheostat
36	Double Element Wattmeter	Measuring Instrument, Portable Wattmeter single phase single element Dual Voltage 150/300/600V Dual current any range upto 15/30A LPF (1-phase)
37	Double Element Wattmeter	Measuring Instrument, Portable Wattmeter three phase double element Dual Voltage 300/600V Dual current any range upto 15/30A UPF (3-phase)
38	Double Element Wattmeter	Measuring Instrument, Portable Wattmeter three phase double element Dual Voltage 300/600V Dual current any range upto 15/30A LPF (3-phase)
39	Starters	Four Point Starter
40	Starters	DOL starter

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. _____