

**GOVERNMENT OF TRIPURA  
EDUCATION (HIGHER) DEPARTMENT  
TRIPURA INSTITUTE OF TECHNOLOGY, NARSINGARH, TRIPURA (WEST)  
NOTICE INVITING TENDER**

Dated:- 20/06 /2016

**NIT NO. 14 /EDL/TIT/2016-2017**

Sealed item rate tender is hereby invited on behalf of the Governor of Tripura from the manufacturers/ authorized dealers/ distributors/reputed firms having experience for supplying the followings up to 22/07/2016, 3: 00 PM. The tenders will be opened on the same day, if possible.

Sl. No.	Name of Work	Estimated Cost	Earnest money	Cost of Tender From	Date of Selling of Tender Form	Last Date of Receiving Tender	Time for Completion
1.	Supplying , testing & Demonstration of Laboratory Equipments for Electric Drives Laboratory, Department of Electrical Engineering of Tripura Institute of Technology, Narsingarh, Tripura (West).	Rs.5,80,000/- (Rupees Five Lakhs Eighty Thousand only)	Rs. 5,800/- (Rupees Five Thousand Eight Hundred only)	Rs. 500.00	23/06/2016 to 21/07/2016 (from 12:00 noon to 3:00 pm)	22/07/2016 upto 3:00 PM	90 (Ninety) Days

**TERMS AND CONDITIONS:-**

Earnest money should be deposited in the form of **Bank Demand Draft** of any BANK scheduled by Reserve Bank of India. Tender forms including terms and conditions can be had from the office of the Principal, Tripura Institute of Technology, Narsingarh, Tripura (West) **w.e.f. 23/06/2016 to 21/07/2016 from 12:00 Noon to 3:00PM** on any working day on payment of an amount of Rs. 500.00 (Rupees Five Hundred) only by Demand Draft (non-refundable) in favour of the Principal, Tripura Institute of Technology, Narsingarh and Payable at Agartala or by downloading from the website [www.titagartala.nic.in](http://www.titagartala.nic.in) , [www.titagartala.ac.in](http://www.titagartala.ac.in) and [www.tenders.gov.in](http://www.tenders.gov.in). The bid forms so downloaded from above website shall accompany a Bank Draft of an amount of Rs. 500/- for bid in favour of the Principal, Tripura Institute of Technology, Narsingarh, Tripura (w), Pin: 799009 payable at Agartala .

Tender(s) may be sent through Registered Post /Speed post only or dropped in the tender box placed at the office of the Principal, TIT, Narsingarh within stipulated date and time mentioned above. The authority reserves the right to accept or reject any tender and to cancel the bidding process and reject all tenders at any time prior to the award of contract without assigning any reason there off.

1. **Bid Price**

- a) Bidders are to quote price for the full /part package as indicated in Annexure "A"
- b) Contract may be made for the full/ part package as per the discretion of the purchaser. Correction, if any shall be made by Crossing out, dating, rewriting and initial signature.

Full Signature of Supplier/ Contractor.

Signature of the Principal.

Tripura Institute of Technology, Narsingarh

- c) All duties, taxes (VAT ) payable by the contractor under the contract shall be included in the total price **strictly as per format** (bill of quantities) and no conditional pricing should be made. **Details break up such as basic price, Taxes (VAT) as applicable etc. required to be furnished clearly against total price of each item. Nothing Extra will be entertained thereafter.**
- d) The rates quoted by the bidders shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
2. Each bidder shall submit only one Tender.

3. **Validity of tender;**

Tender shall remain valid for a period not less than **90 days** after the deadline date specified for submission.

4. **Evaluation of Tenders ;**

The purchaser will evaluate and compare the tenders determined to be substantially responsive i.e. which

- (a) are properly signed and  
 (b) conform to the terms and conditions and specifications

5. **Award of contract;**

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

- a. Notwithstanding the above, the purchaser reserves the right to accept or reject any tender and to cancel the bidding process and reject all tenders at any time prior to the award of contract.
- b. The bidder whose bid to be accepted will be notified for the award of contract by the purchaser prior to expiry of the tender validity period. The terms of the accepted offer shall be incorporated in the purchase order.

6. Payment :-

(i) Advance:- No advance Payment.

(ii) On delivery :- No payment after delivery.

(iii) On final acceptance :- 100% payment of the contract Price shall be paid to the supplier within 30 (thirty) days after the date of the acceptance for the respective goods.

7. Warranty / Guarantee shall be for a period of 01 (One) year as a whole . If normal commercial warranty/guarantee exceeds by 01 (One) year, then higher of the two as indicated shall be applicable to the supplied goods.

8. The bidders are to submit copies of the following documents duly signed by the Owner of the Firm or Authorized Person of the Owner of the Firm.

**Full Signature of Supplier/ Contractor.**

**Signature of the Principal.**

- (i) **PAN CARD** (ii) **STCC of current validity or equivalent such TAX/VAT documents / certificates which established or qualify as bonafied traders / supplier which ever are applicable to be a valid bidder.**
9. ***Brand Name / Model No., if any has to be mentioned wherever applicable along with the copies of authorization letter of the manufacturers / Distributorship or Dealership certificate*** (duly signed by the bidder or Authorized person of the bidder) ***from Manufacturers etc. in favour of the bidder.***
10. Tender has to be submitted along with Manufacturers' Original or downloaded brochure / catalogues, if any duly signed by the bidder or his Authorized person, without which tender may be rejected at the discretion of the Authority.
11. **Earnest money deposit :-**
- 11.1 Earnest money Rs. @ 1% ( Rs.5,800/-) of the estimated cost put to the tender shall be deposited in the State Bank of India or any schedule bank of India guaranteed by the Reserve Bank of India , in the shape of **Bank Demand Draft** only drawn in favor of the Principal Tripura Institute of Technology, Narsingarh, Tripura (west) payable at Agartala must be submitted along with the Tender(s) failing which the tender(s) will be summarily rejected.
- 11.2 ***Validity of EMD / Bid security will be 45 ( forty five) days more beyond the original period of validity of bid / Tender or beyond any period of extension subsequently requested in exceptional circumstances.***
- 11.3 The earnest money deposited by the successful bidder will not carry any interest and it will be dealt with as provided in the conditions stipulated in the tender.
- 11.4 The EMD shall be forfeited.
- (a) In 50%, if the Tenderer withdraws the Tender during the validity period of Tender.
- (b) In full, in case the supplier fails to start supply ( or cannot show valid reasons which is acceptable to the authority) specified in the tender documents within 30<sup>th</sup> day or such time period as mentioned in letter of award after the date on which the Authority issues written orders to commence the work / supply.
12. Security deposit will be 10% of the contract value without any ceiling limit . The Earnest money of the successful tenderer deposited before issue of work / supply order will also form a part of security deposit. . **Security money will be deducted from Running Account bill(s) @10% (ten percent) of the bill(s) amount of the successful bidder till full Security Money is retained and will be retained up to “ defect liability period ” .**
13. Supply, assembling, testing etc. of all equipment including others accessories shall be the responsibility of the contractor.
14. The contractor shall not be permitted to tender for works in Tripura Institute of Technology, Narsingarh responsible for award and execution of contract in which near relatives is posted as an Accountant / as an Officer in any capacity between the grades of the Principal to Assistant Professor. He shall also intimate the name of persons who are working with him in any capacity or are subsequently employed by him and who are nearer relatives to any gazetted officer in Tripura Institute of Technology, Narsingarh, Agartala, Tripura – 799009.
15. Confusions / errors, if any noticed need to be clarified / corrected from the Principal, Tripura Institute of Technology, Narsingarh prior to dropping of tender Any claim on such issues after dropping of tender will not be entertained.
16. The contractors should initial all correction if any, to rate(s) and items in the tender. ***The contractor in full name should signed every pages.*** Letters etc. found in the tender box of raising or lowering the quoted rates or dealing with any other points in connection with tender shall not be considered.
17. The bidder shall seal the bid / tender in an envelope (for each work separately) addressed to the Principal, Tripura Institute of Technology, Narsingarh, Tripura(w) **subscribing on it the Name of Work & DNIT/NIT No.**
18. Tender(s) must be received in the office of the Principal, Tripura Institute of Technology, Narsingarh, Tripura(w) [ employer] not later than the time and date given in the notice of invitation. If the specified date is declared holiday, tender(s) shall be received upto the appointed time on the next working day.
19. Tenderers shall not add or deduct any percentage after the totals have been worked out in an item rate tender. Such tenders shall be liable to rejection.

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Tripura Institute of Technology, Narsingarh

20. Sale Tax (VAT) or any other Taxes of materials in respect of his contract shall be payable by the contractor and the Government shall not entertain any claim whatsoever in this respect.
21. Before submitting tender, tenderers are to satisfy themselves by actual visit to the site of work / supply as regards the prevailing condition to approaches and roads and availability of labourers and materials etc. and the tenderers submitting tenders shall be deemed to have done so. No claim on the above account will be entertained after wards.
22. Any bid received by the Principal, Tripura Institute of Technology, Narsingarh, Tripura(w) [ employer] after the deadline for submission of bid(s) will be summarily rejected and returned unopened to the bidder.
23. Supply order may be issued to the successful bidder(s) depending on the available sanctioned amount. Hence, quantity may be increased or decreased at the discretion of the authority during the time of evaluation of tender.
24. In addition to deduction of Income tax at source Tax (VAT) will also be deducted at source as per applicable rates from the bills of the contractor from running / final bill.
25. The contractors should quote in figures as well as in words the rates and amount tendered by them. The amount for each item should be worked out and requisite totals shall be given.
26. **Correction of Errors**
  - a) The contractor shall quote the rates and amounts tendered by them **both in figures as well as in words**. The amount for each item shall be worked out and requisite totals shall be given.
  - b) Special care must be taken so that the rates and amounts are always written both in figures and words in such a way that interpolation is not possible. In case of figure, the words Rs, should be written before the figure and paise at the end (Viz. Rs, 250.50p). in case of rate or amount in words, the words Rs. should precede and the word only shall be written at the end (Viz. two hundred fifty and paise fifty only).
  - c) Item(s) for which no rate or price has been entered by the contractor / agency shall not be paid for and shall be deemed covered by the other rates / prices in the contract.
  - d) When there is a difference between the rates in figures and in words, the rates, which correspond to the amounts worked out by the contractor, shall be taken as correct.
  - e) When the amount of an item is not worked out by the contractor or it does not correspond with the rates written either in figures or in words, then the rate quoted by the contractor in words shall be taken as correct.
  - f) When the rate quoted by the contractor in figures and words tallies but the amount is not worked out correctly. The rate quoted by the contractor shall be taken as correct and not the amount.
  - g) All corrections to rates and amounts in the tender shall be initialed by the contractor. **Every pages including the blank pages of bid document shall be signed by the contractor.**
27. The Equipment shall be loaded and unloaded by the suppliers at his / her own cost and risk.

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28. The Equipment shall be dispatched under coverage of transit insurance at the supplier own cost and risk.
29. The firm shall test the equipment at the site selected by the department and render demonstration / operational training to the departmental staff for a period suitable for the purpose.
30. Operation and service manual / catalogues and recommended maintenance chart should be supplied at free of cost along with each equipment.
31. Earnest money of the unsuccessful tenderer will be refunded on finalization of tender or on expiry of validity period which ever is earlier.
32. Transit permit / interstate clearance and such other issues will be the responsibility of the tenderer, Nothing extra will be entertained.
33. No transfer of earnest money from any amount already at the credit of tenderers (as earnest money or security money in connection with other works) will be allowed unless however, it is absolutely free and order for its release has been passed.
34. Canvassing in connection with tenders is strictly prohibited and the tender submitted by the tenderer who will resort to canvassing will be liable to rejection.
35. No non-Indian National as laborer, who does not possess valid passport and visa will be allowed to work under any contractor. If otherwise the contract will be cancelled and there is no bar by police for prosecution of these contractors along with their labourers.
36. Bids will be opened in presence of bidders or their authorized representatives (who choose to attend) on the date and time and at the place specified in the said bid.
37. Defects liability :-  
The “Defects liability Period” for the work is 1 (One) year (for articles having commercial warranty more than 1 (one) year, the defect liability for those items will be in accordance with the commercial warranty period as applicable) from the date of acceptance. If any defects noticed within the “Defects liability Period” the same shall be rectified / replaced (same configuration or latest) by the bidder or firm at their cost and risk within 1(one) month from the date of intimation and the defect liability period for the replaced item(s) will be considered from the date of replacement for which proportionate Security Money would be retained till end of the defect liability period as would be applicable for particular Item(s).
38. **The bidder has to provide the duly signed (by the bidder or his Authorized Person) copy of Work / Supply order in similar nature of work / supply in support of previous experience as a prime contractor at least for one similar work of value not less than 80% of the estimated cost put to tender in the last 3 (Three) years to qualify for awarding of the work.**
39. **Tenderer(s) who do not fulfill any of these conditions or are incomplete in any respect, are liable to be rejected. The authority also reserves the right to cancel any of the tenders with out assigning any reason.**

Full Signature of Supplier/ Contractor.

Signature of the Principal.

Tripura Institute of Technology, Narsingarh

BID FORM

**Name of the Works :-                 Supplying , testing & Demonstration of Laboratory Equipments for Electric Drives Laboratory, Department of Electrical Engineering of Tripura Institute of Technology, Narsingarh, Tripura (West).**

Reference:    letter No. .... dated..... from .....

Sir,

We offer to execute the work ..... described in your letter referred to above in accordance with the Conditions of Contract enclosed therewith at a total Fixed Contract price of –

Rs \*\* \_\_\_\_\_ [in figures]

Rs. \_\_\_\_\_ [in words]

This bid and your written acceptance of it shall constitute a binding contract between us. We understand that you not bound to accept the lowest or any bid you receive.

We hereby confirm that this bid is valid for not less than 90 days as per terms and conditions already state earlier.

Yours faithfully,

Authorized Signature : \_\_\_\_\_ Date: \_\_\_\_\_

Name & Title of Signatory : \_\_\_\_\_

Name of Bidder : \_\_\_\_\_

Address : \_\_\_\_\_

\*\* To be filled in by the Bidder, together with his particulars and date of submission at the bottom of this Form.

**Full Signature of Supplier/ Contractor.**

**Signature of the Principal.**

Tripura Institute of Technology, Narsingarh

## AGREEMENT FORM

**Name of work : Supplying , testing & Demonstration of Laboratory Equipments for Electric Drives Laboratory, Department of Electrical Engineering of Tripura Institute of Technology, Narsingarh, Tripura (West).**

### ARTICLES OF AGREEMENT

1. This deed of agreement is made in the form of agreement on \_\_\_\_\_ day \_\_\_\_\_ month \_\_\_\_\_ 2016 \_\_\_\_\_, between the \_\_\_\_\_ (Employer), or his authorized representative (hereinafter referred to as the first party) and \_\_\_\_\_ (Name of the Contractor), S/O \_\_\_\_\_ resident of \_\_\_\_\_ (hereinafter to as the second party), to execute the work / supply of \_\_\_\_\_ (hereinafter referred to as work / supply ) on the following terms and conditions.
2. **Cost of the Contract**  
The total cost of the work / supply (hereinafter refer to as the “total cost”) is Rs. \_\_\_\_\_ as reflected in Annexure – “A”
3. **payments under its contract**
  - a) Payment to the second party for the work will be released by the first party in the following manner :-  
payment shall be made immediate after successful completion of the work/supply.
  - b) Payments at each stage will be made by the first party:-  
  
on the second party submitting an invoice for an equivalent amount;
4. **Completion time**  
The supply is to be completed within **90 (ninety) days**. The time shall be reckoned from the 15<sup>th</sup> (fifteenth) day from the date of issue of supply order. In exceptional circumstances, the time period stated in this clause may be extended in writing by mutual consent of both the parties.
5. Any willful delay on the part of the second party in completing the supply within the stipulated period will render him liable to pay liquidated damages @ **Rs. 0.01%** of the contract price per day which will be deducted from payments due to him. The first party may cancel the contract and take recourse to such other action as deemed appropriate once the total amount of liquidated damages exceeds **10%** of the contract amount.
6. **The second party shall:**
  - a) Take up the supply and arrange for its completion within the time period as stipulated.
  - b) Employ suitable skilled persons to carry out the assembling (where necessary) and commissioning; etc.
  - c) Be responsible for bringing any discrepancy to the notice of the representative of the first party and seek necessary clarification;
  - d) Keep the first party informed about the progress of work;

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- e) Be responsible for all security and watch and ward arrangements at site till completion of the work and handing over as well.
- f) Pay all duties, taxes (VAT) and other levies payable by agencies as per law under the contract (First party will effect deduction from running bills in respect of such taxes as may be imposed under the law).

**7. Security money**

The Security money shall be refunded after expiry of the “**defects liability period**”.

**8. Dispute settlement:-**

Except where otherwise provided in the contract all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions hereinbefore mentioned and of workmanship or materials used on the work or as to any other question, claim, right matter or thing whatsoever, in any way arising out of or relating to the contract, designs, drawing, specifications, estimates, instructions orders or those, conditions or otherwise concerning the work / supply, or the execution or failure to execute the same whether arising during the progress of the work / supply or after the completion or abandonment thereof shall be referred to the sole arbitration of the person appointed by the Director of Higher Education, Government of Tripura. It will be no objection to any such appointment that arbitrator so appointed is a Government servant, that he had to deal with

the matters to which the contract relates and that in the course of his duties as Government servant he had expressed views on all or any of the matters in dispute or difference. The arbitrator to whom the matter is originally referred being transferred or vacating his office or being unable to act for any reason, such Director of Higher Education or as aforesaid at the time of such transfer, vacation of office on inability to act, shall appoint another person to act as arbitrator in accordance with the terms of the contract. Such persons shall be entitled to proceed with the reference from the stage at which it was left by his predecessor. It is also a term of this contract that no person other than a person appointed by such Director of Higher Education Department or as aforesaid should act as arbitrator and if for any reason that is not possible, the matter is not to be referred to arbitration at all. In all cases where the amount of the claim in dispute is Rs. 50,000 (Rupees fifty thousand) and above, the arbitrator shall give reasons for the award.

Subject as aforesaid the provisions of the Arbitration act, 1940, or any statutory modification or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceeding under this part.

It is also a term of the contract that the party invoking arbitration shall specify the dispute or disputes to be referred to arbitration under this part together with the amount or amounts claimed in respect of each such dispute.

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**Signature of the Principal.**

Tripura Institute of Technology, Narsingarh



It is also a term of the contract that the party invoking arbitration shall specify the dispute or disputes to be referred to arbitration under this part together with the amount or amounts claimed in respect of each such disputes.

It is also a term of the contract that if the contractor(s) do / dose not make any demand for arbitration in respect of any claim(s) in writing within 90 days of receiving the intimation from the Government that the bill is ready for payment the claim of the contractor(s) will be deemed to have been waived and absolutely barred and the Government shall be discharged and released of all liabilities under the contract in respect of these claims.

The arbitrator(s) may from time to time with consent of the parties and enlarge the time for making and publishing the award.

The Arbitration proceedings shall be held at Agartala, Tripura, India and the language of the arbitration proceedings and that of all documents and communications between the parties shall be English.

**DECLARATION :-**

I / we .....have gone through carefully all the tender conditions and solemnly declare that I / we will abide by any penal action such as disqualification or black listing or termination of contract or any other action deemed fit, taken by, the department against us, if it is found that the statements, documents, certificates produced by us are false / fabricated.

I / we hereby declare that, I / we have not been black listed / debarred / suspended in any department in Tripura or in any other state of India due to any reason.

**Full Signature of Supplier/ Contractor.**

**Signature of the Principal.**

Tripura Institute of Technology, Narsingarh

Annexure –“A”

Name of work :- **Supplying , testing & Demonstration of Laboratory Equipments for Electric Drives Laboratory, Department of Electrical Engineering of Tripura Institute of Technology, Narsingarh, Tripura (West).**

1	2	3	4	5	6	7	8	9	10
SL. No.	Name of Equipments with Specifications.	Brand name / Model no:	Quantity	Unit	Unit Price In figure. ( In INR)	Unit Price in Words	Tax if any , if contract is awarded ( In INR)	Rate in Figure (Inclusive of Taxes)	Total Amount Col.( 4 X 9)
1.	<p><b>CLOSED LOOP SPEED CONTROL OF 1 (one) HP SQUIRREL CAGE INDUCTION MOTOR.</b></p> <p>This set up is to be supplied to study the open loop &amp; closed loop speed control of squirrel cage induction motor. This set up consists of</p> <ul style="list-style-type: none"> <li>• Microcontroller based PWM Controller</li> <li>• IGBT based Voltage source inverter Power module.</li> <li>• One HP Induction Motor Setup with Mechanical Spring balance Load.</li> </ul> <p>1. Microcontroller based PWM Controller This controller is to be designed for motor control applications, PWM output of controller can be interfaced with Power Module through external cable connection. This controller is to be supplied for IGBT based power electronics with followings:</p> <ul style="list-style-type: none"> <li>• 6 numbers of PWM outputs up to 15KHZ of switching frequency</li> <li>• 2MB PROM &amp; 24 MHZ clock speed</li> <li>• USB-PGM Downloader</li> <li>• 6 Numbers of ADC input</li> <li>• QEP Sensor/Hall sensor/speed sensor(proximity) interface.</li> <li>• PWM increment &amp; decrement key.</li> <li>• Reset switch &amp; LED's for sensor status</li> <li>• 20 x 4 LCD connector</li> <li>• PWM outputs are to be terminated by a FRC connector</li> </ul> <p>2. IGBT based Voltage source inverter Power module: This power module is supplied using IGBT based smart power module (SPM) for AC motor control application. This power should be for AC</p>		01	No.					

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<p>motor application by proper external PWM controller interfacing .</p> <p><b>This module consists of</b></p> <ul style="list-style-type: none"> <li>• One number of SPM-Smart power module rating @ 600V, 20A based voltage source inverter circuit.</li> <li>• SPM-IGBT is fixed with suitable heat sink and snubber circuit for protection</li> <li>• IGBT power circuit input and outputs are to be terminated by suitable rating banana connectors in front panel with necessary indication.</li> </ul> <p><b>Diode rectifier</b></p> <ul style="list-style-type: none"> <li>• one number of diode rectifier should be provided to converter input AC voltage to DC Bus voltage.</li> <li>• DC capacitor is to be provided at diode rectifier output side for filtering.</li> <li>• Analogue DC voltmeter is to be provided to measure DC bus voltage.</li> </ul> <p><b>PWM ISOLATOR</b></p> <ul style="list-style-type: none"> <li>• Six number of PWM Isolator IC to isolate all the six PWM signals input.</li> <li>• One number of +15V@1 amp fixed dc power supply should be provided for PWM Isolator input side for power excitation.</li> <li>• One number of +5V@ 1amp fixed dc power supply should be provided for PWM Isolator output side power excitation.</li> </ul> <p><b>PWM Driver</b></p> <ul style="list-style-type: none"> <li>• Built in IGBT Gate Driver is to be provided in SPM for IGBT Gate signal amplification.</li> </ul> <p><b>SENSORS</b></p> <ul style="list-style-type: none"> <li>• Three numbers of Hall effect current sensor @ 25A is to be provided for 3Ø output for AC/DC current measurement.</li> <li>• One number of Hall effect current sensor @ 25A is to be provided for input DC bus current measurement.</li> <li>• Op-Amp based signal conditioner circuits are to be provided in all sensors for output current signals amplifications.</li> <li>• All current sensor signal conditioner circuit outputs should be terminated in front panel by suitable connectors.</li> </ul> <p><b>PROTECTION CIRCUIT</b></p> <ul style="list-style-type: none"> <li>• One number of automatic trip circuit for Over Current protection.</li> <li>• LED for trip status indication.</li> <li>• Reset switch for TRIP RESET.</li> </ul>								
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<p><b>CONNECTORS</b></p> <ul style="list-style-type: none"> <li>• One FRC Connector for PWM input signal input and feedback.</li> <li>• Banana connectors for AC input.</li> <li>• Banana connectors for 3-phase output.</li> <li>• Test points for PWM signal and current waveform measurements.</li> <li>• MCB is provided at input side for input supply ON/OFF</li> </ul> <p><b>Specification</b>  Power circuit  Input : 0-230V AC, 50HZ (or) 0-300V DC  Output : 3Ø 200V AC @ 5A, Variable voltage, variable frequency (or) 0 +/- 280V DC.</p> <p>Number of PWM input : Six(6).  Maximum PWM Frequency : 15KHZ  PWM level : 0-5V(TTL).  Type 3-phase squirrel cage induction motor  Of 1(one) hp rating.  Voltage : 3 phase -200V AC  Speed : 1440 RPM  Feedback sensor : Proximity sensor  Loading : Spring balance loading</p> <p><b>During balance loading</b></p> <ul style="list-style-type: none"> <li>• One number Brake DRUM with spring balance set up is coupled with the above motor.</li> <li>• Two numbers of dial indication for load in kg measurement</li> <li>• All are mounted on a powder coated mechanical set up.</li> </ul> <p>One Isolation Transformer should be supplied for Experimentation.  Input : 0-230VAC  Capacity : 2 KVA</p> <ul style="list-style-type: none"> <li>• Digital meters for armature &amp; field current and voltage measurement.</li> </ul> <p>This complete setup should be supplied for following Experiments:</p> <ol style="list-style-type: none"> <li>1. Open loop V/F Control of induction motor.</li> <li>2. Closed loop V/F Control of induction motor with speed feedback.</li> </ol>								
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Tripura Institute of Technology, Narsingarh

2.	<p><b>SPEED CONTROL OF 1 (one) HP DC SERIES MOTOR USING SCR BASED JONES CHOPPER.</b></p> <p>This setup is to be designed and supplied speed control of 1(One) HP DC series Motor using SCR based Jones Chopper circuit. The System should consist of (1) SCR Jones Chopper Firing and Power Circuit, (2) DC Series Motor Setup. (3) Motor Controller Circuit (4) Isolation Transformer, (5) One single phase Variac.</p> <p><b>1. SCR based Jones Chopper Firing and Power Circuit</b></p> <ul style="list-style-type: none"> <li>• Two nos. Chopper Firing and Power Circuit.</li> <li>• Two nos. SCR with RC Snubber Circuits.</li> <li>• Two nos. Diodes and one fixed load resistance.</li> <li>• One Centre tapped Inductor for Power Circuit with commutating Capacitor.</li> <li>• Two Isolated firing pulses for firing SCR.</li> <li>• Two nos. Toggle Switches to Switch ON Auxiliary SCR pulse and main SCR pulse.</li> <li>• One 300V Fixed DC Supply for power circuit and one toggle Switch to ON/OFF DC Supply.</li> <li>• All inputs and outputs components are to be terminated in a PCB for Experimentation using Patch Chords.</li> <li>• Necessary test points are to be provided for studying the firing circuit.</li> <li>• One potentiometer to be provided for varying the Duty Cycle.</li> </ul> <p><b>2. DC Series Motor Setup</b></p> <ul style="list-style-type: none"> <li>• Rating: 1(One) HP.</li> <li>• Armature Voltage: 220V DC at 5 Amps.</li> <li>• Speed: 1500 RPM.</li> <li>• Double Side Shaft Extension to be provided.</li> <li>• Speed sensor with speed display and speed feedback facility to be provided.</li> <li>• Mechanical Spring balance load setup should be to be provided.</li> </ul> <p><b>3. Motor Controller Circuit is to be provided for Speed Control of the Motor.</b></p> <p><b>4. 1(One) KVA ISOLATION TRANSFORMER.</b></p> <ul style="list-style-type: none"> <li>• Input: 230V at 50 HZ.</li> <li>• Output: 110V at 50 HZ &amp; 230V at 50 HZ.</li> </ul> <p><b>5. One 10 Amps rated Single Phase Variac is to be provided.</b></p>		01	No.					
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3.	<p><b>SPEED CONTROL OF Three (3) HP THREE PHASE SLIP RING INDUCTION MOTOR USING SCR BASED STATIC KRAMER DRIVE.</b></p> <p>This setup is to be designed and supplied for open loop speed control of a 3HP Slip Ring Induction motor using SCR based Converter and Inverter. This System should consist of followings:</p> <p><b>1. SCR based 3-phase Inverter:</b></p> <ul style="list-style-type: none"> <li>• It should consist of 6 nos. of SCRs rated at 1200V, 50 Amps. With suitable heat sinks to form 3 phase fully controlled converter to be functioned as a 3 Phase Inverter.</li> <li>• Six Isolated gate Signals to be provided for Full Bridge Converter.</li> <li>• Firing angle variable from 180° to 0° through Ramp and pedestal control.</li> <li>• Gate carrier source to be provided.</li> <li>• The System to be housed in a sleek Cabinet.</li> <li>• Test points are to be provided on the Front Panel for detail study of Circuits signals during Experimentation.</li> <li>• Necessary test points are to be provided and terminated so that the different test signals/ data can be monitored during Experimentation using DSO, CRO &amp; DVM etc.</li> <li>• One ON/OFF switch with Indicator to be provided to power the control circuitry.</li> </ul> <p><b>2. Three (3) HP Slip Ring Induction Motor with Diode Bridge Rectifier:</b></p> <ul style="list-style-type: none"> <li>• 3 HP Slip Ring Induction Motor coupled with another 3HP DC Separately Excited DC Shunt Motor on Common base made of M.S. Channel to be supplied.</li> <li>• One three phase Transformer of required ratings &amp; Specifications should be supplied for Slip Power Recovery through Diode-Bridge Rectifier &amp; Inverter.</li> <li>• One no. 3 phase bridge rectifier is to be provided to covert Rotor circuit voltage 210V to DC.</li> <li>• Necessary Inverter circuit to be provided for Slip Power recovery.</li> <li>• One no. of “L” &amp; “R” of required ratings should be provided for DC filtering.</li> <li>• Necessary test Points are to be provided.</li> <li>• Entire Control Circuit to be mounted inside a compact box.</li> <li>• Mimic circuit diagram is to be provided on the Front Panel.</li> </ul> <p><b>3. 1(One)KVA ISOLATION TRANSFORMER.</b></p> <ul style="list-style-type: none"> <li>• Input: 230V at 50 HZ.</li> <li>• Output: 110V at 50 HZ &amp; 230V at 50 HZ.</li> </ul> <p><b>4. One three Phase Variac of required rating should be supplied for power input to the Motor-Generator Setup.</b></p>		01	No.					
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4.	<p><b>Trainer for V-I characteristics of SCR, IGBT and MOSFET</b></p> <p>This trainer is to be designed and supplied to study the V-I characteristics of SCR, IGBT &amp; MOSFET.</p> <p>This trainer should consists of followings :</p> <ul style="list-style-type: none"> <li>• One number of SCR with heat-sink should be provided.</li> <li>• One number of IGBT with heat-sink should be provided.</li> <li>• One number of MOSFET with heat-sink should be provided.</li> <li>• One number of variable dc power supply 0-30v@1Amp is to be provided for input of devices.</li> <li>• One number of variable dc power supply 0-30v@1Amp is to be provided for device gate circuit inputs</li> <li>• One power resistor is to be provided as fixed Load with terminations.</li> <li>• All necessary test points are to be provided for external patching.</li> <li>• All devices are to be mounted on a nice cabinet with sticker front panel with mimic diagram.</li> <li>• 230VAC input with power ON/OFF Switch</li> <li>• Three numbers of Digital Multi meter are to be provided.</li> </ul> <p>This unit to be supplied for following experiments.</p> <p><b>1.</b> 1. Study of VI characteristics of SCR [<i>Static anode-cathode ( VI ) characteristics of SCR at different gate currents</i>].</p> <p>2. Study of VI characteristics of MOSFET.</p> <p>3. Study of VI characteristics of IGBT</p>		03	Nos.					
5.	<p><b>Trainer for Gate firing circuits for SCRs.</b></p> <p>This trainer should consists of UJT , R &amp; RC Firing circuit with SCR</p> <p><b>Specifications:</b></p> <ul style="list-style-type: none"> <li>• UJT , R &amp; RC based Firing circuit are to be provided.</li> <li>• 2N2646 UJT as a triggering device.</li> <li>• Potentiometer for firing angle adjustments (10-170 degree).</li> <li>• Pulse transformer for pulse isolations.</li> <li>• One number of TYN612 SCR with proper heat sink &amp; snubber circuit.</li> <li>• One number R-FIRING circuit with Potentiometer for firing angle adjustment.</li> <li>• One number RC FIRING circuit with Potentiometer for firing</li> </ul>		02	Nos.					

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	<p>angle adjustment.</p> <ul style="list-style-type: none"> <li>• Pulse Outputs are to be terminated by connectors for SCR inputs</li> <li>• All are to be mounted on a nice cabinet with power ON/OFF Switch</li> </ul> <p>This trainer should be supplied for following experiments.</p> <ol style="list-style-type: none"> <li>1. Study of characteristics of UJT based firing/triggering circuit for SCR.</li> <li>2. Study of characteristics of R firing/triggering circuit for SCR.</li> <li>3. Study of characteristics RC firing/triggering circuit for SCR.</li> </ol>								
6.	<p><b>Trainer for Half &amp; Fully controlled converter and Single phase AC Voltage Controller with R and RL load'</b></p> <p>This trainer should be designed and supplied to study the SCR based Half &amp; fully controlled converter &amp; AC regulator power circuit . This trainer consists of SCR Firing pulse controller and SCR Power Module with followings:</p> <ul style="list-style-type: none"> <li>• Four number of TYN612 SCR with heat-sink for Power circuit.</li> <li>• Two number of Power diode of required rating for Power circuit.</li> <li>• One number of Digital- Firing circuits with firing angle adjustments (180-0degree).</li> <li>• Keys for firing angle adjustments.</li> <li>• Four Numbers of Pulse outputs should be terminated for external Patching.</li> <li>• 24V @3Amp AC inbuilt power supply unit for power circuit inputs.</li> <li>• One number of power resistor as fixed Resistive Load with terminations for External patching.</li> <li>• One number of Fixed inductance as fixed Inductive Load with terminations for External patching.</li> <li>• All necessary test points are to be provided for external patching</li> <li>• All should be mounted on a nice cabinet with sticker front panel with mimic diagram.</li> <li>• Input Power : □230VAC input with power ON/OFF Switch.</li> </ul> <p>This unit should be supplied for for following Experiments.</p> <ol style="list-style-type: none"> <li>1. Study of Characteristics of SCR based Half controlled Single Phase Converter with R and RL Loads</li> <li>2. Study of Characteristics of SCR based Fully controlled Single Phase Converter with R and RL Loads.</li> <li>3. Single -Phase AC Voltage Controller with R and RL Loads.</li> </ol>		01	No.					

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7.	<p><b>Trainer for Three -Phase half &amp; Fully controlled bridge converters.</b></p> <p>This trainer is to designed and supplied to study the working principle of 3 phase SCR fully controlled, Half controlled Converter circuits . This trainer consists of</p> <ul style="list-style-type: none"> <li>Six(6) number of TYN612 SCRs with heat-sink for Power circuit.</li> <li>Three (3) number of Power diodes for Power circuit.</li> <li>One IC based Firing circuits with firing angle adjustments (180-0degree).</li> <li>One potentiometer for firing angle adjustment.</li> <li>Six ( 6 )Numbers of Pulse outputs are to be terminated in the PCB for external Patching.</li> <li>3 Phase 24v,1Amp AC inbuilt power supply for power circuit inputs.</li> <li>One number of power resistor as fixed Resistive Load with terminations for External patching.</li> <li>All necessary test points are to be provided for external patching.</li> <li>All are mounted on a nice cabinet with sticker front panel with mimic diagram</li> </ul>		01	No.					
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**Gross Total Cost : Rs.-----**

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

We also confirm that the normal commercial warranty / guarantee of ..... months shall apply to the offered goods.

**Full Signature of Supplier/ Contractor.**

**Signature of the Principal.**