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E-TENDER DOCUMENT FOR
SUPPLY & INSTALLATION OF
ENGINEERING LAB EQUIPMENTS
(PHYSICS/ CHEMISTRY/ ELECTRICAL/ CIVIL/ WORKSHOP,
For B.Tech. Programme as per RTU Curriculum)

E-TENDER NO.: CIPET/JPR./PUR./2020-21/E-TEN.-01/ENGINEERING LAB EQUIPMENTS

LAST DATE FOR SUBMISSION OF ONLINE BID: 29.06.2020: 14.00 Hrs.

CENTRAL INSTITUTE OF PLASTICS ENGINEERING & TECHNOLOGY

(Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India)

SP-1298, Sitapura Industrial Area, Phase III, Tonk Road, Jaipur-302 022

E-mail: jaipur@cipet.gov.in, cipetjaipur@gmail.com

Website: www.cipet.gov.in

Ph. No.: +91 141- 2770264/65/66, 2770664 **Telefax:** +91-141-2770736

**CENTRAL INSTITUTE OF PLASTICS ENGINEERING & TECHNOLOGY (CIPET)**

(Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India)

SP-1298, Sitapura Industrial Area, Phase-III, Tonk Road, Jaipur – 302 022

Ph. No.: 0141-2770264/65/66, 2770664 Telefax No.: 0141-2770736

E-mail: jaipur@cipet.gov.in, cipetjaipur@gmail.comWebsite: www.cipet.gov.in**Notice Inviting E-Tender****E-Tender No.: CIPET/JPR./PUR./2020-21/E-TEN.-01/ENGINEERING LAB EQUIPMENTS 05/06/2020**

CIPET Jaipur invites item rate E-Tender in Two Bid Systems (Technical and Commercial) from Manufacturers/ Authorized Dealers and Reliable Supplier/Vendor for Supply & Installation of **Engineering Lab Equipments (Physics/ Chemistry/ Electrical/ Civil/ Workshop etc.) suitable for B.Tech Programme as per RTU Curriculum F.O.R at CIPET - JAIPUR** campus at Sitapura (Rajasthan) with an estimated cost of **Rs. 43,00,000/- without Tax (Total Amount (Rs.) : Forty Three Lakhs Only).**

1. Engineering Lab Equipments : Rs. 43,00,000.00 (Rs. : Forty Three Lakhs Only)

S. No.	E-Tender No. & Date	Name of the Item / Work	Estimated Cost in Rs.	Completion Time	EMD in Rs.	Tender Fees in Rs.	Last Date & Time of online Bid submission
1.	CIPET/JPR./PUR./2020-21/E-TEN.-01/ENGINEERING LAB EQUIPMENTS Dated : 05 th June, 2020	Supply & Installation of Engineering Lab Equipments (Physics/ Chemistry/ Electrical/ Civil/ Workshop etc.) F.O.R at CIPET - JAIPUR.	43.00 Lakhs	30 Days	2,15,000.00 (Refundable)	2,950.00 (Non Refundable)	29.06.2020 14.00 Hrs.

Interested and eligible bidders may view and download detailed tender documents from CIPET's e-Tender portal www.tenderwizard.com/CIPET, www.cipet.gov.in & www.eprocure.gov.in. **All Bids must be submitted through the online portal www.tenderwizard.com/CIPET.** However, Bidders are also requested to submit a hard copy of the online Technical Bid duly sealed and signed to the Centre Head, CIPET, SP-1298, Sitapura Industrial Area, Phase-III, Tonk Road, Jaipur-302 022 **on or before 29.06.2020 @ 14.00 Hrs.**

The Tender Fee and EMD will be accepted in the form of Demand Draft/Banker's Cheque drawn on any Indian Nationalized Bank favoring **"CIPET Jaipur"** payable at Jaipur and shall be submitted at CIPET Jaipur as specified on or before **29.06.2020 up to 14.00 Hrs.** in separate sealed cover failing which bids will be summarily rejected. However, a soft copy of the Tender Fee and EMD shall also be uploaded along with the Technical Bid to be submitted online.

Salient information about the E-Tender:

- 1. Mode of submission: ONLINE.** No offline Tenders will be accepted.
- 2. Availability of Tender Documents:** All Bid formats (Technical & Commercial) are available ONLINE at CIPET's e-Tender portal www.tenderwizard.com/CIPET, www.cipet.gov.in & www.eprocure.gov.in. The registered vendors can download the Bids from these websites.
- 3. Who can participate for this e-Tender:** The registered vendors of CIPET through www.tenderwizard.com/CIPET can only participate in this tender process.

4. **How to register by a vendor:**

(a) The prospective bidders have to register with CIPET through the E-tender portal of CIPET at www.tenderwizard.com/CIPET by **Online Payment of Rs. 1500/- + 18% GST (As Applicable) to M/S KEONICS LTD.** On completion of the registration process, the bidders will be provided user ID and password. After receipt of User ID & Password, Bidders can log on at our e-Tender portal for downloading & uploading tender documents, which is valid up to 01 year.

(b) **Processing Fees is Rs. 4,300/- + 18% GST Payable Online separately to M/S KEONICS LTD.**

(c) **Tender Documents Fees of Rs. 2,950.00 (2,500.00 + 18% GST) (Non-Refundable)** is Payable to CIPET, Jaipur in the form of Demand Draft from any Nationalize Bank not drawn before the Date of Releasing of NIT.

5. **Is there any device requirement for participation in e-Tender:** Yes, Bidders should have valid Class 3 Digital Signature Certificate (DSC) device for participating in e-Tender. For integrity of data and its authenticity/non-repudiation of electronic records and to be compliant with IT Act2000, it is necessary for each user to have a Digital Certificate (DC), also referred to as Digital Signature Certificate (DSC) of Class-III issued by a Certifying Authority (CA) licensed by Controller of Certifying Authorities (CCA) [refer <http://www.cca.gov.in>].

6. Contact details for e-Tender related issue:

Name of the Service Provider: KEONICS		
Contact Person	Mobile No. / E-mail	Remarks
Local Representative of KEONICS Mr. Deepak Jangid	Mobile : 9680005669/ 8800991840 E-mail: twhelpdes639@gmail.com Deepak.j@etwnderwizard.com	For, Vendor Registration/ DSC/ any other issue regarding E-Tender Process, Please Contact KEONICS as the details given in the previous columns.
KEONICS'S Helpdesk	Tel. No. : +91 80- 22272203, +9180- 40482000 E-mail: cipethelpdesk@gmail.com	

7. Bidders are hereby advised that all the documents to be submitted online are kept scanned and converted to PDF format in a separate folder on their computers before starting online submission. The schedule of rate (Excel Format) may be downloaded and rates may be filled appropriately in this format only. This file may also be saved in a separate folder on your computer.

8. While uploading/submitted the documents, it should be ensured that the file name should be the name of the document itself.

9. All pages of Tender documents with Addenda/Corrigenda (if any) must be signed with proper official stamp and date by the Bidders / or authorized power of attorney holders at the lower right hand corner.

10. Bidders are advised to visit CIPET's e-Tender portal regularly for any Addenda/Corrigenda (if any) with regard to the e- Tender for which no separate paper advertisement will not be published.

11. **Last date of online submission of Tender bid: 29.06.2020 up to 14.00 Hrs.**

12. **EMD and Tender Fee must be in approved mode and Duly Signed and Sealed in separate cover along with filled Technical Bid and with necessary enclosures the same shall be submitted in physical form (hard copy), in person/by speed post on or before 29.06.2020 @ 14.00 Hrs. at CIPET, Jaipur. Non receipt of which the Tenders are liable for rejection.**

13. **Date & Time of Technical Bid Opening: 29.06.2020 at 15.00 Hrs.**

14. **Date & Time of Commercial Bid Opening: Technically qualified bidders will be intimated the date & time after technical bid evaluation through the e-Tender portal.**

15. **Venue for Opening Bids :** CIPET, SP-1298, Sitapura Industrial Area, Phase-III, Tonk Road, Jaipur-22

16. **Eligibility Criteria :**

Age of the Firm	: More than 03 years as on 31.03.2020
Average Annual Turnover	: 50 Lakhs & above in the last 03 financial years along with Income Tax Return, Final Account (Balance Sheet, Profit & Loss A/c & Trading A/c)
Individual Work Order/Purchase Order	: Similar Experience of having supply & installation of Engineering Lab Equipments to institute/organization during last five year along with Purchase Order copies.
Registration Certificate	: Firm establishment, Company Act, Sales Tax, VAT, CST, TIN, Service Tax No., GST, or if any Attach Photocopy of all Certificates.
PAN No.	: The firm should have valid PAN No. Registration (Attach Photocopy)

Note : Firm should not be Black listed by Govt., Semi Govt., Boards, and Corporations.

CIPET-JAIPUR reserves the absolute right to accept/reject any or all bids at any stage of the tender process without assigning any reason whatsoever.

**Director & Head
CIPET- JAIPUR**

THIS TENDER FORM CONTAINS

SECTION I TO X

SECTION : I

INTRODUCTIONS

Central Institute of Plastics Engineering & Technology, (CIPET) is a Govt. of India Institute under Department of Chemicals & Petrochemicals, Ministry of Chemical & Fertilizers, Govt. of India engaged in Training and Research in the field of Plastics with Head Quarters and Head Office at Chennai. The Centre of Rajasthan State is located in Jaipur. CIPET:CSTS-JAIPUR invites e-tenders in 2 bid system (Technical and Financial Bid) for the Item/work titled “Supply & Installation of **Engineering Lab Equipments (Physics/ Chemistry/ Electrical/ Civil etc., suitable for B.Tech Programme as per RTU Curriculum)** F.O.R. at CIPET -JAIPUR.

SECTION : II

SPECIAL TERMS AND CONDITIONS / INSTRUCTIONS TO BIDDER

1. The Tenderer is expected to examine all instructions, forms, terms & conditions and specifications in the Tender Documents. Failure to furnish all information required for the Tender Documents or submission of a Tender not substantially responsive to the Tender Documents in every respect will be at the Tenderer's risk and may result in rejection of the Tender.
2. The tenderer is advised in his own interest to visit/examine the CIPET-JAIPUR Campus before submission of the bid.
3. The Tenderer shall complete the Tender Form and fill the appropriate Financial Bid (Price Schedule) Furnished in the Tender Documents, indicating for the goods to be supplied, a brief description of the Goods, their country of origin, quantity and prices.
4. The cost of tender document is **Rs. 2,950.00 (2,500.00 + 18% GST) Non Refundable** and Tenderer's is requested to submit the tender fees in the form of Demand Draft drawn in favour of “**CIPET**” payable at **Jaipur** on or before **29.06.2020 @ 14.00** hrs. failing which the tender will be rejected.
5. The Bidder shall indicate on the Financial Bid (Price Schedule) attached to these documents, the unit prices and total Bid Prices of the goods, proposed to supply under the Contract.

6. Offer should be of two parts Viz., “**TECHNICAL BID**” and “**COMMERCIAL BID**” and all bids must be submitted through the online portal www.tenderwizard.com/CIPET.

The hard copy of “TECHNICAL BID” shall be submitted in sealed covered envelop include the following with seal & signature:-

- 6.1 Detailed specification of the base equipment along with the specification of accessories, which are included in the Base unit.
- 6.2 Product Literature.
- 6.3 Performa for Performance Statement.
- 6.4 Qualification Criteria.
- 6.5 List of spare parts included (without quoting the price) (the acceptance and rejection of spare parts will be at sole discretion of CIPET)
- 6.6 List of optional accessories with their technical specification.(without quoting the price).
- 6.7 Manufacturer’s Authorization Form.
- 6.8 Deviation Statement.
- 6.9 Demand Draft of Tender Fees of Rs. 2,950.00 (2500.00+18% GST.) drawn in favour of “**CIPET**” payable at Jaipur.
- 6.10 Demand Draft of EMD of Rs. 2,15,000.00 drawn in favour of “**CIPET**” payable at Jaipur.
- 6.11 Certificates of Registration for Company Act, Sales Tax, VAT, CST, TIN, Service Tax No, GST of if any.
- 6.12 Registration Certificate in support of establishment of the firm.
- 6.13 PAN No. Registration Copy.
- 6.14 Experience of having successfully supplied & installation of Basic Engineering Lab Equipments during last 05 financial years along with Purchase Order copies.
- 6.15 The firm should enclose Income Tax Return during the last Three Financial Years (2016-17, 2017- 18 & 2018-19) along with Final Account (B/S, P & L A/c & Trading A/c)
- 6.16 Delivery Period of the Equipment along with all terms & conditions.

Any other information which the bidder would like to state about the technicality of the equipment.

The envelope shall be addressed to the Purchaser at the following address:

**The Director & Head
Central Institute of Plastics Engineering & Technology (CIPET)
SP-1298, Sitapura Industrial Area,
Phase-III, Tonk Road, Jaipur-302022, Rajasthan.**

7. Financial Bid (Price Schedule) should be submitted in the prescribed format (Excel Format) given under price schedule of the Tender Document.

8. Any Tender received by the Purchaser after the deadline for submission of E-Tenders prescribed by the Purchaser, will be rejected.
9. Tenders shall remain valid for 90 days after the date of bid opening of E-Tender.
10. The tenderer shall pay Earnest Money Deposit Rs. 2,15,000/- in the form of Demand Draft drawn in favour of "**CIPET**" payable at Jaipur on or before **29.06.2020 @ 14.00 hrs.** The tenders received without the EMD in the prescribed form shall be rejected. The Earnest money of the Unsuccessful tenderers will be refunded within 15 days time from the completion of tender process and issue of Purchase Order/Work Order.
11. The Earnest Money of the tenderer shall be forfeited by CIPET without prejudice to another rights or remedies:
 - a) If the tenderer withdraws his tender during the period of tender validity specified in the tender document.
 - b) If, after acceptance of his tender, the tenderer fails to take up the job.
 - c) If, the tenderer fails to sign the contract in accordance with the terms and conditions of the contract.
 - d) If, after acceptance of his tender, the tenderer fails to furnish the balance of Security Deposit.
 - e) If, after acceptance of his tender, the tenderer fails to commence the work within seven days after receipt of work order to that effect.
 - f) In case of supply/work not completed within specified completion periods CIPET has right to forfeit the EMD
12. CIPET will notify the successful tenderer in writing by a registered letter / fax / e-mail to be confirmed that his tender has been accepted.
13. Government Taxes will be deducted as per prevailing rules and regulations of the Government.
14. No extra supply/work shall be done without the written permission of In-charge and CIPET shall not be responsible if the contractor executes any extra work without written order.
15. The supply/work should be completed within 30 days.
16. Tenderer/Supplier has to submit original and three copies of the invoice showing goods description, quantity, unit price, total amount along with Manufacturer's / Supplier's guarantee Certificate and Inspection Certificate issued by the nominated inspection agency.
17. This warranty/guarantee shall remain valid for minimum **12 months** after the Goods delivered and Commissioned at the final destination indicated in the Contract. Free maintenance services shall be provided by the suppliers during the period of warranty.
18. In the case of a dispute or differences arising between the Purchaser and Supplier relating to any matter arising out or connected with this agreement, such dispute or differences shall be referred within the Jurisdiction of Court, Jaipur (Rajasthan).
19. 90% amount shall be paid within 10-15 working days after supply of Engineering Lab Equipments at the destination and balance 10% amount shall be paid on completion of installation and commissioning of machine at site along with the certificates.
20. The Director & Head CIPET, Jaipur reserves the right to accept or reject any tender or all tenders at any time prior to award of contract without assigning any reasons whatsoever and no correspondence shall be entertained in this regard.

21. Performance Security

- 21.1 Within 14 days after the Supplier's receipt of Purchase Order, the Supplier shall furnish performance security to the Purchaser for an amount of 5% of the contract value valid up to 60 days after the date of Completion of performance Obligations including warranty obligations.
- 21.2 The Performance Security shall be denominated in the currency of the Contract or in a freely convertible currency acceptable to the Purchaser, and shall be in one of the following forms:
- (a) A Bank guarantee or irrevocable Letter of Credit, issued by a nationalized bank located in India and in the form provided in the Bidding Documents or another form acceptable to the purchaser; or
 - (b) Demand Draft in favour of CIPET, payable at Jaipur.
- 21.3 The performance security will be discharged by the Purchaser and returned to the Supplier not later than 60 days following the date of completion of the Supplier's performance obligations, including any warranty obligations, under the Contract/Purchase Order.
22. The items are available on GeM portal will be procured from GeM only and those items are not available on GeM portal will be procured from bidders.
23. The bidders informed that all the items shall be supplied as per actual requirement of the institute however institute reserve rights to reject, amend and curtails the requirement.
24. In case of any inadvertent mistake in the process of Tender which may be detected at any stage even after the issuance of work order, the CIPET reserves the right to modify / withdraw / cancel any communication made to the tender process.
25. The all lab equipments items mentioned in the tender/financial bid will be procure partially/ individual item wise and group wise from lowest bidders.
26. In case of any confusion about the tender & procurement the CIPET-JAIPUR management decision will be final.

SECTION : III

SCHEDULE OF REQUIRMENT

Supply & Installation of Engineering Lab Equipments

(Physics/ Chemistry/ Electrical/ Civil/ Practices Workshop Etc., suitable for B.Tech Programme as per RTU Curriculum) at CIPET-JAIPUR

S. No.	Description of the Item/Work	Unit	Qty.
1	Supply & Installation of Engineering Physics Lab Equipments	As per Annexure-I	
2	Supply & Installation of Engineering Electrical Lab Equipments	As per Annexure-II	
3	Supply & Installation of Workshop Equipments	As per Annexure-III	
4	Supply & Installation of Engineering Chemistry Lab Equipments	As per Annexure-IV	
5	Supply & Installation of Engineering Civil Lab Equipments	As per Annexure-V	

SECTION : IV

TECHNICAL SPECIFICATION

**TECHNICAL SPECIFICATION OF ENGINEERING LAB EQUIPMENTS
(Physics/ Chemistry/ Electrical/ Civil/ Practices Workshop Etc., suitable for B.Tech Programme as
per RTU Curriculum) at CIPET-JAIPUR**

S. No.	Description of the Item/Work	Technical Specification
1	ENGINEERING PHYSICS LAB EQUIPMENTS	As per Annexure-I
2	ENGINEERING ELECTRICAL LAB EQUIPMENTS	As per Annexure-II
3	WORKSHOP EQUIPMENTS	As per Annexure-III
4	ENGINEERING CHEMISTRY LAB EQUIPMENTS	As per Annexure-IV
5	ENGINEERING CIVIL LAB EQUIPMENTS	As per Annexure-V

SECTION : V

TECHNICAL BID

E-Tender No.: CIPET/JPR./PUR./2020-21/E-TEN.-01/ENGINEERING LAB EQUIPMENTS

Supply & Installation of Engineering Lab Equipments

(Physics/ Chemistry/ Electrical/ Civil/ Workshop Etc., suitable for B.Tech Programme as per RTU Curriculum) at CIPET-JAIPUR

S. No.	Particulars	
1	Name of the Supplier / Manufacturer	
2	Postal address	
3	Telephone No. with STD code	
4	Fax with STD code	
5	Name of Contact person	
6	Mobile No.	
7	E-Mail ID	
8	Following Documents To Be Scanned And Uploaded In The Website www.tenderwizard.com/CIPET Within The Period of Submission.	
9	The firm should have valid registration certificate in support of Establishment of the Firm	
10	PAN (Permanent Account Number) Registration	
11	Certificates of Registration for Company Act, Sales Tax, VAT, CST, TIN, Service Tax No. GST or if any attached seal & signed copy	
12	The firm should be Engineering Lab Equipments Manufacturer or Authorized Dealer/Distributor/Suppliers	
13	Similar Experience of having successfully supplied & installation of Engineering Lab Equipments to institute/ organization during last five years along with purchase order copies.	
14	The firm should enclose Annual Turnover valuing more than Rs. 50.00 Lakhs and above during the last 03 financial years (2016-17, 2017- 18 & 2018-19), in prescribed format (Annexure-VI) & with CA Certificate	
15	The firm should enclose Final Account (Balance Sheet, Profit & Loss A/c & Trading A/c) during the last Three Financial Years (2016-17, 2017- 18 & 2018-19)	
16	The firm should enclose Income Tax Return during the last Three Assessment Years (2017-18, 2018-19 & 2019-20)	
17	Performa For Performance Statement	
18	Deviation Statement	
19	Demand Draft of Tender Fees of Rs. 2,950.00	
20	Demand Draft of EMD of Rs. 2,15,000.00	
21	Delivery Period of the Equipments along with all terms & conditions	
22	List of Customers	
23	Validity of offer	

Date:

Seal & Sign. of bidder

SECTION : VI

MANUFACTURER'S/ DEALER'S AUTHORIZATION FORM

No.....dated.....

To,
Central Institute of Plastics Engineering & Technology (CIPET)
SP- 1298, Sitapura Industrial Area, Phase-III,
Tonk Road, Jaipur – 302 022.

Dear Sir

Ref: Bid Reference

We who are established and reputable manufacturers of
.....having factories atand.....do
hereby authorize M/s..... (Name
and address of Agents) to bid, negotiate and conclude the contract with you against the above Bid.

No company or firm or individual other than M/s..... are authorized
to bid, negotiate and conclude the contract in regard to this business against this specific Bid.

We hereby extend our full guarantee and warranty as per Terms and Conditions of Contract for the goods offered
for supply against this invitation for bid by the above firm.

Yours Faithfully,

(Name)

For and on behalf of M/s.....

(Name of Manufactures)

Note: This letter of authority should be on the letterhead of the manufacturing concern and should be signed by a person competent and having the power of attorney to bind the manufacturer.

SECTION VII

PERFORMANCE SECURITY FORM

To,
Central Institute of Plastics Engineering & Technology (CIPET)
SP-1298, Sitapura Industrial Area, Phase-III,
Tonk Road, Jaipur-302022, Rajasthan-. India

WHEREAS.....(Name of Supplier)

Hereinafter called “the Supplier” has undertaken, in pursuance of Notification of Contract No..... dated ... 20..... to supply (Description of Goods and Services) hereinafter called “ the Contract”.

AND WHEREAS it has stipulated by you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with the Supplier’s performance obligations in accordance with the Contract.

AND WHEREAS we have agreed to give the Supplier a Guarantee:

THEREFORE WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Supplier, up to a total of (Amount of the Guarantee in Words and Figures) and we undertake to pay you, upon your first written demand declaring the Supplier to be in default under the Contract and without cavil or argument, any sum or sums within the limit of (Amount of Guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until theday of.....20.....

Signature and Seal of Guarantors

.....
.....

Date

Address :.....

SECTION VIII

PROFORMA FOR PERFORMANCE STATEMENT

(For Simple Goods/Equipment for a period of last three years)

Bid No.

Date of Opening.....Time.....Hours

Name of the Firm

Order placed by (Full Address of Purchaser)	Order No. and date	Description & Quantity of ordered equipment	Value of order	Date of completion of delivery As per Contract	Delivery actual	Remarks indicating reasons for late delivery, if any	Has the equipment been satisfactorily Functioning ?
1	2	3	4	5	6	7	8

Signature and Seal of the Bidder

SECTION IX

PROFORMA FOR DEVIATION STATEMENT

Please see Section IV

Bid Ref No.	Date of Opening	Time		
Name of the Firm				
Name of the Equipment quoted				
Model No.:				
Purchaser's Specification	Bidders Specification	Deviation, if any	Justification	Remarks

Note : Separate Deviation statements should be submitted along with the bid for all models / alternative quotes.

SECTION : X

CHECK LIST

E-Tender No.: CIPET/JPR./PUR./2020-21/E-TEN.-01/ENGINEERING LAB EQUIPMENTS

1. Have you deposited requisite Tender Fees & EMD?
2. Have you enclosed valid Registration Certificate of Establishment of Firm?
3. Have you enclosed your PAN Certificate?
4. Have you enclosed Income Tax Return Certificate for last 3 years?
5. Have you enclosed Registration Certificate of Company Act, Sales Tax, VAT, CST, TIN, Service Tax No., GST or if any?
6. Have you sealed & signed all the pages of Tender document?
7. Have you enclosed experience certificate/purchase order/work orders copies?
8. Have you enclosed Annual Turnover Certificate?
9. Have you enclosed Product Literature
10. Have you enclosed Performa for Performance Statement
11. Have you enclosed Manufacturer's Authorization Form
12. Have you enclosed Deviation Statement

ANNEXURE-I

1. ENGINEERING PHYSICS LAB EQUIPMENT

S. No.	Name of the Practical	Equipment Specification	Qty.
1	To Determine The Wavelength of Monochromatic Light With The Help of Michelson's Interferometer.	MICHELSON INTERFEROMETER WITH BEAM EXPANDER WITH COMPLETE SET UP. ACCESSORIES REQUIRED(OPTIONAL)	02 Nos.
2		MONOCHROMATIC LIGHT WITH 1.5 CM OPENING The lamp is housed in metal box with diaphragm to adjust the intensity of light in a very precise manner. The metal box slides in a stand & can be adjusted in the vertical plane in the proximity of the object. It compensates for the imperfections of the interferometer in the case of the interferometer in this case. Complete with electronic power supply without humming noise.	02 Nos.
3	To Determine The Wavelength of Sodium Light By Newton's Ring.	NEWTON' RING APPARATUS: (THREE IN MODEL) a. DETERMINATION WAVELENGTH, FOCAL LENGTH OF PLAIN CONVEX LENS WITH DIGITAL CAMERA, 14 INCH LED SCREEN, NEWTON RING APPARATUS WITH STAND. b. TO DETERMINE THE THICKNESS OF THIN PAPER BY FORMING AN AIR WEDGE: complete with an air wedge mounted on a base with a reflecting plate & condensing lens to send parallel beam of light from sodium lamp. c. TO STUDY REFRACTIVE INDEX OF LIQUID 'LABIN' NEWTON' RING APPARATUS: DETERMINATION WAVELENGTH OF SODIUM LIGHT .-----do-----without camera & LED OPTIONAL ACCESSORIES FOR ABOVE NEWTON RING EXPERIMENT: SODIUM LAMP ASSEMBLY LABIN' SODIUM LIGHT ASSEMBLY: with 1.5 cm opening. The sodium lamp is housed in metal box with diaphragm to adjust the intensity of light in a very precise manner. The metal box slides in a stand & can be adjusted in the vertical plane in the proximity of the object. Complete with electronic power supply without humming noise.	02 Nos.
4	To Determine The Wavelength Of Prominent Lines Of Mercury By Plane Diffraction Grating With The Help Of Spectrometer.	SPECTROMETER WITH BUILT IN LIGHT ARRANGEMENT (To take the reading in the dark room) 6 inch 1 minute L.C ,DDF PRISM with working manual. Complete Experimental Set Up (Standard Export Model)	02 Nos.

5		MERCURY LAMP ASSEMBLY with 1.5 cm opening. The mercury lamp is housed in metal box with diaphragm to adjust the intensity of light in a very precise manner. The metal box slides in a stand & can be adjusted in the vertical plane in the proximity of the object. Complete with choke.	04 Nos.
6	To Determine Energy Band Gap In Semiconductor	Complete Set Up with Digital Voltmeter , Ammeter & Digital Temperature Meter, with DC Regulated Power supply with short c.k.t & overload protection. (Deluxe Model)	02 Nos.
7		Complete Set Up with analog voltmeter , ammeter & glass thermometer for temperature reading. This model will give precise reading with calibration sheet. (Routine Model)	02 Nos.
8	To Determine The Height Of Water Tank With The Help Of Sextant.	SEXTANT (All Brass) Sextant fitted Telescope and Index mirror. 1. Heavy Stand 2. A Measuring Tape : Calibrated in inches and feet's. 3. Plumb Line : High precision with string. 4. Spirit Level : High precision with ethanol liquid with metallic body (Precise Model)	02 Nos.
9	To Determine The Dispersive Power Of Material Of A Prism For Violet & Yellow Colour's Of Mercury Light With Help Of Spectrometer.	SPECTROMETER WITH BUILT IN LIGHT ARRANGEMENT (To take the reading in the dark room) 6 inch 1 minute L.C ,DDF PRISM with working manual. SPRIT LEVEL AND CROWN GLASS PRISM FOR CLEAR SPECTRUM. OPTIONAL ACCESSORIES: MERCURY LAMP ASSEMBLY: with 1.5 cm opening. The mercury lamp is housed in metal box with diaphragm to adjust the intensity of light in a very precise manner. The metal box slides in a stand & can be adjusted in the vertical plane in the proximity of the object. Complete with choke. Complete Experimental Set Up (Standard Export Model)	02 Nos.
10	To Study Charging & Discharging Of A Capacitor And Hence Determine The Time Constant.	Complete Set Up with DC Regulated Power Supply with short c.k.t & overload protection	02 Nos.
11	To Determine The Coherence Length & Coherence Time Of Laser Using He-Ne Laser .	Complete Set Up with Special Type Michelson Interferometer, HE-NE laser source with accessories.	02 Nos.
12		TO DETERMINE THE COHERENCE LENGTH & COHERENCE TIME OF LASER USING HE-NE LASER Complete Set Up with Special Y Type Michelson Interferometer, solid state semiconductor laser source with accessories	02 Nos.

ANNEXURE-II

2. ENGINEERING ELECTRICAL LAB EQUIPMENT

S. No.	Name of the Practical	Equipment Specification	Qty.
1	DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, Series-Parallel circuits, Node voltage method, Mesh current method, Superposition, Thevenin's, Norton's and Maximum power transfer theorems.	IRON VOLTMETERS Portable Moving Iron Voltmeter, enclosed in Engg. Plastic Case AE make, range 75/150/300 V or 150/300/600 V Accuracy 1.0%	02 Nos.
2		COIL AMMETERS Portable moving Coil Ammeter, enclosed in Engg. Plastic Case AE make, range 75/150/300 V or 150/300/600 V. Accuracy 1.0%	02 Nos.
3		IRON VOLTMETERS Portable Moving Iron Voltmeter, enclosed in Engg. Plastic Case AE make, range 1/2 A or 2.5/5A or 5/10A. Accuracy 1.0%	02 Nos.
4		COIL AMMETERS Portable moving Coil Ammeter, enclosed in Engg. Plastic Case AE make, range 1/2 A or 2.5/5A or 5/10A. Accuracy 1.0%	02 Nos.
5		DIGITAL MULTIMETER <ul style="list-style-type: none"> • 3 ½ Digit • DC-AC volts & Currents • Resistance/Diodes/ continuity Testing • 10ARange Fuse Protected • Over Range Indication 	02 Nos.
6		CRO CRO dual trace 'Scientific Make' 30MHz	04 Nos.
7	AC Circuits: Representation of sinusoidal waveforms, peak and r.m.s values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase AC circuits consisting of R, L, C, RL, RC and RLC combinations (series and parallel), resonance. Three phase balanced circuits, voltage and current relations in star and delta connections	SINGLE PHASE TRANSFORMER To Determine Excitation Phenomenon (B.H. Loop) (Measurement of Iron Losses) Using CRO Consisting of 0.5 KVA Transformer & control panel consisting of single phase variac & Voltmeter, Ammeter & Wattmeter, suitable electrical load. ADDITIONAL ACCESSORIES CRO dual trace 'Scientific Make' 30 MHz	02 Nos.

8	<p>Transformers: Ideal and practical transformer, EMF equation, equivalent circuit, losses in transformers, regulation and efficiency.</p>	<p>THREE PHASE TRANSFORMER WITH CONTROL PANEL</p> <p>To Study The Performance Of 3 Phase Transformer for Its Various Connections</p> <p>Three phase transformer 1 KVA, 400/400V, Primary & secondary connecting in various configurations. All the terminals of primary and secondary winding are connected to insulated terminals fixed on a Bakelite plate. Fitted on top of the Transformer, enclosed in m.s. performed sheet box.</p> <p>CONTROL PANEL</p> <p>Fitted on engraved balelite sheet enclosed in almirah type ms box suitable for table mounting.</p> <ul style="list-style-type: none"> i) MI Ammeter 96 x 96 mm panel type 0-5 Amp ii) MI Ammeter 96 x 96 mm panel type 0-10 Amp iii) MI Voltmeter 96 x 96 mm panel type 0-300 Amp iv) MI Voltmeter 96 x 96 mm panel type 0-600 Amp v) 3 Ph Variac 0-470 V vi) Educational type insulating terminals vii) Indicating light, Digital Clamp on Meter viii) Price of complete setup with control panel 	02 Nos.
9	<p>Electrical Machines: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Starting and speed control of induction motor, single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited DC motor. Construction and working of synchronous generators. Power Converters: Semiconductor PN junction diode and transistor (BJT). Characteristics of SCR, power transistor and IGBT. Basic circuits of single phase rectifier with R load, Single phase Inverter, DC-DC converter.</p>	<p>CUT SECTION MODEL OF D.C. MOTOR SHUNT/ COMPOUND WOUND:</p> <p>Cut model of D.C. Motor Shunt/ compound wound, consist of quarter cut section of the enclosed Cover to show the constructional details of the Motor. The Motor is fitted on an appropriate size of m.s. channel frame.</p> <p>Silicon steel laminations are used for Armature Core and Field Poles, S.E. copper wire is used for Armature, Field and Interpol windings, Commutator consists of copper segments, individually insulated from one another and from the shaft, electrically connected to the Armature Winding coils. Interpoles are located in Interpol region between the main pole.</p> <p>All connections of field coils armature and interpoles are brought out on the Bakelite plate. Provision has been made to show- commutator, Rocker Arm, Carbon brush holder, Armature winding, Poles, Interpoles and field coils, All parts are marked. The Model is a working one</p> <p>Ratings</p> <ul style="list-style-type: none"> i) DC Motor, 1H.P. 1500 RPM, 230 V, Insulation class “B” ii) DC starter suitable for above 	02 Nos.

10	<p>Electrical Machines: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Starting and speed control of induction motor, single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited DC motor. Construction and working of synchronous generators. Power Converters:</p>	<p>CUT SECTION MODEL OF 3- PHASE SQUIRREL CAGE INDUCATION MOTOR Cut out model of 3 phase Squirrel cage induction Motor, consisting of quarter cut section, including shaft of the enclosed cover t show the constructional details of the Motor, The Motor is fitted on an appropriate size of M. S. Channel frame. Silicon steel laminations are used for STATOR and ROTOR Core and S.E. Copper Wire For Stator Winding And Aluminum BAR for ROTOR winding, having provision of showing Rotor caging and ring and stator winding and insulation. The Model is a working one and all parts are marked. Ratings : i) AC Squirrel cage induction Motor, 1 HP , 3 Phase, 451 V, 50 Hz class “ B” Insulation. ii)DOL Starter</p>	02 Nos.
11	<p>Semiconductor PN junction diode and transistor (BJT). Characteristics of SCR, power transistor and IGBT. Basic circuits of single phase rectifier with R load, Single phase Inverter, DC-DC converter.</p>	<p>CUT SECTION MODEL OF SYNCHRONOUS MACHINE (3- PHASE) Cut section model of 3 phase synchronous machine consist of quarter cut section of yoke. So as to show the constructional details of stationary wound armature fixed to body (yoke) and the Rotating field poles (dove-tailed type) with damper winding and caging for auto induction start which rests on ball bearing fitted end plates. Provision has been made for D.C. field excitation and starting unit. All connections of armature field coils & DC excitation unit are brought out to insulating terminals fixed on a Bakelite plate. Fitted on M.S. Plate. Beautifully painted. Model is a working one. Ratings : i) Synchronous Machine 1 KVA, 3 Phase, 415 V, 50 Hz, 4 Pole, 1500 RPM, Star Connected. ii) DOL Starter</p>	02 Nos.
12		<p>CUT SECTION MODEL OF SLIPRING INDUCTION MOTOR-3 Phase (3-Phase Wound) Cut model of three phase slipring induction motor, consisting of quarter cut section of the enclosed cover to show the constructional details of the wound rotor and stator, sliprings. Silicon steel lamination are used for stator and armature core (Wound Rotor) assembly. S.E. copper wire is used for winding of stator and Rotor. All the connections of stator and wound Rotor are brought out on the Bakelite plate. Provision has been made to show the details of stator, wound Rotor, Slipring and scissors holder with carbons and windings. All parts properly marked and the model is working one. Ratings: i) Slipring Induction motor 2 HP, 3 Phase, 451 V, 1440 RPM, 50 Hz, ii)Rotor resistance starter</p>	02 Nos.

13	<p>Electrical Machines: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Starting and speed control of induction motor, single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited DC motor. Construction and working of synchronous generators. Power Converters: Semiconductor PN junction diode and transistor (BJT). Characteristics of SCR, power transistor and IGBT. Basic circuits of single phase rectifier with R load, Single phase Inverter, DC-DC converter.</p>	<p>CUT SECTION MODEL OF SINGLE PHASE SQUIRREL CAGE INDUCTION O MOTOR</p> <p>Cut out model of single phase squirrel cage induction motor , Capacitor start, consisting of quarter cut section, including shaft of the enclosed cover to show the constructional details of the motor. The motor is fitted on an appropriate size of M.S channel frame silicon steel laminations are used for Stator And Totor Core and S.E Copper Wire For Stator Winding And Sluminum bar FOR rotor WINDING, having provision of showing rotor caging and ring and stator winding and insulation. The model is working one and all parts are marked.</p> <p>Ratings</p> <ul style="list-style-type: none"> i) AC Squirrel Cage Induction Motor, 1 HP, 1 Phase ii) DC Starter 	02 Nos.
14	<p>Electrical Installations: Layout of LT switchgear: Switch fuse unit (SFU), MCB, ELCB, MCCB, Type of earthing. Power measurement, elementary calculations for energy consumption.</p>	<p>DC MOTOR SEPARATELY EXCITED WITH CONTROL PANEL</p> <p>To Study Torque Speed Characteristics Of Separately Excited DC Motor</p> <p>Type : DC Motor, Separately excited, screen Protected, horizontal foot mounted, fan cooled. Capacity : 1HP, R.P.M : 1500, Volts : 230 Insulation : Class 'B'</p> <p>Connections : All the terminals of armature and field shall be brought over to a Bakelite sheet, fixed to C.I. terminal box, fitted on top of motor.</p> <p>Mechanical : Loading of the motor shall be made Loading through pronney brake arrangement, consisting of a C.I drum pulley, suitable for water cooling, round dial spring balances, canvas belt with hooks, C.P. wheels with threaded studs for tightening the belt, frame.</p> <p>CONTROL PANEL FOR SPEED PROQUE CHARACTERTICS OF DC SHUNT MOTOR</p> <p>Fitted on Engraved Bakelite sheet enclosed in almirah type ms box suitable for table mounting.</p> <ul style="list-style-type: none"> i) MC Voltmeter 96 x 96 mm 0-300 V ii) MC Ammeter 96 x 96 mm 0-5A iii) Indicating light iv) Educational type insulated terminals v) DP MCB 10 Amp. Hager Make vi) Static excitation controlling arrangement vii) Inbuilt DC Power supply <p>Complete setup with 1 HP Motor and control panel.</p>	02 Nos.

ANNEXURE-III

3. WORKSHOP EQUIPMENT

S. No.	Name of Equipment	Equipment Specification	Qty.
1	Work Bench	Working Table Technical Specification : Wooden Top Size : 72" x 40" x 1.5" Wooden Top Cover Covered with Aluminum Aluminum Sheet:06 ft. 4" (L)x 44" (W)x 3.0 mm (T) Iron Pipe Frame Size : 50 x 50 x 03 mm, Height from Ground : 37-40 Inch	30 Nos.
2	Bench Vice	Heavy Duty Bench Vice Maximum Width of Jaws opening : 150 mm to 300 mm Heavy Duty Cast Iron Body Hardened Carbon Steel Jaws & are Interchangeable Properly Aligned Nut with leading Screw & is easily replaceable Drawn Steel Handle Polished Anvil Stove Enamel Paint Plain Screw Type with Anvil & Double Ribs	30 Nos.
3	V Block	Size : 75 X 65 X 85 mm Clamping Capacity : 5-55 mm Hardness Steel or Cast Iron	30 Nos.
4	Measuring Tools:-	<ol style="list-style-type: none"> 1. Steel Rule: 12" 2. Outside & Inside Calipers : Measured from the joint to the point Size : 200 mm, Tool Steel 3. Vernier Caliper : (Range : 0-300 mm) 4. Micrometer (Range : 0-25 mm) 5. Sheet Metal Gauge (Range : 0 to 36) 	Each 10 Nos.
5	Marking Tools:-	<ol style="list-style-type: none"> 1. Cast Iron Surface Plate: Size : 400 X 400 2. Cast Iron Slotted Angle Plate : Rust Proof, Machine Slots for Fixing, Size : 175 (L) X 100 (B) X 125 (H) 3. Scriber : Length of Wire 150 to 300mm, Carbon tool steel, Hardened and Tempered 4. Surface Gauge: Base Dimension : 100 X 90 mm Spindle Length : 450 mm, Scriber Length : 185 mm Spindle Size & Base, Medium Carbon Steel 5. Punches : Number & Letter Punch Size : 1/16 to 1/2" Drop forged steel, hardened finished in block designed 6. Steel Try Square : Length of blade will be the size. Available from : 75, 150, 300 mm. 7. Vernier Height Gauge with accessories Range : 0-300 mm, Reading : 0.02, Body : Alloy Steel Tip : HSS or Carbide 8. Trammel 	Each 05 Nos.

6	Cutting Tools:-	<ol style="list-style-type: none"> Hacksaw Frame with Blade : Size : 12 inch Frame : Strong Steel Frame Wooden Handle Supplied with 300MM Blade Flexible Bi-metal Bestard Files 2nd Cut & Fine Cut : Files are specified according to the length from point to heel, shape, grade from 20TPI to 100 TPI and cut of teeth , High Carbon Steel (Square, Round, Half Round, Triangle, Single, Double, Rasp, Spiral & Curve) Flat Chisel : Wedge angle 30°, 45°, 60° and 70°. Lesser angle for soft materials and larger angles for hard materials Tool steel (Hardened and Tempered) Twist Drill Set. in HSS Material 01 mm to 10 mm 	Each 05 Nos.																		
7	Gas Welding	<p>Regulators: (1 no. for Oxygen gas and 1 no. for Acetylene gas)</p> <table border="1" data-bbox="574 716 1365 968"> <thead> <tr> <th>Type of Gas</th> <th>Max. Inlet Pressure (Bar)</th> <th>Max. Outlet Pressure (Bar)</th> <th>Max. Flow (LPM)</th> <th>Inlet Connection</th> <th>Outlet Connection</th> </tr> </thead> <tbody> <tr> <td>Oxygen</td> <td>230</td> <td>10</td> <td>1000</td> <td>5/8" BSP R/H (Male)</td> <td>3/8" BSP R/H (Male)</td> </tr> <tr> <td>Acetylene</td> <td>20</td> <td>1.5</td> <td>250</td> <td>5/8" BSP R/H (Male)</td> <td>3/8" BSP R/H (Male)</td> </tr> </tbody> </table>	Type of Gas	Max. Inlet Pressure (Bar)	Max. Outlet Pressure (Bar)	Max. Flow (LPM)	Inlet Connection	Outlet Connection	Oxygen	230	10	1000	5/8" BSP R/H (Male)	3/8" BSP R/H (Male)	Acetylene	20	1.5	250	5/8" BSP R/H (Male)	3/8" BSP R/H (Male)	01 No.
Type of Gas	Max. Inlet Pressure (Bar)	Max. Outlet Pressure (Bar)	Max. Flow (LPM)	Inlet Connection	Outlet Connection																
Oxygen	230	10	1000	5/8" BSP R/H (Male)	3/8" BSP R/H (Male)																
Acetylene	20	1.5	250	5/8" BSP R/H (Male)	3/8" BSP R/H (Male)																
8	Arc Welding	<p>Specifications for tig/arc 200: input power voltage ac220v (single phase) + 15%, 50/60 rated input power capacity(kva) 3. 9 output current ranges (a) 10 - 200 rated output voltage(v) 17. 2 no - load voltage (v) 56 duty cycle (%) } 60 weight (kgs) 7. 8 overall dimension (mm) 376 x 172x304 post gas (sec) 10 current of mma (a) 20 200 driver adjustment arrange welding thickness (mm) 0. 3-8 efficiency 85 power factor 0. 93 production class of case ip21</p>	01 No.																		
9	Welding Accessories Set.	<p>Pair of Safety Glasses Head Protection Leather Boots Welding Gloves Welding Helmet Jacket Welding Sleeves</p>	Each 05 Nos.																		

10	Hand Tools used in Foundry Shop	Hand Riddle Rammers Sprue pin Trowels Lifter Strike off bar Vent Wire Slicks Swab Gate cutter Bellows Draw spike Sprue pin	Each 05 Nos.
11	Hand Tools (Forming & Joining Tools) Set.	Forming Tools : a. Stakes b. Hammers (Ball peen hammer and smith hammer Cross peen hammers, Hammer are classified according to the shape and weight i. Straight peen ii. ball peen iii. Cross peen Weight from 0.2 kg to about 1 kg. Joining Tools : a. Rivet Set b. Soldering Iron	Each 05 Nos.
12	Tools for Wood Working Set.	Marking and Measuring Tool : a. Rules (150 & 300 mm) b. Straight Edge and Squares c. Steel Tape d. Gauges e. Try Square f. Marking Knife g. Bevel Square Cutting Tools a. Saws b. Chisels Drilling & Boring Tools a. Bradawl b. Carpenters Brace c. Auger bit d. Hand drill e. Gimlet Striking Tools a. Mallet b. Claw Hammer c. Pincer d. Screw Driver Holding Tools a. Work Bench b. Sash-cramp c. C-Clamp d. Bar or T- cramp	Each 05 Nos.

ANNEXURE-IV

4. ENGINEERING CHEMISTRY LAB EQUIPMENT

S. No.	Name of the Equipment	Equipment Specification	Qty.
1	Redwood Viscometer No.01	Redwood Viscometer No.01 Material-Mild Steel Automation Type: Automatic Power Source: Electric Voltage :230V	01 Nos.
2	Redwood Viscometer No.02	Redwood Viscometer No.02 Phase: Single Phase Frequency: 40/50 Hz Power Source: Electric Voltage :230V-240V	01 Nos.
3	Bomb Calorimeter	Bomb Calorimeter Single Phase Stainless Steel Bomb Calorimeter(BABIR-BCTA01) Material- Stainless Steel Phase: Single Phase Voltage :220V-230V	01 Nos.
3	Digital Balance	Digital Balance Single-cell advanced technology: Fully automatic -Stable temperature behaviour Short stabilisation time: Steady weight values within approx. 5 sec under laboratory conditions Shock proof construction High corner load performance Weighing pan, stainless steel: 80mm dia. Weighing chamber (W x D x H): 168 x 172 x 223mm Dimensions (W x D x H): 217 x 356 x 338mm Mains adapter: 220V	02 Nos.
4	Flash Point And Fire Point Pensky Martens Closed Cup Apparatus	Flash Point And Fire Point Pensky Martens Closed Cup Apparatus Material- Stainless Steel Frequency: 40/50 Hz Automation Type: Automatic Voltage :220/230V	01 Nos.
5	Flash Point And Fire Point Able's Closed Cup Apparatus	Flash Point And Fire Point Able's Closed Cup Apparatus Voltage :220V Repeatability:0.5% Resolution:0.1degC Relative Humidity: Less than 85%RH	01 Nos.

6	Flash Point And Fire Point Cleveland (Open Cup)Apparatus	Flash Point And Fire Point Cleveland (Open Cup) Apparatus Specifications: Cleveland open cup flash point. ASTM D 92 (Automatic and manual) Temp. Range Ambient: 370°C Temp. measurement PT 100 Temperature sensor Temperature scale resolution 0.1 °C	01 Nos.
7	PH Meter	PH Meter Type: Table Top, Digital Display Type: 16 x 2 alpha numeric LCD display pH Range:0 to 14 pH Resolution:0.01Ph Storage: up to 100 samples Power Supply:230V,50Hz	01 Nos.
8	Conductivity Meter	Conductivity Meter Automatic Calibration: The Meter Is Capable Of Calibrating Up To 5 Points Using Standard Solution. Conductivity Auto-Ranging: WCM Series Have Auto-Range Function For Measuring Conductivity. Automatic Temperature Compensation: Using The Supplied Temperature Probe, The Temperature Value Is Displayed On The Screen. The Meter Automatically Compensates For Optimum Accuracy Under Variable Temperature Conditions Adjustable Temperature Coefficient And Cell Constant: Various Ions May Have Different Temperature Coefficients. The Meters Can Set The Temperature Coefficient Between 0 And 3.9% In Degrees Centigrade For Optimum Accuracy, Set Three Cell Constants(0.1,1 And 10) For Measuring Requirements	02 Nos.
10	Electric Heating Arrangement-Rectangular Muffle Furnace	Electric Heating Arrangement-Rectangular Muffle Furnace Material Loading Capacity-100Kg Power Source: Electric Voltage:220-550V Max Operating Temperature:1000-1500 Degree C Size:14*14 Inch	01 Nos.
11	Cloud and Pour point apparatus	Cloud and Pour point apparatus As per IP 15 & 219 ASTM-D 2500& IS 1448 (P-10) refrigerated unit with three/four of 0 dg C, -17dgC, -34 dg C &-51dgC with PID controller. Provided with double test app, with SS Insulated body with dry ice.	01 Nos.
12	Glass wares	Glass wares	01 Nos.

ANNEXURE-V

5. ENGINEERING CIVIL LAB EQUIPMENT

S. No.	Name of the Practical	Name of Equipment with Specification	Qty.
1	Linear Measurement by Tape: a) Ranging and Fixing of Survey Station along straight line and across obstacles. b) Laying perpendicular offset along the survey line	Measuring Tape Tape consists of 12 to 15 mm wide Low High Accuracy 5mm + 10ppm 1mm + 1ppm Range 1 km 5 km Cost \$10,000 \$40,000 Data Storage none 7500 pts. Magnification 10X 30X Run-time 3 hrs. 6 hrs. . strip of either Yarn coating or linen or cloth / or plastic coating. having very fine brass or copper or bronze wires. Woven into it to prevent it from elongation and twisting Graduated in metric system. Each meter length is divided into decimeter and centimeters. It is available in various length. 30 meter length is in common use. The tape is available in a leather / suitable cover with a winding device. The Zero end of the tape is provided with a metal ring. 10 meters, 15 meters, 20 meters, 30 meters, 50 meters,	05 Nos.
2		Ranging Rod Circular / Octagonal Ranging Rods preferably circular with 3 to 5 cm diameter made up of either seasoned solid bamboo stick or metal conduit pipe of length 2 to 3 meters, with conical metallic shoe fitted at bottom & fully painted with 20 cm. long colour bands of either of the following combinations. Salient Features a) Black & White - size 2 meters b) Red & White - size 3 meters	22 Nos.
3		Cross Staff Open Cross Staff: made up to a metallic head having four metal arms provided with two pairs of verticals lid giving two lines of sight at right angle made up of either gun metal / brass or any alloy that cannot rust. The base is provided with hollow conical socket at the centre that can be Mounted on the top of wooden staff. (fitted with a pointed iron shoe at the bottom) Cross Staff Head(export quality) Open type having four vanes at right angles with pole having strong iron shoe at the bottom supplied in wooden box. Aluminum size 100 mm size 150 mm Brass size 100 mm size 150 mm	04 Nos.

4	<p>Linear Measurement by Tape:</p> <p>a) Ranging and Fixing of Survey Station along straight line and across obstacles.</p> <p>b) Laying perpendicular offset along the survey line</p>	<p>Measuring Chain Measuring Chain consisting of a fixed number of straight links of galvanized mild steel wire 4mm in diameter. The end of each link are bent into a loop and connected together by means of three circular shape rings. The joints of the rings made be open or welded preferably welded. The ends of the chain are provided with brass handles. The handle is linked with a swivel joint to the chain. The length of each linked is 200 mm. each meter is provided with circular brass ring & each five meter length is provided wit brass talltes of requisite shapes each chain should be provided with 10 nos of M.S. Arrows of 4 mm diameter bar and 40 cm. Height Refer : IS 1492-1970 05 meter chain, 10 meter chain, 20 meter chain, 30 meter chain,</p>	Each 02 Nos.																					
5	Compass Survey: Measurement of bearing of lines using Surveyor's and Prismatic compass	<p>Prismatic Compass With Tripod Stand Consists of a brass or aluminum circular box with a diameter of 100/125 millimeter. Aluminum circle consists of a needle graduated to 30 min. (0. 50) Graduations can be magnified by sliding the prism fitted with colored glasses having a sighting slit at the top.</p>	04 Set.																					
6	<p>Leveling: Using Tilting/ Dumpy/ Automatic Level</p> <p>a) To determine the reduced levels in closed circuit.</p> <p>b) To carry out profile leveling and plot longitudinal and cross sections for road by Height of Instrument and Rise & Fall Method.</p>	<p>Dumpy Level With Tripod Stand Magnification 24x Length Of Telescope 300 mm Objective Aperture 40 mm Stadia Radio 02:40:00 AM Field Of View 1° 30' Resolution 0.01 cm at 100 mt Plate Bubble Size: 12mm X 87.5 mm Sensitivity 45°/2 mm Circle Dia Meter 75 mm(magnetic) Circle Graduation 1 div=1°</p>	04 Set.																					
7		<p>Leveling Staff (04mtr.) Made of Aluminium body Telescopic in 3 PCS, 4 meter in length packed in canvas cover, graduated in meters, dm, cm, and mm with background and black strips. 5 mm thick with suitable locking arrangement Made of Aluminium body / Metallic Body folding in 2 PCS, 4 meter in length graduated in meters, dm, cm and mm. with white background and black strips. 5mm thick with suitable folding & locking arrangement. Improved soap with pattern is made of best quality well seasoned teak wood, Telescopic in three pieces, brass fitting and glued, thus greatly increasing its strength, stability and durability, Accurately machine divided and engraved to read 5 mm. painted and polished. Size 4 meters. Long Size 5 meters. Long Size 6 meters.</p>	04 Nos.																					
8	To study and take measurements using various electronic surveying instruments like EDM, Total Station etc.	<table border="1"> <thead> <tr> <th colspan="3">EDM-Electronic Distance Measurement Meter</th> </tr> <tr> <th></th> <th>Low</th> <th>High</th> </tr> </thead> <tbody> <tr> <td>Accuracy</td> <td>5 mm + 10 ppm</td> <td>1 mm + 1 ppm</td> </tr> <tr> <td>Range</td> <td>1 km</td> <td>5 km</td> </tr> <tr> <td>Data Storage</td> <td>none</td> <td>7500 pts.</td> </tr> <tr> <td>Magnification</td> <td>10X</td> <td>30X</td> </tr> <tr> <td>Run-time</td> <td>3 hrs.</td> <td>6 hrs.</td> </tr> </tbody> </table>	EDM-Electronic Distance Measurement Meter				Low	High	Accuracy	5 mm + 10 ppm	1 mm + 1 ppm	Range	1 km	5 km	Data Storage	none	7500 pts.	Magnification	10X	30X	Run-time	3 hrs.	6 hrs.	02 Nos.
EDM-Electronic Distance Measurement Meter																								
	Low	High																						
Accuracy	5 mm + 10 ppm	1 mm + 1 ppm																						
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Run-time	3 hrs.	6 hrs.																						

9	To study and take measurements using various electronic surveying instruments like EDM, Total Station etc.	<p>Total Station With Accessories Specifications of Total Station: Telescope Magnification – 30x, Shortest distance – 1. 7m Distance Measurement Laser class – class I – prism Class 3 r / reflector less Reflector less - 150 m (white 7odak) Range – 3 kms – (B)Concrete Lab – S. No. Items Quantity Specification 1. CTM 100 Ton Hand Operated cum electrical operated 01 Force Accuracy: +/-1% Test Force Range (KN): 40~1000 Loading speed (KN/S): 1~10 Pressure plate size(mm): 220 External Dimension(mm): 910*580*1800 2. Compaction Factor Apparatus for concrete testing 02 It consists of two rigid conical hoppers and a cylinder mounted on a rigid metal frame. The lower openings of the hoppers are fitted with hinged trap-doors having quick release catches. A circular metal plate is provided to cover single prism. Accuracy – 2 mm+2 ppm (prism) 3 mm+3 ppm (reflector less) Measuring time: 1. 2 sec, Accuracy :1 mm</p> <p>Angle Measurement : Accuracy: 2", 3", 5" Compensator : Dual axis compensator Optical plummet : Magnification : erect Laser plummet : Laser spot: adjustable laser class: class 2 Display : Dual lcd display, 8 lines x 24 character, circular level Battery : Ni-mh battery Memory : Internal memory- 16000 pts Programs : Nez, stakeout, resection, rem/ m/m/ area/ resection/ setting out etc.</p>	01 No.																											
10		Tripod Stand for Total Station	01 No.																											
11		Prism with stand	04 Nos.																											
12	To determine pH, hardness and turbidity of the given sample of water.	<p>Ph Meter</p> <table border="1" data-bbox="599 1304 1391 1934"> <tr> <td>Instrument Type</td> <td>Deluxe pH Meter MODEL # 151-R</td> <td>Digital pH Meter MODEL # 152 - R</td> </tr> <tr> <td>Measurement</td> <td>PH & ORP</td> <td>PH & ORP</td> </tr> <tr> <td>Display</td> <td>3 1/2 Digit LED</td> <td>3 1/2 Digit LED</td> </tr> <tr> <td>Range Resolution</td> <td>0 -14.00 pH 0 ± 1999 mv, 0.01 pH, 1mV</td> <td>0 -14.00 pH 0 + 1999 0.01 pH, 1mV</td> </tr> <tr> <td>Accuracy</td> <td>+ 0.01 pH, + 1mV</td> <td>±0.01 pH, ±1mV</td> </tr> <tr> <td>Temperature Compensation</td> <td>Auto + Manual 0 to 100°C</td> <td>Manual 0 to 100°C</td> </tr> <tr> <td>Slope Control</td> <td>80 to 120%</td> <td>80 to 120%</td> </tr> <tr> <td>Recorder Output</td> <td>0 to 10mV/pH Adjustable</td> <td>0 to 10mV/pH Adjustable</td> </tr> <tr> <td>Power Requirement</td> <td>220 VAC +10% 50 Hz</td> <td>220 VAC ±10% 50 Hz</td> </tr> </table>	Instrument Type	Deluxe pH Meter MODEL # 151-R	Digital pH Meter MODEL # 152 - R	Measurement	PH & ORP	PH & ORP	Display	3 1/2 Digit LED	3 1/2 Digit LED	Range Resolution	0 -14.00 pH 0 ± 1999 mv, 0.01 pH, 1mV	0 -14.00 pH 0 + 1999 0.01 pH, 1mV	Accuracy	+ 0.01 pH, + 1mV	±0.01 pH, ±1mV	Temperature Compensation	Auto + Manual 0 to 100°C	Manual 0 to 100°C	Slope Control	80 to 120%	80 to 120%	Recorder Output	0 to 10mV/pH Adjustable	0 to 10mV/pH Adjustable	Power Requirement	220 VAC +10% 50 Hz	220 VAC ±10% 50 Hz	02 Nos.
Instrument Type	Deluxe pH Meter MODEL # 151-R	Digital pH Meter MODEL # 152 - R																												
Measurement	PH & ORP	PH & ORP																												
Display	3 1/2 Digit LED	3 1/2 Digit LED																												
Range Resolution	0 -14.00 pH 0 ± 1999 mv, 0.01 pH, 1mV	0 -14.00 pH 0 + 1999 0.01 pH, 1mV																												
Accuracy	+ 0.01 pH, + 1mV	±0.01 pH, ±1mV																												
Temperature Compensation	Auto + Manual 0 to 100°C	Manual 0 to 100°C																												
Slope Control	80 to 120%	80 to 120%																												
Recorder Output	0 to 10mV/pH Adjustable	0 to 10mV/pH Adjustable																												
Power Requirement	220 VAC +10% 50 Hz	220 VAC ±10% 50 Hz																												

13	To determine pH, hardness and turbidity of the given sample of water.	Beaker 200 ml, 500 ml, 1000 ml	Each 02 Nos.																														
14	To determine pH, hardness and turbidity of the given sample of water.	Turbidity Meter Range: 0 - 10,000 NTU Principle of Operation: Nephelometric Ratio (Color Correction): Full Time ON or OFF Accuracy: $\pm 2\%$ of reading plus 0.01 NTU (0 to 1000 NTU) $\pm 5\%$ of reading (1000 to 4000 NTU) $\pm 10\%$ of reading (4000 to 10,000 NTU) Resolution: 0.0001 NTU on Lowest Range Response Time: less than 6 seconds Sample Size: 30 ml Light Source: Quick connect Infrared Operating Temperature: 0° - 50°C Air Purge: Connection for external dry air supply Outputs: RS-232 Serial Port	01 Nos.																														
15		Buffer Tablet Buffer capsules pH 7.0 Buffer capsules pH 4.0 Buffer capsules pH 9.2	Each 01 No.																														
16		To determine the pH and total solids of the given sample of sewage.	Hot Air Oven <table border="1"> <tr> <td>Temperature Range</td> <td>5°C above ambient to 250°C Maxi.</td> </tr> <tr> <td>Temperature Accuracy</td> <td>+ / - 2°C</td> </tr> <tr> <td>Temperature Uniformity</td> <td>+ / - 1°C</td> </tr> <tr> <td>Controls</td> <td>PID Controller</td> </tr> <tr> <td>Temp Display</td> <td>LED Display</td> </tr> <tr> <td>Sensor</td> <td>PT-100</td> </tr> <tr> <td>Heating Element</td> <td>Nichrome wire / Kanthal A1</td> </tr> <tr> <td>Safety device</td> <td>Over temperature protection Electric leakage breaker Temperature safety as per DIN 12880 Class 3.1</td> </tr> <tr> <td>Exterior Chamber</td> <td>MS powder coated</td> </tr> <tr> <td>Interior Chamber</td> <td>304 stainless steel</td> </tr> <tr> <td>Insulation</td> <td>Mineral Wool</td> </tr> <tr> <td>Doors</td> <td>Solid doors w/ silicone rubber gasket & lock</td> </tr> <tr> <td>Shelves</td> <td>2-3 Stainless steel shelves (Removable)</td> </tr> <tr> <td>Air Circulation</td> <td>Forced air circulation</td> </tr> <tr> <td>Power Supply</td> <td>220 Volts</td> </tr> </table>	Temperature Range	5°C above ambient to 250°C Maxi.	Temperature Accuracy	+ / - 2°C	Temperature Uniformity	+ / - 1°C	Controls	PID Controller	Temp Display	LED Display	Sensor	PT-100	Heating Element	Nichrome wire / Kanthal A1	Safety device	Over temperature protection Electric leakage breaker Temperature safety as per DIN 12880 Class 3.1	Exterior Chamber	MS powder coated	Interior Chamber	304 stainless steel	Insulation	Mineral Wool	Doors	Solid doors w/ silicone rubber gasket & lock	Shelves	2-3 Stainless steel shelves (Removable)	Air Circulation	Forced air circulation	Power Supply	220 Volts
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Power Supply	220 Volts																																
17	To determine the pH and total solids of the given sample of sewage.	Weighing Balance	02 Nos.																														

18		Plane Table Surveying & Accessories			04 Nos.	
		Plane Table Board	600X750X 16 mm	600 X 750 X 22 mm		
		Plane Table Stand	Wooden	Teak Wood		Aluminum
		Plane Table Head	Ordinary	Quality Size		ISI Specification
		Magnetic Compass	150 mm Aluminium	150 mm Brass		
		Spirit Level	150 mm Aluminium	150 mm Quality Size		150 mm Brass
		Alidade/Sight Vane	Brass	Quality Size		ISI Specification
		Plumbing Fork	Aluminium	Brass		
		Plumb Bob	Steel	Quality Size		Brass
		Canvas Cover	Half	Full		
		Plane Table Board	600X750X 16 mm	600 X 750 X 22 mm		
		Plane Table Stand	Wooden	Teak Wood		Aluminum
		Plane Table Head	Ordinary	Quality Size		ISI Specification
		Magnetic Compass	150 mm Aluminium	150 mm Brass		
		Spirit Level	150 mm Aluminum	150 mm Quality Size		150 mm Brass
19		Alidade for plane table surveying			04 Nos.	
20		Plumb Bob Sizes : 200 gms. 250 gms. 300 gms. in brass plated & chrome plated finish, Corrosion resistance, Perfect finish			04 Nos.	
21		Plumbing Fork Sizes : 200 gms. 250 gms. 300 gms. in brass plated & chrome plated finish, Corrosion resistance, Perfect finish			04 Nos.	
22		Spirit Level (i) Base length : 200 mm + 1 mm (ii) Base width : 20 mm + 0 – 1 (iii) Height : 25 + 1 mm (iv) Bubble opening : 50 mm x 8 mm (length x width) (v) Sensitivity: 2 Min. 30Sec per 2 mm arc divisionof the vial (vi) Least count of graduation : 2 mm (vii) Weight (Without : 150 gms (approx). packing box) (viii) Effective length of bubble : 20 + 1 mm			04 Nos.	
23	To study various water Supply Fittings & Sanitary Fittings.	Joint of elbow, Reducer, Nipple, Tee, End Cap			Each 10 Nos.	
24		Arrow & Peg			02 Nos.	

ANNEXURE-VI

CERTIFICATION OF VERIFICATION BY THE CHARTERED ACCOUNTANT

This is to certify that the total annual turnover-overall from business furnished by M/s. for the last three years i.e. 2012-13, 2013-14 & 2014-15 is as detailed below and as furnished in the enclosed statement of accounts, is verified by us and found correct.

S. No.	Financial Year	Annual Turnover (in Lakhs)
1	2016-2017	
2	2017-2018	
3	2018-2019	

CHARTERED ACCOUNTANT
SIGNATURE WITH SEAL

MY MEMBERSHIP NO. _____

ADDRESS