



तेजपुर विश्वविद्यालय / TEZPUR UNIVERSITY  
(केंद्रीय विश्वविद्यालय / A Central University)  
कुल सचिव का कार्यालय / OFFICE OF THE REGISTRAR  
तेजपुर-784028 :: असम / TEZPUR-784028 :: ASSAM

**NOTICE INVITING QUOTATION (NIQ)**

**ET-NIQ-.....4580.....DT-.....01/01/2020.....**

Online Tenders in 02 Bid System (Technical and Financial) are invited from reputed manufacturers/authorized dealers for supply, installation & commissioning etc. of the following items required for Department of Physics, Tezpur University.

Please read the NIQ document carefully before participating. It shall be deemed that submission of bid by the bidder has been done after their careful study and examination of the NIQ terms with full understanding to its implications. Any lack of information shall not in any way relieve the bidder of its responsibility to fulfill its obligations under the Bid.

The University will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for, or in executing, the Purchase Order. Fraudulent Practice means a misrepresentation of facts in order to influence a procurement process and includes collusive practice among bidders (prior to or after Bid submission) designed to establish Bid prices at artificial non-competitive levels and to deprive Tezpur University of the benefits of free and fair competition. Corrupt Practice means offering, giving, receiving or soliciting of anything of value, pressurizing to influence the action of a public official in the process of this purchase execution.

For any queries/doubt please contact the Stores & Purchase Section (e-mail: snp@tezu.ernet.in).

**Items:**

| Sl. No | Item   | Approx Quantity | Approximate Value in ₹ |
|--------|--|-----------------|------------------------|
| 1      | Magnetic Field measurement apparatus   | 1               | 750000.00              |
| 2      | Study of hybrid parameter of transistor  | 1               |                        |
| 3      | Poiseuilles Viscosity Apparatus.   | 1               |                        |
| 4      | Searl's Apparatus for Thermal conductivity measurement of Copper.                    | 1               |                        |
| 5      | Capacitance and Permittivity Kit   | 1               |                        |
| 6      | Study of transistor amplifier (RC coupled) cum feedback amplifier                    | 1               |                        |
| 7      | Curie temperature Kit for Ferrites   | 1               |                        |
| 8      | Temperature Coefficient Apparatus  | 1               |                        |
| 9      | Thermo Electric Effect Apparatus   | 1               |                        |
| 10     | Two probe methods for resistivity measurement of Insulators at different temperature | 1               |                        |
| 11     | Study of astable and monostable multivibrators using timer IC                        | 1               |                        |

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|    |  |   |
|----|--|---|
| 12 | Ultrasonic interferometer for Liquids and Solids (Single Freq.)      | 1 |
| 13 | Lattice Dynamic Kit with Frequency Meter                             | 1 |
| 14 | Measurement of Premittivity of Air                                   | 1 |
| 15 | Study of modulation and demodulation with built in carrier frequency | 1 |
| 16 | Dielectric constants of solids and liquids                           | 1 |
| 17 | Ionization potential setup   | 1 |
| 18 | Fermi Energy Apparatus   | 1 |
| 19 | Fourier Analysis Kit   | 1 |
| 20 | X-Ray Detraction simulation experiments                              | 1 |
| 21 | NMR Experiment   | 1 |
| 22 | Measurement of susceptibility of solids by Goui's method             | 1 |
| 23 | Digital D.C. Microvoltmeter, (Make: SES, Model : DMV-001)            | 1 |
| 24 | Digital Nanoammeter, (Make : SES, Model : DNM-121)                   | 1 |
| 25 | Digital Picoammeter,(Make: SES, Model : DPM-111)                     | 1 |

**(Detail Technical Specification/Compliance Sheet and BoQ are attached/uploaded separately)**

**General Information about the NIQ**

**Last date and time for submission of Bids: 20.01.2020 (2.00 PM)**

**Date and Time of opening of Bids: 22.01.2020 (4.00 PM)**

**Place of Opening of Bids: Tezpur University**

**GENERAL TERMS & CONDITIONS:**

1. No separate tender paper will be issued from the office; one should only download the specifications from the CPP Portal of Govt. of India or the Tezpur University website ([www.tezu.ernet.in](http://www.tezu.ernet.in)).
2. **GST: As per GoI Notification dated 14.11.2017 GST % for Public Funded Research Institution or a University has been reduced to 5% for certain goods and services. Hence, reduced rate of GST shall be paid if applicable on the tendered items. Exemption Certificate will be provided on request.**
3. **Rates: Rates quoted should be on FOR Tezpur University, Napam, Tezpur, Door Delivery Basis, for indigenous items and CIP Tezpur University, Napam, Tezpur or Delivered Duty Paid, for imported item. Failure to comply with this term may lead to rejection of the quotation.**
4. **Quotations should be accompanied by i) An EMD (in the form of Demand Draft/Banker Cheque) for ₹ 15,000.00 (Rupees Fifteen Thousand) only drawn in favor of Registrar, Tezpur University, payable at Tezpur. No request for consideration of earlier deposited EMD will be considered. ii) A non-refundable application (quotation/participation) fee of ₹ 1000.00 (Rupees Three Thousand)**

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only must be paid only by Demand Draft/Banker Cheque drawn in favour of Registrar, Tezpur University payable at Tezpur. iii) **The original copies of the EMD & Quotation/Participation Fee should be deposited/submitted/reach the office of the undersigned before opening of the Bids in an envelope superscribed as "Quotation/Participation Fee and EMD for ET-NIQ-4580 DT-01/01/2020" addressed to the Assistant Registrar-GA, Tezpur University. Failure to do so may result in rejection of the bid.**

5. **Exemption:** To Bidders who are MSME/NSIC registered may claim exemption from payment of EMD only subject to submission of valid documents in support of their claim. Bidders seeking exemption are asked to clearly mention the category under which exemption is claimed. The category of exemption under MSME/NSIC will be strictly adhered to. **Payment of tender fee is a must and is not exempted. However, the University will make provisions for the tender documents free of cost in its website as well as in CPP Portal.**
6. The rates should be exclusive of taxes and applicable tax % should be clearly indicated.
7. **Validity of Quotation:** Quoted rates must be valid for at least **180 days** from the last date of submission of quotation.
8. Applicable levies, surcharge and discounts should be clearly indicated item wise.
9. The rates should be quoted along with supporting documents of specifications and technical features and list of users, wherever applicable.
10. The system must be installed at the laboratory wherever applicable, and after installation a basic training must also be provided by the supplier or their Indian counterpart without any additional costs.
11. **Literature a must:** All the quotations must be supported by technical leaflet/literature and the specifications mentioned in the quotation must be reflected/ supported by such technical leaflet/ literature. The model and specifications quoted should **invariably be highlighted** in the leaflet/literature for easy reference.
12. **Technical Evaluation:** The bidder should provide the standard technical literature on the subject offered with dealership certificate of the offered product(s). The offers which do not meet the NIQ required technical specifications will be summarily rejected, from any further consideration. The bidder has to provide the details Bill of Materials (BOM). Technical bids will be evaluated and ranked by the award ACCEPT & REJECT. The price bids of ACCEPTED vendors would then be considered by the concerned Purchase Committee of the institute.
13. **After Sales Service Guidelines:** In case of imported goods, bidders should clearly state the detailed address, contact number and email ids of 'after sales service centre' preferably in Tezpur/Guwahati, India or any place in Assam without which their offers shall be liable for rejection. Service against any complaint must be provided within 24 hours
14. **Dealership Certificate:** Dealers or Agents quoting on behalf of Manufacturer must upload valid dealership certificate.
15. **Quality Certificates:** Valid certificate to prove that the products are genuine and of International standard, as mentioned below, must be uploaded: (a) Manufacturer's certificate; (b) ISO/ISI certificate.
16. **Performance Bank Guarantee:** If PO value is above Rs.5 Lakhs, the successful bidder, to whom the PO is placed, shall furnish an unconditional Performance Bank Guarantee from a scheduled Bank of India, for 10% of the Purchase Order value, alongwith the Bill/Invoice. The format for PBG if required; will be provided on request. In case of foreign purchase, the local Agent shall submit the PBG. Where the PBG is to be necessarily given by a foreign bank it shall be endorsed by its

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- counterpart in India. Validity of the PBG, which shall be effective from the date mentioned therein, shall be *warranty period + 2 months before and 3 months after the warranty period.*
- a. **By submitting the PBG, the vendor is understood to have guaranteed that,**
- The Purchase Order (PO) shall be executed as per terms and conditions mentioned therein.
  - The vendor shall at his/their own cost rectify/replace the defects, if any, during the guarantee period.
  - The guarantee is to the extent of 10% of the order value.
- b. **Condition for invoking PBG:** In case of failure to comply with the guarantees above, Tezpur University, Napam, Tezpur may terminate the contract / purchase order in whole or in part and forfeit the PBG. In addition, Tezpur University, Napam, Tezpur, at its discretion, procure upon such terms and in such manner as it deems appropriate, goods similar to the undelivered items/products and the defaulting supplier/vendor shall be liable to compensate Tezpur University, Napam, Tezpur for any extra expenditure involved.”
17. **Genuine Pricing:** Vendor is to ensure that quoted price is not more than the price offered to any other customer in India to whom this particular item has been sold, particularly to Universities/IITs/Institutes and other Government Organization.
18. **Payment:** 100% payment after successful delivery, installation and commissioning and acceptance by the user. **Please note that as per University's norm advance payment is not allowed for indigenous purchase.**
19. **PENALTY FOR DELAYED DELIVERY:** The date of delivery should be strictly adhered to. In the event of delayed delivery, installation & commissioning, the vendor shall be liable for a penalty deduction as per prevailing rule
20. Demonstration may be sought from the vendors for authentication of quoted specification.
21. The University is exempted from paying Custom and Excise duty.
22. Warranty/Guarantee period should be specifically mentioned in the quotation.
23. No Advance payment will be made. However, for foreign supplies, advance payment will be made either by LoC. In such cases 10% Performance Bank Guarantee should be submitted before opening of the LoC.
24. Items of Foreign origin should have Insurance up to installation on site.
25. The University reserves the right to accept or reject any or all the quotations without assigning any reason.
26. Irresponsive/incomplete quote will be rejected.
27. **Award:** The Final Award will be given to the vendor, selected by the Purchase Committee on the lowest quote basis.
28. **Conditional tenders not acceptable:** All the terms and conditions mentioned herein must be strictly adhered to by all the vendors. Conditional tenders shall not be accepted on any ground and shall be rejected straightway. Printed conditions mentioned in the tender bids submitted by vendors will not be binding on Tezpur University.
29. **Enquiry during the course of evaluation not allowed:** No enquiry shall be made by the bidder(s) during the course of evaluation of the tender till final decision is conveyed to the successful bidder(s). However, the Purchase Committee or its authorized representative (Tezpur University) can make any enquiry/seek clarification from the bidders. In such a situation, the agency shall extend full co-operation. The bidders may also be asked to arrange demonstration of the offered items, in a short period notice, as such the bidders have to be ready for the same.
30. **Force Majeure:**

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01/09/2020



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If the performance of the obligation of either party is rendered commercially impossible by any of the events hereafter mentioned that party shall be under no obligation to perform the agreement under order after giving notice of 15 days from the date of such an event in writing to the other party, and the events referred to are as follows:

- I) any law, statute or ordinance, order action or regulations of the Government of India,
- II) Any kind of natural disaster, and
- III) Strikes acts of the Public enemy, war, insurrections, riots, lockouts, sabotage.

**Termination for default:** Default is said to have occurred

- a. If the equipment or any of its component is found having poor workmanship, faulty designs, poor performance and bad quality of materials used.
- b. If the supplier fails to deliver any or all of the services within the time period(s) specified in the purchase order or any extension thereof granted by Tezpur University.
- c. If the supplier fails to perform any other obligation(s) under the contract.
- d. Under the above circumstances Tezpur University may terminate the contract / purchase order in whole or in part and forfeit the EMD/PBG as applicable. In addition to above, Tezpur University may at its discretion also take the following actions: Tezpur University may procure, upon such terms and in such manner, as it deems appropriate, goods similar to the undelivered items/products and the defaulting supplier shall be liable to compensate Tezpur University for any extra expenditure involved towards goods and services obtained. Besides, the Vice-Chancellor, Tezpur University, reserves the right to impose any other form of penalty as deemed fit including blacklisting of the vendor.

**31. Selection criteria:**

**Evaluation Criteria:**

To ensure that each bidder has the necessary qualifications and resources to fulfil its obligations under the contract, the following criteria shall be evaluated. The Eligibility, Financial, Experience & Support criteria should be passed before the technical criteria. Technical criteria will be evaluated and ranked by the award of ACCEPT and/or REJECT. Only the ACCEPTED vendors will be considered for price bid. In case a joint venture makes a bid, any one of the members of the joint venture need to be qualified for each of the criteria mentioned below.

**Eligibility Criteria:**

- a. All technical specifications of the quoted product(s) should be verifiable through the official website of the OEM and the data sheet available on the web site on the day of the Purchase Committee Meeting of the tender will be considered as final and no further clarification will be cited in this regard. The URL links to the respective documentation should be provided.
- b. Tender specific MAF (Manufacturing Authorization Form) is to be submitted by all interested Vendors, Dealership certificate/ authorization certificate from OEM if the bidder is a dealer.
- c. The bidder or the OEM should not be blacklisted by Tezpur University or any other Educational /R&D/ PSU/ Govt organizations. A certificate or undertaking to this effect must be submitted.

Note: The bidders should provide sufficient documentary evidence to support the eligibility criteria.

**Support Criteria:**

The Bidder must have experience of supply and maintenance facilities and must have qualified support staff and resident engineers that can provide maintenance support for the hardware and software items concerned and all the items quoted must be covered by these facilities. List of spare items should be mentioned in the quotation. Similarly, all partnerships for maintenance

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01/01/2022



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shown as part of the above qualifying criteria must be in existence before the publication of this tender. Documentary proof of this must be provided. The purchaser reserves the right to reject a bid as non-responsive if not satisfied with the level of support as detailed above.

**Manufacturer's Authorization Certificate:**

The OEM should authorize the bidder to participate in the quote. Original copy of the MAF specific to the NIQ has to be submitted along with the tender.

**Technical Criteria**

The bidder should provide the standard technical literature on the subject offered with dealership certificate of the offered product(s). The offers which do not meet the NIQ required technical specifications will be summarily rejected, from any further consideration. The bidder has to provide the details Bill of Materials (BOM). Technical bids will be evaluated and ranked by the award Accepted & Rejected. The price bids of Accepted vendors would then be considered by the concerned Purchase Committee of the institute.

**32. ADDITIONAL TERMS FOR IMPORTED GOODS:**

Following additional terms will be applicable in case of foreign supply:

- a) **Rates:** Rates quoted should be on **DELIVERED DUTY PAID basis**, with break-ups as per details given in the BOQ,
- b) **Exchange rate:** Rate of foreign exchange shall be the rate prevailing on the date of Purchase Committee Meeting.
- c) While transshipment will be allowed, **part shipment will not be allowed.**
- d) **Payment:** By an irrevocable Letter of Credit at CIF/CIP Kolkata value negotiable through any overseas branch of State Bank of India with unrestricted provision. 90% of payment will be released on receipt of the shipping document and balance 10% after receipt of consignment. LoC will be established on receipt of Order acknowledgment, Proforma Invoice and Performance Bank Guarantee (PBG).
- e) **Agency Commission:** The percentage of ex-works value to be paid to Indian agent in equivalent Indian currency as agency commission as applicable if any will have to be clearly stated in the quotation.
- f) **Country of Origin:** While Country of Origin will have to be stated in the Original Invoice for payment through LoC.
- g) **LoC Amendment:** LoC amendment charges due to mistake on the part of the supplier, if any, will have to be borne by the supplier.
- h) Any query related to Technical Specifications, Instruction to Bidders and Terms & Conditions must be made before 7 working days of last date of submission of bids to Stores & Purchase Section, Tezpur University.

33. Applications for release of EMD should be submitted to the Registrar/ Joint Registrar-GA/Assistant Registrar-GA, Tezpur University.

34. Apart from the above terms and conditions the University has the right to include any other terms and conditions as and when felt necessary.

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07/01/2020*



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**INSTRUCTIONS TO BIDDERS FOR ONLINE BID SUBMISSION**

Instructions to the Bidders to submit the bids online through the Central Public Procurement Portal for e Procurement at <http://eprocure.gov.in/eprocure/app>

1. Possession of valid Digital Signature Certificate (DSC) and enrollment/registration of the agencies/bidders on the e-Procurement/e-tender portal is a prerequisite for e-tendering.
2. Bidder should do the enrollment in the e-Procurement site using the "Online Bidder Enrollment" option available on the home page. Portal enrollment is generally free of charge. During enrollment/registration, the bidders should provide the correct/true information including valid email id. All the correspondence shall be made directly with the agency/bidder through email id provided.
3. Bidder need to login to the site through their user ID/ password chosen during enrollment/registration.
4. Then the Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by SIFY/TCS/nCode/eMudra or any Certifying Authority recognized by CCA India on eToken/SmartCard, should be registered.
5. The DSC that is registered only should be used by the bidder and should ensure safety of the same.
6. Agency/Bidder may go through the tenders published on the site and download the required tender documents/schedules for the tenders he/she is interested.
7. After downloading / getting the tender document/schedules, the Bidder should go through them carefully and then submit the documents as asked, otherwise bid will be rejected.
8. If there are any clarifications, this may be obtained online through the tender site, or through the contact details. Bidder should take into account the corrigendum published before submitting the bids online.
9. Bidder then logs in to the site through the secured log in by giving the user id/ password chosen during enrolment/registration and then by giving the password of e-Token/Smartcard to access DSC.
10. Bidder selects the tender which he/she is interested in by using the search option & then moves it to the 'my tenders' folder.
11. From my tender folder, he selects the tender to view all the details indicated.
12. It is construed that the bidder has read all the terms and conditions before submitting their offer. Bidder should go through the tender schedules carefully and upload the documents as asked; otherwise, the bid will be rejected.
13. Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender documents/schedule and generally, they can be in PDF/xls/rar/jpg/dwf formats. If there is more than one document, they can be clubbed together and can be provided in the requested format. Bidders Bid documents may be scanned with 100 dpi with black and white option. It is advisable that each document to be uploaded through online for the tenders should be less than 2 MB. If any document is more than 2MB, it can be reduced through rar and the same can be uploaded, if permitted. However, if the file size is less than 1 MB the transaction uploading time will be very fast.
14. If there are any clarifications, this may be obtained through the site. Bidder should take into account the corrigendum published from time to time before submitting the online bids.
15. The Bidders can update well in advance, the documents such as certificates, annual report details etc., under My Space option and these can be selected as per tender requirements and then send along with bid documents during bid submission. This will facilitate the bid submission process faster by reducing upload time of bids.
16. Bidder should submit the Tender Fee/EMD as specified in the tender. The original should be posted/couriered/given in person to the Tender Inviting Authority, within the bid submission due date & time for the tender or as indicated in the tender. Scanned copy of the instrument should be uploaded as part of the offer.
17. While submitting the bids online, the bidder reads the terms & conditions and accepts the same to proceed further to submit the bid packets.
18. The bidder has to select the payment option as offline to pay the Tender Fee/EMD as applicable and enter details of the instruments.
19. The details of the DD/ any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise submitted bid will not be acceptable or liable for rejection.

*Y. J. M.*  
01/01/2020



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20. The bidder has to digitally sign and upload the required bid documents one by one as indicated. Bidders to note that the very act of using DSC for downloading the bids and uploading their offers shall be deemed to be a confirmation they have read all sections and pages of the bid document including General conditions of contract without any exception and have understood the entire document and are clear about the requirements of the tender requirements.
21. The bidder has to upload the relevant files required as indicated in the cover content. In case of any irrelevant files, the bid will be rejected.
22. If the price bid format is provided in a spread sheet file like BoQ\_xxxx.xls, the rates offered should be entered in the allotted space only and uploaded after filling the relevant columns. The Price-bid BOQ template must not be modified/replaced by the bidder; else the bid submitted is liable to be rejected for this tender.
23. The bidders are requested to submit the bids through online e-tendering system to the Tender Inviting Authority (TIA) well before the bid submission end date & time (as per Server System Clock). The TIA will not be held responsible for any sort of delay or the difficulties faced during the submission of bid online by the bidders at the eleventh hour.
24. After the bid submission (i.e. after Clicking "Freeze Bid Submission" in the portal), the acknowledgement number, given by the system should be printed by the bidder and kept as a record of evidence for online submission of bid for the particular tender and will also act as an entry pass to participate in the bid opening date.
25. The time settings fixed in the server side & displayed at the top of the tender site, will be valid for all actions of requesting, bid submission, bid opening etc., in the e-tender system. The bidders should follow this time during bid submission.
26. All the data being entered by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered will not be viewable by unauthorized persons during bid submission & not be viewable by any one until the time of bid opening.
27. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid openers' public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.
28. The confidentiality of the bids is maintained since the secured Socket Layer 128-bit encryption technology is used. Data storage encryption of sensitive fields is done.
29. The bidder should logout of the tendering system using the normal logout option available at the top right-hand corner and not by selecting the (X) exit option in the browser.
30. For any queries regarding e-tendering process, the bidders are requested to contact as provided in the tender document. Parallely for any further queries, the bidders are asked to contact over phone: 180030702232 or send a mail over to [cppp-nic@nic.in](mailto:cppp-nic@nic.in).

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*11/01/2020*

Assistant Registrar-GA  
Tezpur University



**Technical Specifications cum Compliance Report**  
**(To be submitted on Company's/Firm's Letterhead Signed and Sealed)**

| Sl. No | Item  | Technical Specifications   | Complied (Yes/No) | Remarks, if any; |
|--------|---|--|-------------------|------------------|
| 1      | MAGNETIC FIELD MEASUREMENT APPARATUS                              | <p>1. Digital gauss meter:</p> <p>i. Ranging: 0- 200</p> <p>ii. Resolution: 0.1 Gauss</p> <p>iii. Display: 3½ digit 7 segment LED with autopolarity</p> <p>iv. Accuracy: 0.5%</p> <p>2. Two Coils</p> <p>i. Diameter: 200mm</p> <p>ii. Number of turn: 1000</p> <p>The 2 coils are mounted on platform one coil is fixed and other coil move smoothly on a rail along with the axis of the coils</p> <p>3. Constant Current Power Supply:</p> <p>Current range 0-0.5A smoothly adjustable</p> <p>i. Display: 3½ digits 7 Segment LED Display</p> <p>ii. Line Regulator: 0.2%for 10% mains variation.</p> <p>iii. Load Regulator: 0.2 % for 0 to full load.</p> <p>iv. Protection: Against overload/ short current.</p> |                   |                  |
| 2      | STUDY OF HYBRID PARAMETER OF TRANSISTOR                           | In built kit with inbuilt power supply and the external circuit diagram on the front panel.  |                   |                  |
| 3      | POISEUILLE'S VISCOSITY APPARATUS.                                 | A capillary tube of fine bore is fitted on a wooden board with two ends are joined by a rubber tubing with manometer with scale. Complete with minimum three limbed constant level tank of brass with rubber tube connection steady flow of water.   |                   |                  |
| 4      | SEARL'S APPARATUS FOR THERMAL CONDUCTIVITY MEASUREMENT OF COPPER. | Should have a copper rod of length: 30cm and diameter : 2. 5 cm with its one end surrounded with a steam jacket for heating it from a boiler and the other end is kept cool by a steam of water flowing throughout a spiral tube fitted on that end fitted in a well-polished board with thermometer and boiler.   |                   |                  |

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|---|---|--|--|--|
| 5 | CAPACITANCE AND PERMITTIVITY KIT                                  | In built DC micro ammeter having ranges 0-100 $\mu$ A.<br>ON-OFF switch and cable connectors   |  |  |
| 6 | STUDY OF TRANSISTOR AMPLIFIER (RC COUPLED) CUM FEEDBACK AMPLIFIER | The board must consist of the following built in parts:<br>01.-12V D.C. IC regulated Power Supply internally connected.<br>02.Two PNP transistors.<br>03. Adequate no. of other electronic components.<br>04. Mains ON/OFF switch, Fuse and Jewel light.<br>* The unit is operative on 230V $\pm$ 10% at 50Hz A.C. Mains.<br>* Adequate no. of patch cords stackable from rear both ends 4mm spring loaded plug length $\frac{1}{2}$ metre.<br>* Good Quality, reliable terminal/sockets for connections.<br>* Operating Instructions.   |  |  |
| 7 | Curie temperature Kit (For Ferrites)                              | Setup should consists of Main Unit having<br>(1) Electronic circuitry with specially designed integrator<br>(2) 4mm connector to connect Primary and Secondary windings of sample to main unit.<br>(3) Provision to vary "H" by selecting Resistance (5 $\Omega$ / 15 $\Omega$ /50 $\Omega$ )<br>(4) Ferrite Sample with 3.5 mm connector and silver plated twisted wire coated with teflon.<br>(5) No of turns in primary : 200<br>(6) No of turns in secondary : 400<br>(7) Hot Air Oven (upto 200 $^{\circ}$ C) with Digital Temp Indicator.<br>(8) Thermocouple (PT-100 type , Grade A) with 4" long SS sheath.<br>(9) Silicon Oil with glass container. |  |  |
| 8 | Temperature Coefficient Apparatus                                 | The experimental setup should consists of<br>(1) Main unit for accurate measurement of resistance<br>(2) Copper sample (in wire form).<br>(3) Hot air oven (upto 125 $^{\circ}$ C) with Digital  |  |  |

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|    |  | Temperature Indicator & Thermocouple<br>(4) Silicon Oil with glass container.  |  |  |
| 9  | Thermo Electric Effect Apparatus   | Setup should consists of<br>(1) Main unit to measure the Thermo emf (3 digit 7segment display with polarity indication, LC.0.1mV)<br>(2) Thermoflask (Teflon )<br>(3) Oven with Heating Block & digital temperature indicator (upto 450 °C ) .<br>(4) Fe-Cu bi-junction thermocouple (For inversion and neutral temperature measurement )<br>(5) Al-Cr bi-junction thermocouple<br>(6) Cu-Ko bi- junction thermocouple   |  |  |
| 10 | Two probe methods for resistivity measurement of Insulators at different temperature | (1) Two Probes Arrangement:<br>(a) Max. voltage upto 1500V; current = $10 \times 10^{-12}$ A (max).<br>(b) Thickness of sample should be atleast 1mm and the resistivity of the sample could be measured upto $10^{14}$ ohm.cm.<br><b>(2) PID Controlled Oven</b><br>(a) Temperature Range: Ambient to 200°C<br>(b) Display Accuracy: $\pm 0.3^\circ\text{C}$<br>(c) Setting Type: Front push buttons<br>(d) Control Method: PID, PIDF, PIDS<br>(e) Measurement Accuracy: $\pm 0.5^\circ\text{C}$ (typical)<br>(f) Oven: Specially designed for the Set-Up<br>(g) Sensor: Thermocouple (Chromel Alumel)<br>(h) Display: 7 segment LED, two rows<br>(i) Values: Process Value, PV and Set Value, SV<br><b>(3) Required High Voltage Power Supply with power requirements:</b><br>220V $\pm 10\%$ , 50Hz<br><b>(4) Digital Picoammeter</b> |  |  |
| 11 | Study of astable & monostable multivibrators   | (1) The set-up consists of 555 IC with facilities for convenient connection at the board.  |  |  |

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|    |  | <p>(2) built-in power supply for various types of triggers-variable frequency, variable voltage.</p> <p>(3) The required resistors and capacitors are to be mounted on the board.</p>  |  |  |
| 12 | Ultrasonic interferometer for Solids.    | <p>The set-up should consist of</p> <p>(1) Piezoelectric Oscillator with built in power supply and R.F.meter</p> <p>(2) Longitudinal Crystal holder,</p> <p>(3) Longitudinal Gold plated Quartz crystal (80KHz) with sample ,</p> <p>(4) connecting cables &amp; Glue,</p> <p>(5) Accessories for study of temperature Variation: PID Controlled Hot Air Oven (upto 150 degree C)</p>  |  |  |
| 13 | Lattice Dynamic Kit with Frequency Meter | <p>The set-up should consist of</p> <p>(1) Audio oscillator with amplitude control and facility to vary the frequency in 2 selectable ranges LO (0.8 KHz to 8 KHz) &amp; HI (8 KHz to 80 KHz )</p> <p>(2) Transmission line to simulate 1-D monoatomic and di-atomic lattices</p> <p>(3) Provision to match impedance of audio oscillator to simulated lattice.</p> <p>(4) Provision to match terminating impedance of simulated lattice.</p> <p>(5) Digital frequency counter (6 digit 7 segment displays)</p> <p>(6) Additional Accessory : C.R.O. 30MHz, 2 Channel oscilloscope with alternate triggering &amp; trigger bandwidth of 60MHz &amp; Component tester .</p> |  |  |
| 14 | Measurement of Premittivity of Air       | <p>The set-up should consist of</p> <p>(1) Coulomb and current balance</p> <p>(2) Power supply 0-30V DC, 0-20A</p> <p>(3) Fractional weight set</p> <p>(4) Multimeter</p> <p>(5) Diode laser</p> <p>(6) Measuring scale of 50cm length</p> <p>(7) Instruction manual</p>   |  |  |

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| 15 | Study of modulation and demodulation with built in carrier frequency | The set-up should be able to :<br>(1) Study the carrier signal.<br>(2) Study the variation of modulated wave with the modulation signal.<br>(3) Study the detector circuit.<br>Should have :<br>(4) Built-in power supply<br>(5) carrier signal range: at least from 70 KHz to 150 KHz<br>(6) The ckt diagram should be laid-down on the surface. |  |  |
| 16 | Dielectric constants of solids and liquids                           | The set-up should have :<br>(1) Range : 0pf – 50mf<br>(2) Resolution : 0.01pf<br>(3) Display :16 x 2 LCD display with back light Accuracy : Better than 1%<br>(4) Zero Setting: Push button zero setting  |  |  |
| 17 | Ionization potential setup   | The set-up should have the main Ionization Potential Set-up with:<br>(1) Argon filled tetrode<br>(2) Filament Power Supplyc (Power Supply for VG1K d) Power Supply for VKA e) Power Supply for VG2Kf) Saw tooth wave form for CRO display<br>(3) Multirange Voltmeter<br>(4) Multirange Ammeter   |  |  |
| 18 | Fermi Energy Apparatus   | Main Unit should have the following :<br>(1) Frequency Counter (4digit)<br>(2) Oscillator : 500 KHz<br>(3) Electronic Circuitry<br>(4)Dielectric Cell (special grade SS) assembly<br>(5) 100 ml Glass container (Beaker)<br>(6)Connecting Cable   |  |  |
| 19 | Fourier Analysis Kit   | The set up should able to analyze complex wave (square, clipped sine wave triangular wave etc.) and should be able to verify the existence of different harmonics and measure their relative amplitudes.  |  |  |
| 20 | X-Ray Detraction   | Should be able to replicate ranging from  |  |  |

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|    | simulation experiments                                   | short wavelengths of X-rays to the long wavelengths of visible light and should be allowed to replicate the basic features of structural determination.   |  |  |
| 21 | NMR Experiment   | The set up should be :<br>(1) Suitable for $^1\text{H}$ and $^{11}\text{F}$ nuclei<br>(2) FET based marginal Oscillator<br>(3) Digital Display of frequency and current<br>(4) Clear display of resonance peaks<br>(5) Compatible with general purpose CRO  |  |  |
| 22 | Measurement of susceptibility of solids by Gouy's method | The set up should consists of the following:<br>(1) One Scientific Balance with capacity of 200 gms, Sensitivity: 1/10 mg.<br>(2) Vernier Beam: Hard Bronze/ Brass<br>(3) Arrestment: Circular, falling away type<br>(4) Air Damping: Very quick and positive, beam coming to rest in 2-3 sec<br>(5) Chainomatic Device: A gold plated chain suspended from the beam with its other end screwed on the rotating drum on which a scale graduated from 0 to 10 div each division representing 1mg .<br>(6) Set of 4 samples, 2 each of Ebonite and Wood (in the form of a long rod)<br>(7) Electromagnet with pole pieces: 75mm tapered to 25mm, Mag. Field: 20KG at 6mm air gap<br>(8) Energising Coils: Two of approx. 13A, each, Power: 0-90Vdc, 3A, for coils in series 0-45Vdc, 6A, for coils in parallel<br>(9) one constant current power supply with<br>Current: 0-3A per coil Smoothly adjustable<br>Line Regulation: $\pm 0.1\%$ for 10% mains variation<br>Load Regulation: $\pm 0.1\%$ for load variation from 0 to max.<br>Display: 3 $\frac{1}{2}$ digit, 7 segment LED display<br>Protection: Protected against overload, short circuit and transients caused by the |  |  |

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|    |                                | load inductance.<br>Power: 220V 10%, 50Hz or 110V 10%,<br>60Hz as required.  |  |  |
| 23 | Digital D.C.<br>Microvoltmeter | (1) Very low temperature drift<br>(2) Low dc input bias current-10pA<br>(3) Measures voltage down to 1mV<br>(4) Recorder facility (optional)<br>(5) Should be able to measure at : very<br>low d.c. voltage measurement at very<br>high impedance Range:1mV, 10mV,<br>100mV, 1V & 10V with 100% over-ranging<br>Resolution: 1mV, Accuracy:±0.2%<br>Stability: Within ±1 digit, Input<br>Impedance:>1000MW(10MWon 10V<br>range, Display:3½ digit, 7 segment LED<br>with auto polarity and decimal indication. |  |  |
| 24 | Digital Nanoammeter            | (1) Measures current down to 100pA<br>(2) All solid state and IC design<br>(3) Accepts either polarity of input current<br>(4) Should be able to measure at : low<br>currents down to 100pA, current, Range:<br>100nA to 100mA full scale in 4 decade<br>ranges with 100%overranging (100pA<br>minimum), Accuracy:±0.2% for all ranges<br>Display:3½ digit, 7 segment LED with<br>autopolarity and decimal indication,<br>Input: Through BNC connector V   |  |  |
| 25 | Digital Pico-ammeter           | (1) Should be able to measure Measures<br>current down to 1pA<br>(2) All solid state and IC design<br>(3) Very low offset current<br>(4) Should have : Multiplier: X1, X10,<br>X102, X103, X104, X105, Accuracy: 0.2%<br>for all ranges, Resolution: 1pA, 10pA,<br>100pA, 1nA, 10nA, 100nA, Input: Through<br>amphenol connector, Power Supply: 220V<br>±10%, 50Hz   |  |  |

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