



VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA
PO- ENGINEERING COLLEGE BURLA, DIST-SAMBALPUR,
ODISHA-768018

No. VSSUT/Elect/Tender

/2016

Dated:

TENDER CALL NOTICE

Sealed tenders are invited from original manufacturers/authorized dealers for the supply of equipments for laboratories of Mechanical Engineering Department at VSSUT, Burla, Sambalpur, Odisha. The tenders shall reach the office of the undersigned through **Speed/Registered post only on or before 20.05.2016 up to 12.30PM.**

For more details, please visit our university website www.vssut.ac.in. The authority reserves the right to accept or reject all the tenders without assigning any reason thereof.

Sd/-REGISTRAR

No. VSSUT/Mech./Tender

/2016

Dated:

Copy to:

1. M/s Display Lines, 219, Saheed Nagar, Bhubaneswar – 751007 with request to publish the above advertisement in one issue of the all Odisha daily edition of “THE SAMAJA” and “THE TIMES OF INDIA” (Odisha, Kolkata, Delhi and Bengaluru Edition) at the I & PR approved/lowest rate. The bill may be sent in triplicate along with a copy of the paper in which the publication is made.
2. University /Department Notice Board of VSSUT, Burla.
3. Dean F&P, with a request to hoist the tender call notice in the University web site www.vssut.ac.in for wide publicity.
4. Comptroller of Finance, VSSUT, Burla for information and necessary action.
5. HOD, Mechanical Engineering, for information and necessary action.
6. PA to Registrar for information and record. This is based on UCPP proceedings held on 2nd March, 2016 at 4:00PM and approval of Vice Chancellor ^{Sheet page} Note 1. of file 66 of Mech. Engrg. Dept.
7. PA to Vice Chancellor for information.

BT

20/4/16
REGISTRAR

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20/4/16

DETAILED INFORMATION

Section I: Invitation for Bids

Sealed Tenders in two bids system (Technical Bid and Price Bid) are invited by the “The Registrar, Veer Surendra Sai University of Technology, Odisha, Burla” from reputed Manufacturers/ Authorized distributors /dealers having up-to-date VAT clearance certificate/PAN and TIN for supply of materials for laboratories of Mechanical Engineering Department at VSSUT, Burla campus. The intending Bidders may download the Tender Documents directly from the website available at <http://www.vssut.ac.in>.

All the bidders are required to submit EMD not less than 2% of the quoted amount in the shape of demand draft in favour of “**The Registrar, Veer Surendra Sai University of Technology, Burla**” payable at SBI, Burla. The EMD shall be in Indian Rupees. Non-submission of EMD or submission of EMD of lesser amount than required shall result in rejection of bid. The EMD deposited against other bids cannot be adjusted or considered for this bid. No interest is payable on EMD.

The cost of tender document of Rs.500/- (Non-refundable) is to be submitted in shape of Demand Draft drawn in favour of “**The Registrar, Veer Surendra Sai University of Technology, Burla**” payable at SBI, Burla along with the technical Bid. The tender cost fee and the EMD amount should be submitted separately in separate demand draft. In case of any bid clarification, responsibility lies with the bidders to collect the same from the website and the purchaser shall have no responsibility for any delay/ omission on part of the bidder. The envelope containing the Tender must be super-scribed as “**TENDER FOR MECHANICAL ENGINEERING DEPARTMENT**” and tender notice No. & date.

Time Schedule:

- a) Date of commencement of downloading bidding document 20.04.2016 at 11.00 AM
- b) Last date and time for Receipt of bids 20.05.2016 up to 12.30 PM
- c) Time and date of opening of Tender & technical bid 20.05.2016 at 12.30 PM
- d) Time and date of opening of price bid : to be notified later on after verification of technical bid

Place of Receipt & Opening of Tender and Address for Communication

The Registrar

Veer Surendra Sai University of Technology, Odisha

P.O.-Burla Engineering College, Dist-Sambalpur-768018

Section II: General Terms and Conditions

GENERAL TERMS AND CONDITIONS OF CONTRACT FOR SUPPLY, INSTALLATION AND DEMONSTRATION OF THE MATERIALS REQUIRED FOR DEPARTMENT OF MECHANICAL ENGINEERING, VSSUT, BURLA, ODISHA.

1. Document Establishing Bidder's Eligibility & Qualification

The Bidders shall furnish as part of the Bid the following Documents establishing Bidder's eligibility and qualification to the Purchaser's satisfaction.

1.1 Manufacturer / Authorized Distributor / Dealer having valid license / certificates for the quoted item and the direct Importers holding valid Import License Manufacturer / Authorized Distributor / Dealer of the product are eligible to participate in the Bid.

1.2 Bidders should have **ISI or equivalent** certification for quoted instruments and equipment. However, the Purchaser shall have the right to consider the items where ISI or equivalent certification is not applicable.

1.3 The Bidder whether manufacturer/ distributor/ dealer must have experience of supply and installation of the quoted items in reputed Government Institutions / Public Undertakings / reputed Private Institutions within India during last preceding 03(Three) years reckoned from the date of bid opening and the details must be submitted along with documentary proof.

1.4 The Bidders shall have to produce document in support of their service associates **nearest to Bhubaneswar/ Sambalpur**, Odisha.

1.5 Bidder shall have to provide operational Training for **Machineries** to one Official of each consignee at Suppliers Plant or Consignee site **at least for 7 days whichever is suitable to Purchaser.**

1.6 The Bidder shall quote items of one reputed Brand/model with all accessories in complete to perform functionality of Equipment/Machinery.

1.7 Manufacturer has to submit copy of Industry Registration of quoted products and Tax Registration Certificate issued from competent authority. In case of Authorized Distributor / Dealer/Suppliers have to submit Manufacture authorization along with copy of above documents of Manufacture Industry.

2. Document Establishing Goods Eligibility

The instruments and equipment offered against the schedule of requirement of instruments, equipment and Machineries should be in accordance with the stipulated specifications and of one reputed brand/model (**N.B: Variation in specification is allowed upto±5% in case of Machineries/Equipments**)

2.1 The documentary evidence establishing the brand and the model may be in the form of literature, pamphlets, manuals, drawing, circuit diagram etc.

2.2 Detailed description of instruments and equipment with essential technical and performance characteristics may also be furnished.

2.3 The Bidders should clearly mention in their bid regarding the compatibility of the various equipment or the individual units.

2.4 The quantity shown in the bid can be increased or decreased to any extent depending upon the actual requirement.

2.5 The instruments and equipment should have testing certificate for its satisfactory functioning.

3. Technical Bid (COVER - A)

The following document should be submitted in cover-A.

3.1 Earnest Money Deposit

3.2 Technical details of the materials as per **Annexure-V**

3.3 Copy of the manufacturing license/ import license/ authorized distributor/ dealer certificates

- 3.4 Copy of the authorization from the Manufacturing Company in case of Authorized Distributor /Dealer in **Annexure-III** along with Manufacturer Industry Registration and Tax Registration Certificate.
- 3.5 VAT/ST clearance certificate **up to date** where applicable.
- 3.6 Performance/ Market standing certificate establishing that the Bidders have executed supply of similar items as mentioned in Schedule of Requirement of instruments and equipment to different Govt. Organizations/ Government PSUs / reputed Private Institutions.(proof of documents)
- 3.7 Copy of the IT PAN Card.
- 3.8 Detail name, address, telephone no. fax, e-mail of the firm and of the Director/ Managing Director/ Proprietor of the firm (As per **Annexure IV**)
- 3.9 Address, Telephone No., e-mail, Fax of the Branch Office/ Contact Person/ Liaisoning Office in Odisha. (As per **Annexure IV**)
- 3.10 Power of Attorney/ Authorization to a person for liaisoning and monitoring the business on behalf of the manufacturer / bidder but not entitled to raise the bills.
- 3.11 Document if any to establish the recognition of the manufacturing unit in respect of ISO or equivalent.
- 3.12 **The original bid document signed & sealed by authorized person in each page as a token of acceptance of all terms and conditions of the tender with original receipt.**
- 3.13 Documentary evidence establishing that the instruments & equipment and ancillary services to be supplied by the Bidders shall confirm to the Bidding Document
- 3.14 Any deviation in the specification of the item including standard accessories / optional accessories in complete for functionality of Machine should be marked in **bold letters.**(**N.B: Variation in specification is allowed upto±5% in case of Machineries/Equipments**)
- 3.15 Details of foundation drawing for instruments and equipment, if any, should be provided.

3.16 The details of the service station / service associates nearest to Bhubaneswar/Sambalpur shall have to be submitted to qualify in the technical bid.

3.17 Willingness to provide operational Training for Machineries to one Official of each consignee at Suppliers Plant or Consignee site **at least for 7 days whichever is suitable to Purchaser**

4. **Price Bid (COVER – B)**

4.1 The hard copy of price bid giving the rates for various materials should be submitted along with sealed soft copy of **price bid in Excel format through CD/Pen drive** both in separate sealed cover here in after called **Cover B (Price Bid)**. **Price Bid (Cover - B)** of the bidders who qualify in **Technical Bid (Cover – A)** will only be opened and will be communicated through **E-mail/Fax**.

4.2 The price of the each item shall be quoted as per the prescribed Price Schedule Format at **Annexure-I** along with price break up of custom duty, Excise Duty, CST, Packing, Forwarding and Handling charges, Insurance charges, ET, Freight up to destination including unloading, VAT, commissioning including testing and training with total price per item at **FOR** destination. The bidders are required to submit the individual price of each instrument(s) and equipment(s) as indicated in the schedule of requirements.

4.3 Each quoted item and all accessories should cover the warranty / guarantee for **2(two)** year from the date of commissioning (**Annexure-II**).

4.4 The **Cover B** of the technically qualifying bidders shall be only opened at the Office of the **“The Registrar, Veer Surendra Sai University of Technology, Burla”** on the date and time to be communicated to them after technical evaluation of **Cover A by E-mail/Fax**.

4.5 The cost of standard accessories shall be included in basic price and optional accessories shall have to be quoted separately.

4.6 The bidders are required to submit the list of the spare parts required for the materials as well as the list of the dealers/ Distributors of the spare parts nearest to Bhubaneswar, Odisha for its availability.

5 BID CONDITIONS

5.1 The bidders should verify the sites of existing laboratories of Department of **MECHANICAL ENGINEERING**, VSSUT, Burla and the proposed lay out Plan indicating the location of each unit for necessary Technical Evaluation. The scope of Supply as mentioned in the schedule of requirements if not sufficient for full function of the materials should be intimated in writing with the technical bid.

5.2 The quoted rate shall not vary with the quantum of order placed or destination point.

5.3 A copy of the original bid conditions and the schedules should be signed by the bidder at the bottom of each page with the office seal duly affixed and returned along with the bid. Bid schedule should be duly filled in with an **index** and **page number** for the documents, enclosures & EMD etc. **Paging** must be done for all the documents submitted.

5.4 Bids should be type written or Computerized and every correction/ over writing in the bid should invariably be attested with signature of the bidder with date before submission of the bids to the authorities concerned. No revision of price upward or downward will be allowed once the bid is opened. However the purchaser shall have the right for considering the exchange rate of foreign currencies on verification of documents.

5.5 Language of Bid

The Bid prepared by the bidders and all correspondence and document relating to the bid exchanged by the Bidders and the *Purchaser*, shall be written in the English language. Supporting document and printed literature furnished by the Bidders may be written in another language provided they are accompanied by an accurate translation of the relevant passages in the English language in which case, for purposes of interpretation of the Bid, the English translation shall govern.

5.6 Bid Price

- The contract shall be for the full quantity as described above. Corrections, if any, shall be made by crossing out, initialing, dating and re-writing.

- All duties, taxes, and other levies payable on the raw materials and components, job contract shall be included in the total price.
- VAT in connection with the sale shall be shown separately.
- The rates quoted by the bidders shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
- The price shall be quoted in **Indian Rupees** only.

5.7 VAT/ST clearance

Copies of valid VAT clearance Certificates shall be furnished by the Bidders and the originals of the above certificates shall be produced to the purchaser before placement of notification of award if asked for by the Purchaser.

5.8 EMD

All bidders are required to submit EMD **not less than 2% of the quoted amount** in shape of **Demand draft** drawn in favour of **“The Registrar, Veer Surendra Sai University of Technology, Burla”** payable at **SBI, Burla** only. The EMD shall be in **Indian Rupees**.

NOTE: Non-submission of EMD or submission of less EMD than the desired one shall result in rejection of Bid. The EMD deposited against other Bids cannot be adjusted or considered for this Bid. No interest is payable on EMD.

5.9 SUBMISSION OF BIDS

Sealing and Marking of Bids

Bid should be submitted in two Bid system containing two parts as detailed below.

Sealed Cover-A: Technical Bid.

Sealed Cover-B: Price Bid (hardcopy & sealed soft copy in CD/pen drive)

Both the sealed envelopes should then be put in one outer cover and each cover should have the following indication:

- i) Name of Department: _____
- ii) Reference No of Bid _____
- iii) Bid regarding _____
- iv) Due date & time for submission of the Bid _____
- v) Due date & time for opening of the Bid _____
- vi) Name of the Firm _____

NOTE:

A. Bids submitted without following two Bid system procedures as mentioned above will be summarily rejected.

B. Please Note that **prices should not be indicated in the Technical Bid.** The Prequalification document including EMD as required in the Bid document should invariably be accompanied with the Technical Bid (**Cover A**).

The outer envelope shall indicate the name and address of the bidders to enable the bid to be returned unopened in case it is declared “**late**”. If the cover containing the outer envelope is not sealed and marked as required, *Purchaser* will assume no responsibility for the bid’s misplacement or premature opening.

The above procedure shall be adopted both for the Technical bid and Price bid separately. Telex, cable, email or facsimile bids will be rejected.

5.10 Deadline for Submission of Bids

Bids must be received by the *Purchaser* at the address specified not later than the time and date specified in the Invitation of Bids. In the event of the specified date for the submission of bids being declared a holiday for the *Purchaser*, the bids will be received up to the appointed time on the next working day.

The *Purchaser* may, at its discretion, extend this deadline for submission of bids by amending the bid document, in which case all previous rights and obligations of the purchasers and bidders will remain same till the extended date.

5.11 Modification and Withdrawal of Bids

No Modification and Withdrawal of Bids is allowed between the interval of time of submission and the last date and time of the bids.

No bid may be withdrawn in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the bidders on the bid form.

5.12 BID OPENING

5.13 The *Purchaser* will open all bids, in the presence of bidder's representatives who choose to attend at **12.30 PM on dated 20.05.2016** at the Office of the "**The Registrar, Veer Surendra Sai University of Technology, Burla**".

5.14 The bidder's representatives who are present shall sign a register evidencing their attendance. In the event of the specified date of bid opening being declared a holiday for the *Purchaser*, the bids shall be opened at the appointed time and location on the next working day.

5.15 The bidder's names, and the presence or absence of the requisite EMD and such other details as the *Purchaser*, at its discretion, may consider appropriate will be announced at the opening. No bid shall be rejected at bid opening, except for late bids, which shall be returned unopened to the bidders.

5.16 Acceptance of the Bid

- Bidders submitting bids would be considered who have considered and accepted all terms and conditions. No enquiries, verbal or written, shall be entertained in respect of acceptance or rejection of the bid.
- Genuine equipment and instrument etc. should be supplied. Bidders should indicate the source of supply i.e. name and address of the manufacturers from whom the items are to be sourced.
 - Supply of equipment means – Installation and Commissioning (except civil works), Demonstration as well as Training at site. **No separate charges will be paid on this account.**

5.17 Rejection of the Bid

The Bid document shall be out-rightly rejected under following stipulation and no correspondence will be entertained whatsoever.

- If the Bidders has not furnished the required **Tender paper cost** and **EMD** or EMD exemption certificate from competent authority.
- If the Bidders has not submitted the Price as per the prescribed format **Annexure-I**

- **Manufacturing Authorization Annexure-III and in case of Authorized Distributor / Dealer/Suppliers have to submit Manufacture authorization along with copy of above documents of Manufacture Industry.**
- If the bid is not supplemented with breakup of standard accessories / Optional accessories & cost of AMC separately for three years after completion of warranty period **(In case of major machinery only)**.
- Photo copy of the up-to-date valid manufacturing license/ import license (if it is imported) /dealership certificate/Distributor certificate of the product along with Tax registration Certificate of Manufacturer issued from competent authority.
- If the bidders, whether manufacturer or authorized distributor/ dealer have not supplied the required quantity for qualification as per the eligibility criteria and not submitted the performance statement at **Annexure-IV with supporting documents**.
- If the quoted product of the bidders not confirms to technical specification with complete accessories for functional Equipment/Machinery and standard of workmanship required by the Purchaser.
- If the bidder has not furnished technical details of the equipments and machinery with **one make & model** as per **Annexure-V**.
- **If bidder will quote items of more than one make/model.**
- If the bidder has not furnished detailed mandatory drawings, **catalogue**/, Foundation drawings & schedule of supply of items, if required.
- If the bidders have not agreed to give **bid validity**.
- If Bidder is not willing to provide operational Training for Machineries to one Official of each consignee at Suppliers Plant or Consignee site **at least for 7 days in case of major machineries whichever is suitable to Purchaser**.

5.18 Purchaser's Right to Accept any Bid and to Reject any Bid

The Purchaser reserves the right to accept or reject any bid and to annul the bidding process and reject all the bids without assigning any reason thereof at any time prior to award of Contract, without thereby incurring any liability to the affected Bidders or Bidders on the grounds of such action of the purchaser. In case no bidder qualifies as per qualifying criteria

and standards, purchaser may at his discretion relax qualification criteria for award of contract.

5.19 Evaluation and Comparison of Bids

The comparison shall be of FOR destination price basis including the price of all costs wherever applicable as well as duties and taxes (**but excluding VAT**) paid or payable on Machineries, instruments & equipment incorporated or to be incorporated in the items including the warrantee/guarantee period from the date of installation.

- The Purchaser's evaluation of a bid will take into account, in addition to the bid price and the price of incidental services.
- The purpose of bid evaluation is to determine substantially responsive bid with the lowest evaluated cost, but not necessarily the lowest submitted price, which should be recommended for award.
- Evaluation of bids should be made strictly in terms of the provisions in the bid document to ensure compliance with the commercial and technical aspects.
- The past performance of the suppliers will be taken into account while evaluating the bids.
- Cost of the inland transportation, insurance and other costs within the Purchaser's Country incidental to delivery of the goods to their final destination;
- Delivery schedule offered in the bid;
- Deviations in payment schedule from that specified in the General Terms & Conditions of Contract;
- The availability in the Purchaser's country of spare parts and after-sales services for the goods offered in the bid;
- The projected operating and maintenance costs during the life of the equipment/ goods.
- The performance and productivity of the equipment/ goods offered.
- The quality and adaptability of the equipment/ goods offered.
- Any other point as deemed proper to be incorporated by the evaluation committee.
- **Alternative options of offer shall not be allowed.**
- Each Bidder shall submit only one quotation with one make & model.
- The quotation would be evaluated separately for each item

- Sales Tax in connection with sale of goods shall not be taken into account in evaluation.
- Negotiation shall be made with the lowest evaluated bidder.
- Lowest evaluated price shall be taken in to consideration, but not the lowest quoted price.
- Willingness to provide operational Training to one Official of each consignee at consignee site for at least **7 days whichever is suitable to Purchaser.**

6.0 Supply Conditions

6.1 Delivery of Goods

The delivery of goods shall be made by the supplier to the Consignee in accordance to the order placed as shall be detailed in the Schedule of requirements & technical specifications.

6.2 Instruments, Equipment & Machineries Demonstration cum Inspection

Purchaser reserves the right to ask for demonstration cum inspection of the instruments & equipment where ever applicable.

6.3 Inspection/ Test/Training

The supplier shall get each equipment inspected in manufacturer's works and submit a test certificate (New & Unused) and also guarantee/warranty certificate that the equipment confirms to laid down specifications.

The supplier shall invite the purchaser for pre-dispatch inspection. The Purchaser or his representative shall have the right to inspect/ examine/ test the goods in conformity with the contract awarded/supply order during the production or before dispatch from the manufacturer's premises. Such inspection and clearance will not prejudice the right of the consignee to inspect and test the equipment on receipt at destination.

The inspection/examination/ test may be conducted in the premises of the Supplier or at the goods final destination or at the premises of the consignee, as will be decided by the Purchaser.

The purchaser's right to inspect/ examine/test & where necessary to reject the instruments & equipment after the arrival of the goods at the final destination, shall in no way be limited or

waived by the reason of the goods having been inspected and tested by the manufacturer previously. In case of rejection of the goods at the final destination after inspection and test as stipulated above and in case any inspected/ tested goods fail to confirm to the specification/ working condition, the purchaser may reject them and the supplier shall replace/ repair the same free of cost.

6.4 Warrantee Period (comprehensive)

The Bidders must quote for a minimum period of **2 (Two) years** of comprehensive **warranty** from the date of completion of the satisfactory commissioning as per (**Annexure-II**). This also includes all accessories related to instruments & equipment quoted for.

6.5 Up time Warrantee

The Bidders should provide uptime guarantee of 95%.

6.6 Downtime Penalty Clause

During the warranty period, desired uptime of 95% of 365 days (24 hours) if downtime exceeds 5%, penalty in the form of extended warranty, double the number of days or more will be applied for which the equipment goes out of service.

In no case the machineries should remain in non-working condition for more than 30 days beyond which a penalty of 0.2% of machine cost will be charged per day.

6.7 Payment Terms

No advance payment will be made by the Purchaser to the supplier for performance of the contract. 100% of the contract price shall be paid within 30 (thirty) days after satisfactory supply, installation, demonstration, Commissioning & training and stock entry of bills of the goods within due date of delivery.

6.8 Transportation

The Supplier shall be required to meet all transport and storage expenses until commissioning of the instrument(s) / equipment covered in the contract.

6.9 Taxes and Duties

The Supplier shall be entirely responsible for payment of all Taxes, Duties etc. incurred until delivery of the contract goods to the Consignee subject to recovery afterwards in the bill as claimed in the Bid offer.

VAT as applicable is payable, to the suppliers of the State of Odisha if claimed in the Bid offer.

VAT/ CST will be paid to the Suppliers of the outside State other than Odisha, if claimed in the Bid offer. Any revision of VAT/ CST shall automatically be taken into account.

Entry Tax, if paid by the Supplier, at the local (destination head) Corporation/ Municipality/ NAC is allowed once only on production of money receipt for such payment, if claimed in the Bid offer. Any other statutory levy imposed by the Govt. of India/ Govt. of Odisha from time to time will be considered extra on demand with adequate proof thereof. The service tax and the work contract tax shall be levied (Wherever applicable). Income Tax as applicable shall be deducted at source.

6.10 Incidental Services

The Supplier shall be required to provide any or all of the following services: (The cost should be included in the quoted Price)

- Furnishing of detailed literature/pamphlets/ circuit diagram/ operation & maintenance manual / drawings (as applicable) for each appropriate unit of supplied goods.
- Furnishing of tools required for assembly and / or maintenance of the supplied goods.
- Performance or supervision of on-site assembly and the supplied goods.
- Performance or supervision or maintenance and/ or repair of the supplied goods, for a period of time agreed by the parties, provided that this service shall not relieve the supplier of any warranty/ guarantee obligations under the contract.
- **Training of the Purchaser's personnel at the Supplier's plant and / or on site, in assembly, start up, operation, maintenance and/ or repair of the supplied goods is Mandatory** .A maintenance contract for the goods supplied, if required by the user beyond

the warranty period shall be on mutually agreed upon terms between the user and supplier.
The cost of such maintenance contract shall not be included in the Bid cost.

6.11 Period of Validity of Bids

- The bid rates should be kept open/ valid for a period of **180** days from the date the Bids are opened.
- A bid valid for a shorter period i.e less than **180** days shall be rejected, as nonresponsive.
- In absence of any indication of the date of validity in the bid, it will be presumed that the offer will remain valid for the minimum period i.e. **180** days as prescribed above.
- In exceptional circumstances the purchaser may solicit the bidders consent for extension of the period of validity. If agreed upon, the bid security so deposited shall also be suitably extended.

6.12 Commissioning Period

Maximum commissioning period is **30 days** from the date of supply OR **120 days from the date of issue of Purchase Order** failing which the purchaser will have the right to impose penalty for the delay period @ **0.5% per week of the contract value of item/items excluding taxes from the bill amount subject to maximum of 10%**. However Registrar has right to extend the delivery period/commissioning period in special cases.

6.13 Penalty against Non Supply

In case of non supply of Stores within the due date i.e. within the date of delivery the EMD deposited by the bidder shall be forfeited.

6.14 Rejected items

No payment shall be made for rejected supplied items. Rejected items must be removed by the bidders within two weeks of the date of rejection at their own cost and replace immediately. In case these are not removed these will be auctioned by the purchaser (at the risk and responsibility of the suppliers) without any further notice.

6.15 Annual Maintenance Contract

The Cost of Annual maintenance contract for next 3 years after warranty period shall be submitted as per the **Annexure at I(b)** . The after sales service during and after the warranty / guarantee period should be available from companies own engineers.

6.16 Jurisdiction of the Court

The Purchaser and the Supplier shall agree that the competent Court at Sambalpur shall have the jurisdiction to try and decide anything between the parties and they may approach the Competent Court at Sambalpur if required at any time.

**REGISTRAR
VSSUT, Burla**

ANNEXURE-I (a)

PRICE SCHEDULE (ITEM WISE) -A

Item Serial No	Item Description	Country of origin with make & model	Quantity & Unit								
				Exware house/ Ex-showroom/ Off-the-shelf (a)	Excise duty/Cost um duty, if any (b)	Packing & Forwarding (c)	Inland transportation, insurance and other local csts incidental to delivery (d)	CST/ Entry tax, if any (e)	Unit price (a+b+c+d+e)	VAT (f)	Total Price (a+b+c+d+e+f)

ANNEXURE-I (b)

PRICE SCHEDULE (ITEM WISE) - B

PRICE SCHEDULE FOR ANNUAL MAINTANCE CONTRACT AFTER COMPLETION OF WARRANTY PERIOD.

Sl.No	Brief description of Goods Total annual	Quantity in nos.				Annual Maintenance Contract cost 3 years i.e. 3x (4a+4b+4c)	
1	2	3	4			5	
			1st yr.	2nd yr.	3rd yr.		
			(a)	(b)	(c)		

** After Completion of warranty period

Note:-

1. In case of discrepancy between unit price and total prices, THE UNIT PRICE shall prevail.
2. The cost of Annual Maintenance Contract (AMC) which includes preventive maintenance including testing & calibration as per technical/ service/ operational manual, labour and spares, after satisfactory completion of warranty period may be quoted for next 3 years on yearly basis for complete equipment and turnkey (if any).
3. The cost of AMC may be quoted along with taxes applicable on the date of bid opening. The taxes to be paid extra, to be specifically stated. In absence of any such stipulation the price will be taken inclusive of such taxes and no claim for the same will be entertained later.
4. Cost of AMC will not be added for Ranking/Evaluation purpose. However, the cost of AMC for lowest evaluated bidder is subject to negotiation.
5. The payment of AMC will be made as per payment terms of the bid document.
6. The uptime warranty and down time penalty shall be as per the bid document.
7. All software update should be provided free of cost during AMC period.
8. The stipulations in Technical Specification will supersede above provisions.
9. The supplier shall keep sufficient stock of spares require during Annual comprehensive Maintenance Contract period. In case the spares are required to be imported, it would be the responsibility of the supplier to import and get them custom cleared and pay all necessary duties.

Place:

Date:

Signature of Bidder
Business Address
Seal of the Bidder

ANNEXURE - II

WARRANTY MAINTENANCE CONTRACT AGREEMENT.

THIS AGREEMENT made the.....day of, 20__ between the “**The Registrar, Veer Surendra Sai University of Technology, Burla**” (hereinafter "the Purchaser") of the one part and M/s..... (here in after called "the Supplier") of the other part:

WHEREAS the Purchaser invited bids for certain Goods & ancillary services viz, supply and commissioning of the instruments & equipment at Bhubaneswar including Comprehensive Warranty Maintenance Services and has accepted a bid by the Supplier for the instruments & equipment specified below at the Consignee site including Comprehensive Warranty maintenance Services for a period of 2 (Two) year from the date of installation & commissioning of the instruments & equipment as per award of Contract No..... Dated

Name of the Equipment & machineries Qty

(To be filled in as per details of goods in the award of Contract)

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. Maintenance Services shall consist of Preventive and Corrective maintenance of equipment specified above & will include repair and replacement of parts free of cost.
2. Preventive maintenance, monthly once, which includes:
 - 2.1 Check-up to ensure that device connection is proper, cabling is at proper condition etc.
 - 2.2 Cleaning of the above instruments & equipments and checking the System Performance.
3. The Supplier is to furnish the tentative schedule of the preventive maintenance of Warranty Maintenance Contract (WMC) to be carried out.
- 4 The parts replaced must be new parts or equivalent in performance to new parts.
5. The Supplier will also provide the same maintenance service in case of the movement of equipment from the place of original installation to a different place or location, if the equipment is shifted by the Purchaser to another place or location at the cost and risk of the purchaser.
6. Any complaint informed through telephone must be acknowledged with a Complaint No. by the Supplier which will be noted by Consignee. All further contact with the Supplier on such complaint will be initiated through that Complaint No. Once rectification done, that No. will be cancelled by both parties. A register is to be maintained by the Supplier where complaints are to be noted along with Complaint No.
7. The maintenance shall normally be done at the earliest.
8. The Service Engineer of the Supplier will be allowed to handle the respective plant & machineries only in presence of the officer in charge at the Consignee site.

9. The Supplier should ensure that maintenance job is not hampered/delayed due to paucity of spares/inadequate manpower etc.
10. The Supplier should submit the services call report, to the Consignee for each and every service call without fail.
11. The Supplier evaluation data format for the WMC of Consignee systems may be filled up for necessary action.
12. All formats after filled up should be signed at the end of each page by the Supplier.
13. After completion of the work/repair/maintenance, the Purchaser shall issue a certificate of completion to the supplier to that effect.

Signature

Signature

For the Purchaser

For the Supplier

Name:

Name:

Designation:

Designation:

Address:

Address:

Telephone No:

Telephone No:

ANNEXURE-III

MANUFACTURES' AUTHORISATION FORM

No. _____ / Date _____ /

To

The Registrar,
VSSUT Odisha
Burla, Sambalpur.

Dear Sir, Bid No. _____

We _____ who are established and reputable manufacturers of _____ having factories at _____ (Address of Factory) do thereby authorize M/s. _____ (Name and address of Agent) to submit a bid and sign the contract with you against the above bid.

* No company or firm or individual other than M/s. _____ are authorized to bid and conclude the contract in regard to this business against this specific invitation for bid.

We hereby extend our full guaranty and warranty as per general conditions of contract for the goods and services offered by the above firm against this bid.

Yours faithfully,
(Signature for and on behalf of Manufacturers)

Note: This letter of authority should be on the letterhead of the manufacturer and should be signed by a person, competent and having the power of attorney to bind the manufacturer. It should be included original by the Bidders in its bid.

- This para should be deleted for simple items where manufacturers sell the product through different stockiest.
- The Supplier/Managing Director of the Company (if the supplier is a Company) or the Power of Attorney Holder having specific power to sign the contract can only sign the contract/execute the agreement.

ANNEXURE-IV

DETAILS OF THE BIDDERS

Bid Reference No.

Name and address of the Bidder:

01 Name of the bidder

- a) Full postal address
- b) Full address of the premises
- c) Telegraphic address
- d) Telephone number
- e) Fax number
- f) E mail:
- g) PAN No
- h) TIN No

02 Total annual turn-over (value in Rupees)

03 Quality control arrangement details

04 Test certificate held

- a) Type test
- b) BIS/ISO certification
- c) Any other

05 Details of staff

- a) Technical
- b) Skilled
- c) Unskilled

06 Branch Office/ Contact Person/ Liaisoning Office in Odisha.

- a) Address
- b) Telephone No.
- c) e-mail,
- d) Fax

Signature and seal of the Bidder

ANNEXURE-V

Technical details of the materials to be supplied by the bidder

Bid SI No. of the item	Tender specification	Bidders Specification with make and model no (Enclose manufactures catalogue / brochure for each item)	Deviation if any With university specification

Signature and seal of the Bidder

SPECIFICATION OF THE EQUIPMENTS/ INSTRUMENTS

Sl. No.	Description of Items	Quantity	Remarks
1.	Micro Hardness Tester	One	Annexure-1
2.	Ultrasonic Crack Detector	One	Annexure-2
3.	Thermocouple thermometer	One	Annexure-3
4.	Pressure and Flow meter	One	Annexure-4
5.	Optical Flat	One	Annexure-5
6.	Twin Belt Grinder	One	Annexure-6
7.	Two Disc Polishing Machine with Automatic Polishing Attachment (Variable speed)	One	Annexure-7
8.	Digital Vernier Caliper	One	Annexure-8
9.	Thermocouple Set Up with Data Recording Facility	One	Annexure – 9
10.	Muffle Furnace with Stirrer to Churn the Melt	One	Annexure-10
11.	Universal Sand Strength Testing Machine (Mechanical and Digital)	One	Annexure – 11
12.	Sand Sieve Shaker	One	Annexure –12
13.	Sand Mould Hardness Tester	One	Annexure –13
14.	Rapid Moisture Teller	One	Annexure –14

15.	Clay Content Set Up	One	Annexure –15
16.	Ceramic Slurry Mixer	One	Annexure –16
17.	Variable Speed Kaplan Turbine Test Rig	One	Annexure –17
18.	Vane Pump Test Rig	One	Annexure –18
19.	Single Cylinder 2 Stroke Petrol Engine With Rope Brake Dynamometer	One	Annexure –19
20.	Single Cylinder 4 Stroke Diesel Engine With Variable Compression Ratio (VCR)	One	Annexure –20
21.	Critical Heat Flux	One	Annexure –21
22.	Shell and Tube Heat Exchanger	One	Annexure –22
23.	Parallel and Counter Flow Heat Exchanger	One	Annexure –23
24.	Unsteady State Heat Transfer	One	Annexure –24
25.	Heat Pipe Apparatus	One	Annexure –25
26.	Boundary Layer Apparatus	One	Annexure –26
27.	Drop wise and Film Wise Condensation Heat Transfer	One	Annexure –27
28.	Simple Vapor Absorption System	One	Annexure –28
29.	Thermocouple Calibration Setup	One	Annexure –29
30.	Experimental Refrigeration Tutor	One	Annexure –30

31.	Experimental Air Conditioning Tutor	One	Annexure –31
32.	Differential Setup	One	Annexure –32
33.	Centrifugal Force Apparatus	One	Annexure –33
34.	Inertia of Rotational Motion Apparatus	One	Annexure –34
35.	Torsional Vibration Apparatus (Digital Type)	One	Annexure –35
36.	Static and Dynamic Balancing Machine	One	Annexure –36
37.	Journal Bearing Friction Apparatus	One	Annexure –37
38.	Roller Bearing Faults Apparatus/Kit	One	Annexure –38

MICROHARDNESS TESTER
Technical Specifications

Sl. No.	Parameters	Specification
1.	General specifications	<ul style="list-style-type: none"> • Vickers and Knoop Indenters • Wide load range (10-2000 gf) • Motorized stage • Multiple measurements • Automatic hardness evaluation • Easy clamping and grips for various sized samples
2.	Power Requirements	<ul style="list-style-type: none"> • 220V/ 50Hz
3.	CCD Camera	High pixel image to be produced
4.	Supporting software	<ul style="list-style-type: none"> • The instrument should be installed with latest available version of software for control, operation and analysis. • The supplier should upgrade the software as and when the up gradations become available for at least five years from installation • Should have intelligent calibration logic • Continuous automatic hardware diagnosis
5.	Computer and Printer	<ul style="list-style-type: none"> • The equipment should come with a high performance computer with all the requisite software installed on it • Minimum Configuration: Intel dual core processor, 2 GB RAM, 500GB Hard Disk, 24" Display with other essential peripherals • Laser printer should be provided with the computer
6.	Safety Norms	<ul style="list-style-type: none"> • The instrument should include safety devices for protection against vacuum, water , power etc • The instrument should be compliant with international norms for safety and environment
7.	Installation, Commissioning and Training	<ul style="list-style-type: none"> • The delivery of the equipment should be considered complete only after successful commissioning of the instrument • The pre-installation requirements should be communicated to VSSUT Burla well in advance of the installation

		<ul style="list-style-type: none"> • The Installation, commissioning and training should be done only by well trained factory engineers • The supplier should provide training to at least three candidates at the installation site to make them familiar with smooth operation of the instrument
8.	After-sales Service	<ul style="list-style-type: none"> • The supplier should provide a prompt after-sales service such as regular instrument maintenance, troubleshooting and fixing • The list of service centers in India should be included.
9.	Spares	<ul style="list-style-type: none"> • List of standard spares to be provided for each year starting from 1st to 5th year along with cost and discounted rates • An undertaking that the vendor will supply all the spares and services for the equipment for at least 5 years from the date of commissioning
10.	Annual Maintenance Cost	<ul style="list-style-type: none"> • Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
11.	The supplier	<ul style="list-style-type: none"> • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the quotation. • Supplier will provide certificate of calibration and inspection. • Manufacturer of machine should provide certificate on their letter head for "Spares and parts can be supplied up to 10 years from date of supply.
12.	Warranty	3 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

ULTRASONIC CRACK DETECTOR
Technical Specifications

Sl. No.	Parameters	Specification
1.	Test Range	10mm/ 0-10 mt in steel
2.	Sensitivity	140+/-3dB
3.	Gain Control	0.25, 0.5, 6, 12 or 20 dB step
4.	Velocity Adjustment	0-9999 m/s
5.	Scan memory	Up to 200 Trace Patterns should be stored, recalled, printed or transferred to PC via RS-232 serial port.
6.	Calibration Set-up	50 different calibration set-ups can be Stored and Recalled
7.	Software	Interface software for transferring A-Scan from detector to PC should be supplied
8.	Full Screen	Scan should displayed in full screen area by pressing zoom the scan
9.	Battery Life	3-4 Hours
10.	Display	Minimum 122x92mm (320x240 pixel) Colour LCD/TFT display for better visibility with option of different colour sets.
11.	Acceptable Temperature Range	0-50 ⁰ C
12.	After-sales Service	<ul style="list-style-type: none"> • The supplier should provide a prompt after-sales service such as regular instrument maintenance, troubleshooting and fixing • The list of service centers in India should be included.
13.	Annual Maintenance	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period.

	Cost	Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
14.	The supplier	<ul style="list-style-type: none"> • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the quotation. • Supplier will provide certificate of calibration and inspection. • Manufacturer of machine should provide certificate on their letter head for “Spares and parts can be supplied up to 10 years from date of supply.
15.	Spares	<ul style="list-style-type: none"> • List of standard spares to be provided for each year starting from 1st to 5th year along with cost and discounted rates • An undertaking that the vendor will supply all the spares and services for the equipment for at least 5 years from the date of commissioning
16.	Warranty	Three Years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

THERMOCOUPLE THERMOMETER
Technical Specifications

Sl. No.	Parameters	Specification
1.	Max temperature (°C)	1300
2.	Temp range (°C)	-50 to 1300
3.	Min temperature (° F)	-500 C
4.	Accuracy	$\pm 1^{\circ}\text{C} \pm 0.75$ between 500 to 750°C, $\pm 1^{\circ}\text{C} + 2\%$ between 750 to 1000 °C, $\pm 3^{\circ}\text{C} + 4\%$ between 1000 to 1200°C, $\pm 2^{\circ}\text{C}$ at -20 °C, $\pm 3^{\circ}\text{C}$ -40 °C, $\pm 4^{\circ}\text{C}$ -50 °C
5.	Probe	Included, type K, general-purpose
6.	Display	3.75-digit LCD, 0.625 in H
7.	Warranty	Three Years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

PRESSURE AND FLOW METER
Technical Specifications

Sl. No.	Parameters	Specification
1.	Product Type	Manometer
2.	Unit of Measurement	<ul style="list-style-type: none"> • For Pressure: psi, mbar, in. H₂O, mm H₂O, Pa • For Air Velocity: m/s, ft/min, km/hr, mph, knots • For Airflow: cfm, cmm • For Temperature: °C, °F
3.	Output	USB Output
4.	Range	<ul style="list-style-type: none"> • For Pressure: ±50 mbar (differential) or 0-50 mbar (static) • For Air Velocity: 200 to 15,733 ft/min • For Airflow: 0 to 99.999 cfm • For Temperature: 32 to 122°F or 0 to 50°C
5.	Power	One 9V battery (included)
6.	Display	Backlit LCD
7.	Warranty	One Year
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

OPTICAL FLAT
Technical Specifications

Sl. No.	Parameters	Specification
1.	Diameter of the plate	Minimum 8 inch
2.	Accuracy	¼, 1/10 wave
3.	Warranty	Minimum 2 years

*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.

BELT GRINDER
Technical Specifications

Sl. No.	Parameters	Specification
1.	Type of machine	Two grinding belts, Water cooling mechanism belt centering
2.	Cover and Coating	Anticorrosion Low Carbon Steel Base with powder coated SS cover
3.	Grinding belts size	100X915 mm
4.	Spindle Speed	Variable (100-1400 rpm)
5.	Power System	Electrical Interlock System, Water Connection 1xR 1/2" ant recirculation, Water Valve: Right and Left
6.	Dimension .WxHxD	630 x 250 x 520 mm
7.	Warranty	Minimum 2 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

POLISHING MACHINE
Technical Specifications

Sl. No.	Parameters	Specification
1.	Type of machine	Table top double wheel (8 inch disc) polishing machine with suitable drainage facility for each disc with suitable water jet for each wheel.
2.	Polishing disc	Two aluminium discs of 8 inch diameter with one paper holding ring and one cloth holding ring for each disc. Additional set of one aluminium disc, one paper ring and one cloth holding ring should be provided.
3.	Wheel control	Different for both wheels
4.	Speed control	Continuous 200-1200 rpm. No step variation. No wobbling of discs.
5.	Automatic Polishing Attachment	<ul style="list-style-type: none"> • Variable speed (Disc Diameter 200 mm) • Capacity six samples • Polishing Force: Pneumatic
6.	Wash bowl	Made of corrosion resistant material.
7.	Control panel	LED/LCD display
8.	Consumables	One set of startup consumables including 10 set of polishing cloths should be provided
9.	Power supply	Standard 220V 50Hz AC
10.	Warranty	Minimum 2 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

DIGITAL VERNIER CALIPER
Technical Specifications

Sl. No.	Parameters	Specification
1.	Length	Maximum 300 mm
2.	Accuracy	± 0.02 mm
3.	Resolution	0.01 mm
4.	Repeatability	0.01 mm
5.	Display	LCD
6.	Length standard	ABSOLUTE electromagnetic induction linear encoder
7.	Warranty	Minimum 2 years

*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.

THERMOCOUPLE SET UP WITH DATA RECORDING FACILITY
Technical Specifications

Sl. No.	Parameters	Specification
1.	No. of channels	16/24
2.	Accuracy	± 0.25% of reading or more
3.	Measuring Rate	0.2 Seconds (200 mS) per Channel
4.	Scan Mode Settable Scan Time	Auto / Manual (1 to 99 Seconds) in Auto Mode
5.	Temperature measurement using thermocouples (J, K, T, N, E, S &R)	Possible
6.	Data storing capacity	Yes
7.	Interface with computer	Yes
8.	Portable easily	Yes
9.	Warranty	Minimum 2 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

MUFFLE FURNACE WITH STIRRER TO CHURN THE MELT
Technical Specifications

Sl. No.	Parameters	Specification
1.	Opening Cover	From top
2.	Inner chamber	Rectangular in shape
3.	Temperature to melt alloy	up to 1400 Centigrade
4.	Stirrer inside the furnace	The material of the stirrer should sustain 1400 Centigrade without being damaged.
5.	Motor for stirring action of alloy inside the crucible	Crompton Greaves make
6.	RPM Controller	Required
7.	Stirrer blades	Should be properly built for good stirring
8.	PID temperature controller with Ampere meter and Volt meter	Yes
9.	High Alumina Crucible with 5 liters and 2/3 liters capacity each	Each category one crucible
10.	Warranty	Minimum 2 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

**UNIVERSAL SAND STRENGTH TESTING MACHINE [MECHANICAL AND DIGITAL]
Technical Specifications**

Sl. No.	Parameters	Specification
1.	Suitable for measuring the properties of green sand and Nobake sand, CO ₂ sand	Compression Strength, Tensile Strength, Transverse Strength, Shear strength (of both green sand and dry strength)
2.	Digital Strength Indicator and Compression Pads	Required with high accuracy
3.	Load Cell	Yes
4.	Tensile Strength Attachments Transverse Strength Attachments Shear Strength Attachments High Dry Strength Attachments	Yes
5.	Warranty	Minimum 2 years
*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.		

SAND SIEVE SHAKER
Technical Specifications

Sl. No.	Parameters	Specification
1.	Motor (Good brand)	1/8 Hp Single Phase, Cycles – 50
2.	Sieve Set	As per ISS No 53, 75, 106, 150, 212, 300, 425, 600, 850, 1700
3.	Micron. Dia. 200 mm, OR (Sieves As Per Requirement)	
4.	Timer 0-15 Min	
5.	Warranty	Minimum 2 years
*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.		

SAND MOULD HARDNESS TESTER
Technical Specifications

Sl. No.	Parameters	Specification
1.	Dial Indicator	To Measure Hardness of Mould 0 – 100
2.	Warranty	Minimum 2 years
*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.		

RAPID MOISTURE TELLER
Technical Specifications

Sl. No.	Parameters	Specification
1.	Capacity	10 % Moisture
2.	Single Pan Balance, Absorbent Compound And Carrying Case	
3.	Warranty	Minimum 2 years
*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.		

CLAY CONTENT SET UP
Technical Specifications

Sl. No.	Parameters	Specification
1.	Sand Type	Green Sand & Raw Sand
2.	Consists of stirrer, glass jar, siphon, timer unit, 53 micron sieve pan, wash bottle	
3.	Warranty	Minimum 2 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

CERAMIC SLURRY MIXER
Technical Specifications

Sl. No.	Parameters	Specification
1.	Bowl Capacity	8 litres
2.	Bowl Material	Stainless steel
3.	Stirrer	With different types of blades for proper mixing of ceramic particles
4.	Motor (Should able to run continuously for 72 hours without stop for preparing ceramic slurry for Investment casting process)	Up to 2 HP
5.	Make	Crompton greaves
6.	RPM Controller	Required
7.	Special Features	Heavy platform, Up and down motion with gear box, RPM Controller
8.	Extra Accessories	Control panel, Timer, Temperature
9.	Warranty	Minimum 2 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

VARIABLE SPEED KAPLAN TURBINE TEST RIG
Technical Specifications

SI No.	Parameters	Specification
1.	Kaplan Turbine	<ul style="list-style-type: none"> • Type: Axial Flow Reaction Turbine • Capacity: 5hp/3.75kW • Rated speed:1800 rpm • Discharge Capacity: 1500 lpm • Supply Head:7 meters • Guide Vane: Gun metal vanes(aerofoil Blade Shaped) • Transparent window for inner view
2.	Loading (Rope Brake)	<ul style="list-style-type: none"> • Material: Cast iron • Drum Size: 200 mm diameter
3.	Supply Pump Set	<ul style="list-style-type: none"> • Size: 5"x 4" • Discharge: 1500lpm • Total Head: 10 m • Motor Capacity: 15hp • Make: Kirloskar • Starter for motor: dual starter
4.	Flow Measurement	<ul style="list-style-type: none"> • Venturimeter and manometer • Material: CI body • Manometer fluid: Mercurry
5.	Pressure Measurement	<ul style="list-style-type: none"> • 4" dial bourdon tube Pressure gauges(0-4kg) • 4" dial bourdon tube vacuum gauges(0-700mmof Hg)
6.	RPM indicator	<ul style="list-style-type: none"> • Tachometer
7.	Sump tank	<ul style="list-style-type: none"> • Material of construction: MS, with FRP coating with suitable capacity • Service required: 3 phases, 440volts, 50Hz AC supply
8.	Annual Maintenance Cost	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
9.	The supplier	<ul style="list-style-type: none"> • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the

		quotation. <ul style="list-style-type: none"> • Supplier Will provide certificate of calibration and inspection • Manufacturer of machine should provide certificate on their letter head for "Spares and parts can be supplied up to 10 years from date of supply.
10.	Warranty	3 years
*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.		

VANE PUMP TEST RIG
Technical Specifications

SI No.	Parameters	Specification
1.	Pump	Vane type with special arrangement to prevent over pressure. Working fluid: OIL must be provided by the supplier
2.	Motor	1HP AC motor, 3-phase, 440volts, 50Hz Foot Mounting Motor.
3.	Energy meter	3 phase, 4 wire industrial energy meter(ISI mark)
4.	Stop watch	Digital type
5.	Storage tank	<ul style="list-style-type: none"> • Collecting tank with suitable size • Material:MS with anti corrosive provision
6.	Measuring tank	MS tank with proper coating and gauge glass scale fitting with drain valve
7.	Pressure gauge	4 inch Dial, Bourdon gauge type
8.	Vacuum Gauge	4 inch Dial, Bourdon gauge type
9.	Flow measurement Flow control valve	<ul style="list-style-type: none"> • Rotameter • Suitable size
10.	Speed measurement	Tachometer
11.	Annual Maintenance Cost	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
12.	The supplier	<ul style="list-style-type: none"> • The supplier must provide ISI mark • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the quotation. • Supplier Will provide certificate of calibration and inspection • Manufacturer of machine should provide certificate on their letter head for "Spares and parts can be supplied up to 10 years from date of supply.
13.	Warranty	3 years
*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.		

**SINGLE CYLINDER 2 STROKE PETROL ENGINE WITH ROPE BRAKE
DYNAMOMETER
Technical Specifications**

Sl. No.	Parameters	Specification
1.	Engine	Single cylinder, 2 stroke
2.	Loading	Rope brake dynamometer
3.	Exhaust gas calorimeter	Shell and Tube calorimeter with proper insulation
4.	Air box	Suitable size fitted with orifice and U tube manometer for measurement of mass flow of air
5.	Temperature indicator	6 point digital temp. indicator with operating knob, range 0-600°C with 1°C
6.	RPM indicator	Tachometer
7.	Mass	Dead weight
8.	Annual Maintenance Cost	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
9.	The supplier	<ul style="list-style-type: none"> • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the quotation. • Supplier Will provide certificate of calibration and inspection • Manufacturer of machine should provide certificate on their letter head for "Spares and parts can be supplied up to 10 years from date of supply.
10.	Warranty	3 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.</p>		

**SINGLE CYLINDER 4 STROKE DIESEL ENGINE WITH VARIABLE
COMPRESSION RATIO (VCR)
Technical Specifications**

Sl. No.	Parameters	Specification
1.	Engine	Single cylinder, 4 stroke water cooled high speed diesel engine of rated power output of 5 hp.
2.	Loading	Eddy current dynamometer
3.	Exhaust gas calorimeter	Shell and Tube calorimeter with proper insulation
4.	Air box	Suitable size fitted with orifice and U tube manometer for measurement of mass flow of air
5.	Fuel measuring arrangement	Suitable provision for fuel measurement
6.	Temperature indicator	<ul style="list-style-type: none"> • 6 point digital temp. Indicator with, range 0-600°C with 1°C. • Water meter for heat carried away by the cooling water
7.	RPM indicator	Tachometer
8.	Sump tank	<ul style="list-style-type: none"> • Material of construction: MS • Service required: Electrical supply-5hp • 3 phases, 440volts, 50Hz AC supply
9.	Annual Maintenance Cost	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
10.	The supplier	<ul style="list-style-type: none"> • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the quotation. • Supplier Will provide certificate of calibration and inspection • Manufacturer of machine should provide certificate on their letter head for "Spares and parts can be supplied up to 10 years from date of supply.
11.	Warranty	3 years
*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.		

**CRITICAL HEAT FLUX
Technical Specifications**

Sl. No.	Parameters	Specification
1.	Cylindrical glass Vessel diameter	200 mm approx.
2.	Cylindrical glass Vessel height	125 mm approx.
3.	Bulk Heater	Nichrome Coil
4.	Test Heater	Nichrome Wire
5.	Thermometer	10 to 110 C
6.	Dimmerstat	0 - 10 amps
7.	Voltmeter	0 - 100 V
8.	Ammeter	0 - 10A
9.	Sump tank	<ul style="list-style-type: none"> • Material of construction: MS • Service required: Electrical supply-5hp • 3 phases, 440volts, 50Hz AC supply
10.	Annual Maintenance Cost	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
11.	The supplier	<ul style="list-style-type: none"> • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the quotation. • Supplier Will provide certificate of calibration and inspection • Manufacturer of machine should provide certificate on their letter head for "Spares and parts can be supplied up to 10 years from date of supply.
12.	Warranty	3 years
*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.		

SHELL AND TUBE HEAT EXCHANGER
Technical Specifications

Sl. No.	Parameters	Specification
1.	Shell	<ul style="list-style-type: none"> • Material -M.S. • I.D. -208 mm. • Thickness -6 mm. • Length -500 mm • 25% cut baffles at 100 mm distance -4 nos.
2.	Tubes	<ul style="list-style-type: none"> • Material: copper. • I.D.: 13 mm. • O.D.: 16 mm. • Length of tubes - 500 mm. • No. of Tubes - 32.
3.	Geysers	<ul style="list-style-type: none"> • 230 V A.C.3kW.- 2 nos.
4.	Temperature Measurement	Digital Temp. Scanner
5.	Measuring Tank	<ul style="list-style-type: none"> • 500 x 400 x 300 mm • Corrosion resistant materials for use with ordinary waters
6.	Guarantee	Preferably 3 years
7.	Annual Maintenance Cost	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
8.	The supplier	<ul style="list-style-type: none"> • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the quotation. • Supplier Will provide certificate of calibration and inspection • Manufacturer of machine should provide certificate on their letter head for "Spares and parts can be supplied up to 10 years from date of supply.
9.	Warranty	3 years

*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system

should be indicated.

Experimental facilities to be conducted:

1. Determination of heat transfer coefficient for inner and outer surface of tubes.
2. Study of variation of heat transfer coefficient with the type of flow and the temperature differential upon it.
3. Energy balance and efficiency calculation

PARALLEL AND COUNTER FLOW HEAT EXCHANGER
Technical Specifications

Sl. No.	Parameters	Specification
1.	length of heat exchanger	1.6 m
2.	Outer Tubes Inner tube	<ul style="list-style-type: none"> • Material –G.I. • I.D. –27.5 mm; O.D. – 33.3 mm • material – copper • O.D.- 12.7 mm(approx)
3.	Geysers	230 V, A.C. 3kW.
4.	Temperature Measurement	Digital temperature scanners with 4 thermocouples
5.	Measuring flask	1000 cc with stop clock.
6.	Annual Maintenance Cost	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
7.	The supplier	<ul style="list-style-type: none"> • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the quotation. • Supplier Will provide certificate of calibration and inspection • Manufacturer of machine should provide certificate on their letter head for “Spares and parts can be supplied up to 10 years from date of supply.
8.	Warranty	3 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.</p>		

UNSTEADY STATE HEAT TRANSFER
Technical Specifications

Sl. No.	Parameters	Specification
1.	Test Piece	<ul style="list-style-type: none"> • Length: 400mm, Dia: 30mm • Material: Brass
2.	Temperature Measurement	Digital temperature indicator with 6 thermocouples
3.	Hot water bath	<ul style="list-style-type: none"> • Digital temperature controller • Fully insulation
4.	Dimmerstat	0-240V, 0-2 Amps
5.	A timer	To give signal at regular interval of time.
6.	Annual Maintenance Cost	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
7.	The supplier	<ul style="list-style-type: none"> • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the quotation. • Supplier Will provide certificate of calibration and inspection • Manufacturer of machine should provide certificate on their letter head for "Spares and parts can be supplied up to 10 years from date of supply.
8.	Warranty	3 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.</p>		

HEAT PIPE APPARATUS
Technical Specifications

Sl. No.	Parameters	Specification
1.	Heat Pipe	<ul style="list-style-type: none"> • O.D: 30mm, Length: 350mm(appprox.) • Material: SS, Copper
2.	Temperature indicator	0-200°C, multichannel controller with cold junction compensation
3.	Condenser Tank size	2lirs of water capacity
4.	Dimmerstat	0-240V, 0-4 Amps
5.	Voltmeter	0-100 volts,
6.	Ammeter	0-3 Amps
7.	Annual Maintenance Cost	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
8.	The supplier	<ul style="list-style-type: none"> • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the quotation. • Supplier Will provide certificate of calibration and inspection • Manufacturer of machine should provide certificate on their letter head for “Spares and parts can be supplied up to 10 years from date of supply.
9.	Warranty	3 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.</p>		

BOUNDARY LAYER APPARATUS
Technical Specifications

Sl. No.	Parameters	Specification
1.	Wind Tunnel	Open type
2.	Test Section	200mm x 200mm
3.	Blower	Compatible capacity
4.	Motor	Compatible capacity
5.	U-tube manometer	Length: 1m
6.	Pitot static tube	300mm, Tube diameter:3/8"
7.	Annual Maintenance Cost	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
8.	The supplier	<ul style="list-style-type: none"> • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the quotation. • Supplier Will provide certificate of calibration and inspection • Manufacturer of machine should provide certificate on their letter head for "Spares and parts can be supplied up to 10 years from date of supply.
9.	Warranty	5 years
*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.		

DROPSWISE AND FILM WISE CONDENSATION HEAT TRANSFER
Technical Specifications

Sl. No.	Parameters	Specification
1.	Steam generator	Suitable Capacity
2.	Tube	<ul style="list-style-type: none"> • Copper • Natural finish, polished surface
3.	Temperature Measurement	Digital temperature scanner 0 ^o -200 ^o C
4.	Annual Maintenance Cost	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
5.	The supplier	<ul style="list-style-type: none"> • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the quotation. • Supplier Will provide certificate of calibration and inspection • Manufacturer of machine should provide certificate on their letter head for "Spares and parts can be supplied up to 10 years from date of supply.
6.	Warranty	5 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.</p>		

SIMPLE VAPOR ABSORPTION SYSTEM
Technical Specifications

Sl. No.	Parameters	Specification
1.	Fluids in the system	Ammonia + Water + Hydrogen
2.	Heat Input	90-120 Watt
3.	Voltmeter	0-300 V
4.	Ammeter	0-10 Amp
5.	Temperature Indicator	<ul style="list-style-type: none"> • Digital temperature indicator (50-150° C) • No. of channels: 12 Nos. along with a suitable selector switch.
6.	Annual Maintenance Cost	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
7.	The supplier	<ul style="list-style-type: none"> • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the quotation. • Supplier Will provide certificate of calibration and inspection • Manufacturer of machine should provide certificate on their letter head for "Spares and parts can be supplied up to 10 years from date of supply.
8.	Warranty	5 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.</p>		

THERMOCOUPLE CALIBRATION SETUP
Technical Specifications

Sl. No.	Parameters	Specification
1.	Heat Source	Provided with ceramic insulations
2.	Heater	Nichrome wire heater
3.	Temperature controller	Digital, Range:0-100°C
4.	Ice Pot	Compatible capacity
5.	Thermometer	Glass thermometer, Range:0-100°C
6.	Thermocouple	Fe constant type
7.	Annual Maintenance Cost	Include the cost of annual maintenance for each year for five years after the guarantee/ warranty period. Provide the amount and the terms, Note that those providing better after sales service and support with written evidence will be given preference.
8.	The supplier	<ul style="list-style-type: none"> • Supplier should have commissioned at least 10 no. machines to reputed research/ government establishments • At least 3 user performance certificate for similar type of machines to be attached to the quotation. • Supplier Will provide certificate of calibration and inspection • Manufacturer of machine should provide certificate on their letter head for “Spares and parts can be supplied up to 10 years from date of supply.
9.	Warranty	5 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.</p>		

EXPERIMENTAL REFRIGERATION TUTOR
Technical Specification

Sl. No.	Parameters with Specification
1.	Compressor: Hermetically sealed., 1/3 Ton capacity with suitable fan for cooling, Make: Kirloskar
2.	Condenser: Finned tube type air cooled condenser with variable speed fan
3.	Thermostatic expansion valve with adjustable evaporator load
4.	Capillary tube of suitable size copper tube
5.	Temperature indicator: Digital temperature indicator of 6 channels with selector switch & accuracy of $\pm 1^{\circ}\text{C}$
6.	Pressure gauges: Bourdon tube type- 4" dial (0-15 kg/cm ²)
7.	Rotameter for mass flow measurement of liquid refrigerant. (Eureka)
8.	Energy meter (Digital with ISI mark) – 02 Nos each for Compressor and heater of evaporator to be controlled by dimmerstat
9.	Evaporator tank of suitable size made up of Stainless steel
10.	Refrigerant: R134a
11.	HP/LP Cutout for safeguard to compressor
*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.	

EXPERIMENTAL AIR CONDITIONING TUTOR
Technical Specifications

Sl. No.	Parameters with Specification
1.	Compressor: Hermetically sealed., 1/2 Ton capacity., Make : Kirloskar
2.	Condenser: Finned tube type air cooled condenser suitable for above compressor
3.	Thermostatic expansion valve: Indfoss/danfoss Make
4.	Evaporator: Suitable air cooled type fitted in the duct
5.	Temperature indicator: Digital temperature indicator of 10 channels with selector switch & accuracy of $\pm 1^{\circ}$ C.(k-type) to measure DBT & WBT at different points
6.	Orifice & manometer to measure the mass of air flow
7.	Steam generator: for steam injection
8.	Axial fan: For forcing the air in duct
9.	Pressure gauges: Bourdon tube type- 4" dial (0-15 kg/cm ²)
10.	Rotameter for mass flow measurement of liquid refrigerant. (Eureka Make)
11.	Energy meter (Digital with ISI mark) – 02 Nos each for Compressor and heater
12.	Refrigerant: R134a
13.	Heater: Finned type for heating air
14.	HP/LP Cutout for safeguard to compressor
*Additional optional accessories should be indicated separately along with their price. The above specs are desirable and the actual numbers achievable for your system should be indicated.	

DIFFERENTIAL SET UP
Technical Specifications

Sl. No.	Parameters	Specification
1.	General specifications	Experimental set up unit for demonstration of working of differential gear.
2.	After-sales Service	<ol style="list-style-type: none"> 1. The delivery of the equipment should be considered complete only after successful commissioning of the instrument. 2. The supplier should provide a prompt after-sales service.
3.	Warranty	3 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

CENTRIFUGAL FORCE APPARATUS
Technical Specifications

Sl. No.	Parameters	Specification
1.	General specifications	<ol style="list-style-type: none"> 1. To consist of a built in variable speed drive, rotation assembly; digital tachometer and digital force display. 2. Rotating radius: 25-125 mm.(with sliding adjustment and having at least 5 steps) 3. Rotating masses: 50, 75, 100, 125, 150 gm. 4. Motor with speed controller. 5. Rotating speed: 0-600 rpm. 6. Speed measurement: speed sensor and digital display 7. Force measurement: Load cell and Digital display, 8. Rotating arm fully guarded.
2.	Power Requirements	220V/ 50Hz
1.	Installation, Commissioning and Training	<ol style="list-style-type: none"> 1. The delivery of the equipment should be considered complete only after successful commissioning of the instrument. 2. An instruction manual for student and lecturer provided.
3.	After-sales Service	The supplier should provide a prompt after-sales service.
4.	Warranty	3 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

INERTIA OF ROTATIONAL MOTION APPARATUS
Technical Specifications

Sl. No.	Parameters	Specification
1.	General specifications	<ol style="list-style-type: none"> 1. To consist of a built in variable speed drive, rotation assembly; digital tachometer and digital force display. 2. Metal rotating bar (length =550mm and dia=10 mm), weights (100gm, 200gm, 4000 gm) with knurled bolts for quick fastening. 3. Solid and hollow test cylinders. 4. Ball bearing mounted rotating drum. 5. Acceleration of system by weight attached to the drum.
2.	Power Requirements	220V/ 50Hz
3.	Installation, Commissioning and Training	<ol style="list-style-type: none"> 1. The delivery of the equipment should be considered complete only after successful commissioning of the instrument. 2. An instruction manual for student and lecturer provided.
4.	After-sales Service	The supplier should provide a prompt after-sales service.
5.	Warranty	3 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

TORSIONAL VIBRATION APPARATUS (DIGITAL TYPE)
Technical Specifications

Sl. No.	Parameters	Specification
1.	General specifications	<ol style="list-style-type: none"> 1. Experimental unit for investigating torsional vibration and torsional stiffness in demonstrations and student experiments. 2. A corrosion resistant steel torsion bar. 3. Three mass discs. 4. Four ball bearings mounted bearing units with chucks and 3 hole flange, the bearing units can be positioned as required. 5. Sealed oil damper. 6. Exciter with drive crank, excitation amplitudes 1.4°, 1.8°, 2.4° 7. Electrical exciter control unit with digital frequency display, 10-turn potentiometer and supply for the shaft encoders. 8. Software for data acquisition via USB under Windows 7
2.	Power Requirements	220V/ 50Hz
3.	Installation, Commissioning and Training	<ol style="list-style-type: none"> 1. The delivery of the equipment should be considered complete only after successful commissioning of the instrument. 2. An instruction manual for student and lecturer provided.
4.	After-sales Service	The supplier should provide a prompt after-sales service.
5.	Warranty	3 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

STATIC AND DYNAMIC BALANCING MACHINE
Technical Specifications

Sl. No.	Parameters	Specification
1.	General specifications	<ol style="list-style-type: none"> 1. Speed controlled motor giving shaft speeds between 0...1400rpm. 2. Balance mass radius adjustment range 30....80mm 3. Balance masses of 50, 75, 100 and 125 gm supplied 4. Linear scale in millimeters 5. Angular scale in degrees, resolution 1degree (°) 6. 100 small bearing masses supplied along with weighing tub.
2.	Power Requirements	220V/ 50Hz
3.	Installation, Commissioning and Training	<ol style="list-style-type: none"> 1. The delivery of the equipment should be considered complete only after successful commissioning of the instrument. 2. An instruction manual for student and lecturer provided.
4.	After-sales Service	The supplier should provide a prompt after-sales service.
5.	Warranty	3 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

JOURNAL BEARING FRICTION APPARATUS
Technical Specifications

Sl. No.	Parameters	Specification
1.	General specifications	<ol style="list-style-type: none"> 1. Unit to investigate basic tribological topics 2. Radial journal bearing with stainless steel shaft journal and free-moving bronze bearing shells. 3. Single phase-phase AC motor with frequency converter (variable frequency drive) for speed control. 4. Load applied to journal bearing using a mechanical lever. 5. Measurement of friction moment achieved through the use of a lever with sliding weight. 6. Balance weight to compensate for the intrinsic weight of the measuring set-up. 7. Drip-feed lubrication for continuous lubricant supply (drip-feed lubricator) . 8. Drip tray for leakage oil. 9. Inductive speed sensor. 10. Thermocouple for oil temperature measurement and with digital displays for oil temperature. 11. Variety of bearing materials for testing
2.	Power Requirements	220V/ 50Hz
3.	Installation, Commissioning and Training	<ol style="list-style-type: none"> 1. The delivery of the equipment should be considered complete only after successful commissioning of the instrument. 2. An instruction manual for student and lecturer provided.
4.	After-sales Service	The supplier should provide a prompt after-sales service.
5.	Warranty	3 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		

ROLLER BEARING FAULTS APPARATUS
Technical Specifications

Sl. No.	Parameters	Specification
1.	General specifications	<ol style="list-style-type: none"> 1. Investigation of the vibrations of roller bearings. 2. Roller bearings with damaged outer race. 3. Roller bearings with faulty inner race. 4. Roller bearings with damaged rolling element. 5. Roller bearings with combined damage. 6. Long-running roller bearings. 7. New and undamaged roller bearings. 8. Radial loading of bearings (belt drive). 9. Accessory set for machinery diagnostic training system. 10. Stackable storage system to house the components.
2.	Power Requirements	220V/ 50Hz
3.	Installation, Commissioning and Training	<ol style="list-style-type: none"> 1. The delivery of the equipment should be considered complete only after successful commissioning of the instrument. 2. An instruction manual for student and lecturer provided.
3.	After-sales Service	The supplier should provide a prompt after-sales service.
4.	Warranty	5 years
<p>*Additional optional accessories should be indicated separately along with their price. The above specifications are desirable and the actual numbers achievable for your system should be indicated.</p>		