

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, ODISHA



P.O: Engineering College Burla (Siddhi Vihar), Dist: Sambalpur
Odisha– 768018, India

Website : www.vssut.ac.in, E-mail: registrar@vssut.ac.in, Ph:(0663)2430573,Fax-2430592

No. VSSUT/ CIVIL / Equip/ 2696

Date: 21/08/2017

TENDER CALL NOTICE

Sealed Tenders are invited from the intending reputed Original Equipment Manufacturers/ Direct Importers/ Registered Dealers for supply of Equipments for different laboratories of **Civil Engineering Department of VSSUT, Burla**. Detailed information and the tender document are available in the University website www.vssut.ac.in.

Sd/-

REGISTRAR

Memo No. VSSUT/CIVIL/Equip/2697 (5)

Dated 21/08/2017

Copy to:

- 1) M/s Display lines, 219, Saheed Nagar, Bhubaneswar-751007 with a request to publish the above advertisement in one issue of the Odisha daily edition (ALL ODISHA EDITION) of THE SAMAJ and The Indian Express (All India edition) using minimum space at I & PR approved/lowest rates. The bills may be sent to the Comptroller of Finance, VSSUT, Burla-768018 in TRIPLICATE along with copies of the paper in which the publication is made, for necessary payment.
- 2) The University/Department Notice Board for publicity.
- 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) S.O. Accounts, for information and necessary action.
- 5) Steno to Registrar for record. This is based on the allocation of Rs.80 lakhs to the Department of Civil Engg. Under the programme for Infrastructure Development vide VSSUT/F&P-124/1657/2017 Dated 03.08.2017

Sd/-

REGISTRAR

SECTION - I: INVITATION FOR BIDS (IFB)

Sealed Bids (properly stitched separately) in two separate covers (Technical Bid and Price Bid) are invited by the “The Registrar, Veer Surendra Sai University of Technology, Odisha” from the Original Equipment manufacturers/ Importers/ authorized distributors/ dealers for supply of Instruments, equipments, machineries etc. of reputed make (National/ International) for the Department of Civil Engineering, VSSUT Burla, Odisha.

The Bidders may download the Tender Documents directly from the website available at <http://www.vssut.ac.in> and the Tender cost fee of Rs.1000/- (Non-refundable) by way of separate Demand Draft drawn in favour of “The Registrar, Veer Surendra Sai University of Technology, Burla” payable at SBI, Burla should be enclosed along with the Bid. The Tender cost fee and the EMD amount should be submitted separately in separate demand drafts. 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.

TIME SCHEDULE:

- a) Date of commencement of downloading bidding document - 22/08/2017 at 11.00 AM
- b) Last date and time for Receipt of bids - 21 /09/2017 up to 5.00PM
- c) Time and date of opening of Tender & Technical bid - 23/09/2017 at 10.30 AM
- d) PLACE OF OPENING OF TENDER – Conference Hall of VC Secretariat, VSSUT, Burla
- e) ADDRESS FOR COMMUNICATION AND RECEIPT OF BID DOCUMENTS:

THE REGISTRAR
VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, ODISHA
At- Burla, PO - Burla Engineering College, Dist-Sambalpur-768018
Tel. No-0663-2430211 Fax No-0663-2430204

Sd/-
REGISTRAR
VSSUT Burla

SECTION-II: GENERAL TERMS AND CONDITIONS

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. Non-compliance of any of these conditions shall disqualify the eligibility.

1.1 Original Equipment manufacturers/ Importers/ authorized distributors/ dealers 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 The Bidder whether manufacturer/ distributor/ dealer must have experience of supply and installation of the quoted items in different IITs/ NITs/ Institutes of national repute during last preceding 3(Three) years reckoned from the date of bid opening and the details such as 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 IIT/ NIT/ Institute of national repute must be submitted along with documentary proof including purchase orders from the institute. A list of organisations / institutes with their detailed address, contact telephone and email address, to whom the quoted items were supplied is to be attached with the technical bid.

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

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

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 up to $\pm 5\%$ 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.

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 equipment and machineries 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 Tax clearance certificate up to date where applicable.

3.6 Copy of the IT PAN Card.

3.7 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)

3.8 Address, Telephone No., e-mail, Fax of the Branch Office/ Contact Person/ Liaisoning Office in Odisha. (As per Annexure IV)

3.9 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.

3.10 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.

3.11 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 $\pm 5\%$ in case of Machineries/Equipments)

4. Price Bid (COVER – B)

4.1 The hard copy of price bid giving the rates for various instruments & equipment and other items 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 Taxes admissible, Packing, Forwarding and Handling charges, Insurance charges, ET, Freight up to destination including unloading, commissioning including testing and training with total price per item at FOR VSSUT Burla. The bidders are required to submit the individual price of each instrument(s) and equipment(s) as indicated in the schedule of requirements. For imported equipments the quoted price should be in currency of the country of origin.

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 conference Hall of VC Secretariat,VSSUT, Burla on the date and time to be communicated to them after technical evaluation of Cover A by E-mail/Fax.

5 BID CONDITIONS

5.1 The bidders should verify the sites of existing laboratories of Department of Civil 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 Equipment/Machinery 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 Bid Price

- The contract shall be for the full quantity as described above. Corrections, if any, shall be made by crossing out, initialling, 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.

- Taxes 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.

5.6 Tax clearance

Copies of valid Tax 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.

5.7 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 or submission of EMD in any other form except Demand Draft 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.

5.8 SUBMISSION OF BIDS

Sealing and Marking of Bids

Bid should be submitted only through REGISTERED POST /SPEED POST 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) Reference No of Bid _____
- ii) Due date & time for submission of the Bid _____
- ii) 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 invariable 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 and bids submitted by hand will not be entertained.

5.9 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.

5.10 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.

5.11 BID OPENING

The **Purchaser** will open all bids, in the presence of bidder's representatives who choose to attend at **10.30 AM on dated 23/09/2017 at the Conference Hall of the VC's Secretariat, Veer Surendra Sai University of Technology, Burla**".

5.12 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.

5.13 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.

5.14 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.

5.15 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
- 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 submitted the detailed catalogue, Foundation drawings & schedule of supply of items, if required.
- If the bidders have not agreed to give bid validity.
- Furnishing of wrong/ambiguous information in the compliance statement may lead to rejection of bid and further black listing of the bidder, if prima-facie it appears that the information in the compliance statement was given with a malafide/fraudulent intent.

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 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;
- 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.

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 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.

6.3 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.

6.4 Transportation

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

6.5 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. Income Tax as applicable shall be deducted at source.

6.6 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.

6.7 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.

6.8 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.

6.9 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.

Sd/-

REGISTRAR
VSSUT, Burla

SECTION – III: FORMS AND ANNEXURES
ANNEXURE-I (a)

PRICE SCHEDULE (ITEM WISE)

Name of the Firm: _____

Sl. No.	Name of the Instrument Make: Model No.: Country of origin	
01	(A1) Base Price/Unit	
02	(A2) All Taxes	
03	(A3) Freight Charge (if any)	
04	(A4) Any Other (If any, Mention Details)	
05	(A) Total= A1+A2+A3+A4 in INR	
06	IN WORDS	

Note- (i) Price Bid proforma should be provided individually for all equipments.

(ii) Taxes like GST, Freight and or other taxes/ Charges, if any applicable must be explicitly mentioned in this price bid. Any type of correction/ addition in price schedule shall not be permissible. **Taxes mentioned elsewhere except this price bid will not be taken into consideration.**

(Signature of Authorized signatory of Bidder with seal)

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)
			4			
1	2	3	1st yr.	2nd yr.	3rd yr.	
			(a)	(b)	(c)	

Note:-

1. 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).
2. The cost of AMC may be quoted along with taxes applicable on the date of bid opening. The taxes to be paid extra should be specifically stated. In absence of any such stipulation the price will be taken inclusive of all taxes and no claim for the same will be entertained later.
3. Cost of AMC will not be added for Ranking/Evaluation purpose. However, the cost of AMC for lowest evaluated bidder is subject to negotiation.
4. The payment of AMC will be made as per payment terms of the bid document.
5. The uptime warranty and down time penalty shall be as per the bid document.
6. All software update should be provided free of cost during AMC period.
7. The stipulations in Technical Specification will supersede above provisions.
8. 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

rectification is done; that number 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 hereby 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.

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 Machineries & Equipments 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

SECTION-IV: SCHEDULE OF REQUIREMENTS AND TECHNICAL SPECIFICATIONS

Sl no	Name & Specification of articles/materials/machineries/services	quantity
COMPUTATION LAB		
1	<p><u>On line UPS of reputed make with battery</u> Warranty Details: Minimum 2 year on site. Capacity- Minimum 2000 VA/ 1600 watts Voltage compatibility- 220 V, 230 V, 240 V Wattage- Minimum 800 W Battery Type: Free sealed, lead acid battery with suspended electrolyte, leak proof Typical recharge time- 6 hours Output Power Capacity- 1600 Watts/ 1.0 KVA The Supplier has to make necessary electrical wiring and check the proper functioning of equipment in compatible with existing Desktops and other peripherals.</p>	1
2	<p><u>Inverter of reputed make with tubular battery (reputed make)</u> Appropriate for running of 3 ceiling fans, 10 ceiling LED lights (10 W each), 2 desktop, 1 printer Minimum backup: 8 hours Minimum Warranty: 2 years All electrical wirings and installations should be made and checked for its operation and compatibility.</p>	1
3	<p><u>Color Printer (Laser) of reputed make</u> Printing method: Laser Type: multifunctional Printing output: Color, Duplex Function: Print, Scan and Copy Maximum print resolution: 1440 x 1440 dpi Media size supported: A3, A4, A5, A6, B5, DL, B6 Input tray capacity: 100 sheet Output tray capacity: 30 sheet Input tray type: Standard cassette OS window: 10, 8.1, 8, XP Multicopy: Minimum 20 pages Warranty : Minimum 1 year All fittings, installations, operation and compatibility should be made at required Lab</p>	1
4	<p><u>Printer with Scan and Copy (B/W) of reputed make</u> Printing method: Laser Type: Multifunction</p>	1

	<p>Printing output: Monochrome, Duplex Function: Print, scan, copy Internal Memory: 128 mb Refill type: Toner cartridge Duty Type: Monthly average 10000 copies Maximum print resolution: 1200x 1200 dpi Multicopy- minimum 99 pages OS window- 10,8.1,8, XP Warranty : Minimum 1 year All fittings, installations, operation and compatibility should be made at required Lab</p>	
5	<p><u>ARC GIS Master Lab Kit</u> (Minimum requirement: The supplier may add any extra add-ons and hands on training as needed for academic Institutions. Necessary after sale service and maintenance and upgradation shall be provided.) ESRI ArcGIS Master Lab Kit includes: ArcGIS Desktop Advance SU – 1 Lic ArcGIS Desktop Standard SU – 1 Lic ArcGIS Desktop Basic SU – 1 Lic <u>Desktop Extensions</u></p> <ul style="list-style-type: none"> · ArcGIS Geo-Statistical Analyst Extension for Desktop · ArcGIS Network Analyst Extension for Desktop · ArcGIS Publisher Extension for Desktop · ArcGIS Schematics Extension for Desktop · ArcGIS Spatial Analyst Extension for Desktop · ArcGIS 3D Analyst Extension for Desktop <p>ESRI ArcGIS Desktop Basic SU</p>	1
6	ESRI ArcGIS Desktop Basic SU	2
7	<p><u>Single moulded plastic chairs</u> The chairs should be from reputed make. Product Dimensions: Length (22 inches), Width (22 inches), Height (32 inches) Color: Black No Assembly Required: The product is to be delivered in a pre-assembled state Warranty: 2 year on product Lacquered finish with arm chair with seat and back cushion velvet upholstery and pu cushion ergonomically designed for maximum comfort.</p>	10
8	<p><u>Inverter Air Conditioner 1.5 ton of reputed make</u> Cooling capacity: 5300 W Remote: Yes Power: 230 AC, 50 Hz Power Consumption: 1600 W Warranty- 1 year for product and 5 year for compressor Necessary wiring with copper wire and drain pipe must be fitted.</p>	1

	Appropriate Voltage stabilizer must be supplied, installed and checked for its compatibility and successful operation with Air Conditioner. The stabilizer must be with minimum 2 years onsite warranty.	
9.	Anti-Virus Small Office and Internet Security PCs + File Server + Mobile Devices (CD)	Twenty five user
CONCRETE LAB		
1	Rapid Chloride permeability test set , as per ASTM-1202 chloride permeability test set up consists of: 1) Electronics microprocessor based monitor, 2) Sample conditioning set up includes vacuum pump, high vacuum glass desiccator, Water reservoir with manifold, Macleod gauge, pressure rubber tubing, 3) USB port with Pen Drive Technical specification: • Applied voltage: Min. 60 V dc • Accuracy: Voltage accuracy ± 0.1 V: Current accuracy ± 1 mA • Measurement channel: Min. 4 Nos. • Test cell along with accessories : Min. 4 Nos. for holding specimen of size: min 95 mm dia, 50 mm thick • Vacuum saturation apparatus along with kits - Separatory funnel : min 500 mL capacity - Vacuum desiccator : min 250 mm inside dia - Vacuum pump maintaining pressure: < 50 mm Hg - Vacuum gage : Accurate to ± 5 mm Hg over range of 0- 100 mm Hg • Operating voltage/current : 100-240 V, 50 Hz • Auto temperature control during test • Programmable test duration • Measurement display • User friendly PC software along with USB connection • Conform to ASTM C1202 / AASHTO T227 for electrical indication for resistance of concrete to chloride ion penetration Optional accessories • Temperature measuring device : 0-100 o C • Data storage facilities • Shunt resistor-100 mV, 10 A rating and tolerance $\pm 0.1\%$	1
2	Standard Test Sieves set of 30 cm diameter as per IS specifications, for coarse aggregate made of G.I. frame with joint fitted with steel (M.S.) Punched sheets square hole opening. Containing following sieve sizes: mm 80, 40, 20, 12.5, 10, 4.75 with lid and pan.	5 set
3	Standard Test Sieve set 20cm dia as per IS specification, brass frame without joint nicely polished Endcott Pattern, double folded bottom having beading at top tight fitting with each other finished and having stainless steel mesh. Containing following sieve sizes: mm 4.75, 2.36, 1.18, 600 μ , 300 μ , 150 μ with lid and pan.	5 set
4	Standard Test Sieve set 20cm dia as per IS specification, brass frame without joint nicely polished Endcott Pattern, double folded bottom having beading at top tight fitting with each other finished and having stainless steel mesh. Containing following sieve sizes Size: 90 μ with lid and pan.	5 set
5	Vicat Needle Apparatus confirming to IS specifications. Consists of a metallic frame bearing a movable rod with cap at one end and a vicat mould 80mm in dia at the base, 70mm at the top and 40 mm high and with a glass base plate, consistency plunger initial and final needless in a nice Jewellery case. Fitted with Dashpot to facilitate the gentle lowering of the needle.	5

6	Prism mould of size 150mmx150mmx700mm, made of steel and are supplied complete with a base plate.	9 no
7	Electronic Weighing Balance; Capacity 20 Kg, Accuracy ± 1 gm,	1
8	Concrete Pan Mixer, Cap. 80 ltr. With Hydraulic Arrangement for tilting the drum	1
9	Concrete core cutting machine with core cutter Specification: Compact and mobile, Core Cutting machine to drive through hard rock, concrete and bitumen and takes out cores for the preparation of laboratory samples. • It should be able to cut cores up to 150 mm dia. • Geared motor moves on a slide and the slide should be able to be rotated through 360 deg. • Travel of the geared motor is approximately 500 mm and the cores of 400-450 mm should be easily taken out in single operation. • Power Supply: AC or Petrol/Diesel Engine Drill bits with barrel 100 mm dia and 150 mm dia need to be quoted.	1
10	Half cell Potential for corrosion measurement : Battery operated with memory Temperature range:- 0° to 60°C Display:- 128 x 128 pixel graphic LCD with backlight Impedance:- 10 M Ω Memory:- Non-volatile memory for simultaneous storage of up to 235'000 potential measurements (980 pages @ 240 measurements each organized in up to 71 objects) Data Output:- RS 232 interface, with USB adapter Battery Operation:- Six LR 6 batteries, 1.5 V for up to: 60 hours (or 30 hours with activated backlight) during potential measurement - 40 hours (or 20 hours with activated backlight) during resistivity measurement Case Dimensions:- 580 x 480 x 210 mm (22.8" x 18.9" x 8.3") Potential Measurement:- Measurement range:- -999 mV to +340 mV Resolution:- 1mV Data Transfer:- software for downloading data and evaluation on PC in windows OS	1
11	Advanced cover meter based on the new generation Profometer touchscreen with universal probe and scan cart. Enhanced correction factor for maximum cover accuracy on congested rebar arrangements. Dedicated functionalities for mapping concrete cover and for reporting one layer rebar arrangements.	1
12	Steam curing tank for concrete specimens: This Apparatus perform steam curing for concrete and second products by the temperature programmed running. The temperature can be controlled from ambient temperature to 90°C . The spray nozzle creates convection current from the internal liquid chamber with an ejector. The internal steam is distributed evenly, and the humidity is kept in 95 % or higher. Repeat testing for temperature and time setting is available by the program control. Specifications: Temperature: Ambient temperature to $90^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Humidity: 95 % or higher (ejector type)	1

	<p>Operation: By program Dimensions of chamber: W 800 x D 825 mm x H 1450 mm Shelf board : 3 Operating voltage/current : 100-240 V, 50 Hz</p>	
13	<p>Length Comparator as per IS : 1199/1959, IS : 4031/1968,IS:9459 The instrument consists of a SS channeled base over which two vertical SS pillars are fixed. An adjustable cross plate is at the top. A digital dial gauge, reading to 0.002mm accuracy can be fixed to the top cross plate. The plunger end of the dial gauge meter can be located upon a 6.5mm dia ball or other reference point cemented on the specimen. On the base there is a similar recessed seating in which can be placed a second ball or reference point of specimen. Complete with a stainless steel standardization bar with insulated grip and 6.5mm dia balls mounted in the ends.</p>	1
14	<p>L-Box Test apparatus for self-compacting concrete as per EN 12350-10: A rectangular-section box in the shape of an 'L', with a vertical and horizontal section, separated by a moveable gate, Made of Mild Steel Duly powder coated, Overall dimensions: 700x200x600 mm, Weight approx.: 18 kg, Gates with 3 smooth bars of 41 mm gap or with 2 smooth bars of 59 mm gap respectively.</p>	1
15	<p>J-Ring Test Apparatus for self-compacting concrete as per ASTM C 1621/C 1621M: Made of Mild Steel Duly powder coated, a base plate 915x915mm, one cone of 200mm bottom dia 100mm top dia and 300mm height, Complete with J Ring of 300mm Dia with 16 nos. Plain rods of 16mm Dia.</p>	1
16	<p>V-Funnel Test for self-compacting concrete as per EN 12350-9: Made of Mild Steel Duly powder coated, Inverted cone shaped equipment with 75 mm square opening at the bottom</p>	1
17	<p>Flow Table Apparatus for self-compacting concrete as per EN 12350-2 / ASTM 1611: Flow table top shall be constructed from a flat metal plate of minimum thickness 1.5 mm, top shall have a plan area of 700 mm × 700 mm and a flatness of within 1.5 mm, Centre of the table shall be scribed with a cross, the lines of which run parallel to the edges of the plate and with a central circle 200 mm in diameter, Weight of the flow table top shall be 16 ± 1 kg, Flow table top shall be hinged to a base frame using externally mounted hinges <u>Mould</u> mould is made of a metal readily not attacked by cement paste or liable to rust and of minimum thickness 1.5 mm, the interior of the mould shall be smooth and free from projections, such as protruding rivets, and shall be free from dents, the mould shall be in the form of a hollow frustum of a cone, tamping bar shall be made of a suitable hardwood</p>	1
18	<p>Orimet Test Apparatus as per EN 12350: It is made of steel, with the tube of a length of 600 mm, inner diameter of 120 mm, Stopwatch with the accuracy of 0.1 second, Straightedge for levelling the concrete</p>	1

ENVIRONMENTAL ENGINEERING LABORATORY		
1	<p>Automated Gas Chromatography Single Quadrupole Mass Spectrometer (GC-MS)</p> <p><u>Technical Specifications:</u> GC system must be upgradable with FID, ECD and NPD detectors. A Complete setup of GC-MS System is required with highest quality performance for comprehensive Metabolomics applications.</p> <p><u>A. GC Specifications:</u></p> <ol style="list-style-type: none"> 1. A GMP compliance GC system with oven operating Temperature from ambient to 450 °C with fast oven heating from 50 to 450 °C in 5 minutes and cool down time from 450 to 50 °C in 4 Minutes. 2. 15- Step or more oven temperature programming. 3. Full electronic Pneumatic control of all the modules of GC should be 15 Channels or more including auxiliary gases. 4. One capillary split/split less and one PTV split/split less injection port. 5. Use of capillary columns (50-320 Micron and Above). 6. Use of Helium or Hydrogen as a carrier Gas. 7. Auto sampler with capacity to hold 15 or more vials. 8. GC-MS direct interface operating temperature from ambient to 350 °C. 9. Gas filtration for inlet of GC. 10. It should include FID Detector with following properties : Detection limit < 1.5 pg c/s or better Data acquisition speed up to 400 Hz or better Dynamic Range > 10⁷ 11. The pressure set points should be adjustable by increments of 0.001 psi up to 100 psi. 12. Head Space Sampler with minimum 12 vials capacity with Pneumatic control and should have option for priority vials. 13. The Head Space Sampler should be transfer line based with loop system for precise quantification and it should be from same manufacturer. It should have up gradation facility as well. 14. System should have capability of locking/adjusting the retention time so that same retention time can be reproduced from system to system and the method should be electronically transferred. NIST 2011 library along-with AMDIS/DRS software should be provided and also retention time locked databases with NIST Database. <p><u>B. Mass Spectrometer Specifications :</u></p> <ol style="list-style-type: none"> 1. Dedicated electron ionization (EI) source with positive and negative modes of operations. 2. Dedicated chemical ionization (CI) source with positive and negative modes of operations. 3. It should have automated tuning for EI/CI. 4. Dual filament for easy switching in EI mode. 5. A Quadrupole Mass Analyzer with a mass range up to 1050 amu or better preferably monolithic quartz type. 	1

	<p>6. Mode of scanning: Full Scan or SIM. 7. Scan speed up to 12,000 u/sec or better. 8. Provision for quadruple heating (150 °C or above) to keep the source clean for a long period. 9. Ionization source temperature programmable up to 350 °C. 10. It should include turbo molecular pump with 260 L/Sec capacity or better. 11. Unit resolution across the total mass range. 12. Mass Stability : ± 0.1 units over 48 hours. 13. EI Sensitivity: Sub picogram sensitivity with full scan (S/N : 1000:1 or better) and femotogram sensitivity under SIM mode. 14. High speed scanning: 20 spectra/sec or better. 15. Capable to run up to 90 SIM ions or above. 16. Automatic Tuning, calibration and snapshot capabilities. 17. Electron multiplier detector for mass spectrometer. 18. A certificate of the principle be included stating the instrument spares and services will be available for 10 years after the supply. 19. User friendly software to control GC, MS, auto sampler and all instrumental operations included qualitative and quantitative data analysis and automatic report generation (original CD with license number). 20. Latest version of NIST databases (including original CD) with license number from manufacturer. 21. Tool kit for routine maintenance of GC and MS. 22. The system must have metabolite identification, quantification software and also pathway analysis software. 23. The system should be capable of replacement GC column without venting MS vacuum which results in elimination of GC/MS downtime.</p> <p><u>C. Other requirements:</u></p> <p>1. Branded PC and printer to be supplied from factory along with the system directly. 2. Suitable table/tables with granite flooring, electrical switches and power supply extension to accommodate GC-HS-MS system with PC and printer. 3. UPS with built-in input and output isolation transformer. Compliant for inductive loads; SMF batteries; Minimum one hour back up with full load (UPS suitable for IT/NETwrok load not acceptable). It should be with 5 years comprehensive warranty to keep system in continuous working condition. 4. All the necessary calibrants of GC-MS to be provided. 5. Consumable spare parts for five years (the list at least include source filaments – 20 Nos, Source Heater – 20 Nos, Injection port glass liners – 10 Nos, GC Septum - 200 Nos, Column inlet/outlet nuts – 10 each, inlet/interface ferrules – 20 each, source insulator, vacuum oil 5 Nos).</p>	
2	<p>CHNS - O Elemental Analyzer <u>Technical Specifications:</u> Fully Automated PC controlled Elemental Analyzer for Liquid and Solids samples. 1. Operating modes for measurement of CHNS, CHN, CNS, CN, N, S,</p>	1

<ol style="list-style-type: none"> 2. Sample weight Range: 0.01 to 1000 mg or better. 3. Detection range: C: 0-40mg (or 100%); N: 0-15mg (or 100%); C: 0-40mg (or 100%); H: 0-3mg (or 100%); S: 0-6mg (or 100%); O: 0-6mg (or 100%) and Cl- 0-2mg. 4. Vendor should quote optional attachment O, Cl as add on modules. 5. Standard deviation: ≤ 0.1 % of absolute or better. 6. To ensure effective separation for complex matrix samples, the system should have two furnaces for combustion and reduction with independent temperature control through software. 7. Should have ash finger to allow removal of ash of combusted samples without the need to change the combustion tube and to handle high halogen or fluorine containing samples. 8. Should have integrated electro mechanical autosampler with 100 positions or more. 9. Should meet international safety standards 10. Total inorganic carbon module also to be offered as optional which can take sample weight up to 5g with no stirring requirement. 11. Multipoint calibration, regression liner to the 4th order, stable over months. 12. Simultaneous C.H.N.S analysis with one sample intake. 13. Software should be windows based and should have display actual pressures, temperatures, flow rates, number of samples analyzed with the provision for setting maintenance interval with monitoring of maintenance cycle. 14. To be supplied with consumables sufficient for CHNS of 5000 samples solid samples and CHNS of 2000 liquid analysis & 1000 consumables for Oxygen.. 15. Automatic leak detection using the software. 16. Analyzer should be able to operate on both Argon & Helium as carrier gas or if possible nitrogen gas too. 17. To ensure complete sample combustion furnace temperature should be 1400°C and maximum up to 1800°C using tin boats. 18. 10 years warranty on furnace system (to be backed by certificate from manufacturer). 19. Advanced chromatographic separation of gases using temperature individual temperature programmed columns for each element. 20. Complete instrument control over elution process with provision of auto zero of baseline after each element elution. 21. Detector: temperature stabilized TCD for measurement of CHNSO, (NDIR for trace S, and Cl optional). 22. Autosampler integrated electro mechanical auto sampler with 100 positions or more. 23. Total organic carbon analysis kit and auto sampler for liquid/solid should also be offered as option. Total inorganic carbon module also to be offered which can take sample weight up to 5 g and with stirring option also. 24. Should be upgraded for the analysis of chlorine and stable isotope Mass spectrometer. 25. Should also be upgradable for performing the analysis of trace sulphur using 	
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	<p>IR detector.</p> <p>26. System should be supplied complete with helium and oxygen gas with cylinders and regulators.</p> <ul style="list-style-type: none"> • The gases should be high purity (oxygen 99.9995% and He 99.999%). * The vendor should provide standards for soil/ sediment/ plants etc. with the instrument. • Branded PC and printer to be supplied from factory along with the system directly. • Required spares kit for 3 years trouble free operation to be offered. • Required stabilizer should be offered. • The vendor should indicate all the Auxiliary requirements for successful installation of system. • All other requirements to run the instrument should be quoted so as to enable the installation of instrument immediately without causing any delay. • Vendor should clearly mention the after sales local service and parts availability, which will be deciding factor. * Uniqueness of the quoted model shall be mentioned and will be preferred * Provide User list * Provide operation manual (soft and hard copy) * Training: training for two faculty (in-campus/off-campus) * Note : Matching specifications shall be properly mentioned as yes / no or partially matching with appropriate remarks 	
3	<p>TOC ANALYZER</p> <p><u>Technical Specifications:</u></p> <ol style="list-style-type: none"> a) The instrument should be able to analyse Total Carbon (TC), Inorganic Carbon (IC), Organic Carbon (OC) and if possible, optionally, Volatile Organic Carbon (VOC) and Dissolved Organic Carbon (DOC) in a single analysis cycle. b) Application: both Solid and Liquid samples (Preferably solid samples like soil, sediments, sludge, plant etc. will be analyzed. In case of liquid samples, other than water, waste water, solutions may also be analysed). c) Mode: Combustion oxidation at high temperature sufficient enough to oxidize solids samples completely desirably with no catalyst followed by non-dispersive IR detection. d) IC Pretreatment – Internal acidification, automatic (preferably) e) Detection limit: May vary from 4 µg/L to 50 µg/L f) Analytical range: 0.01 to 120 mg Total C for solid, 0.004 to 3000 mg/L for liquid g) Sample size: Solid – 1 to 3 g, Liquid – 100 to 1000 µL h) Reproducibility: Less than 2% RSD, FSD i) Analysis time: 3 to 6 min/sample j) Power: AC 220-240 V k) LCD display of important operating parameters in case of stand alone mode l) Ambient temperature range: 10 to 40 °C m) Auto sampler 	1

	<p>n) Essential and quickly replaceable Consumables should be supplied.</p> <p>o) For PC controlled instruments latest version of software required to run the instruments including options like gas flow, gas shut down, auto baseline background correction, post run analysis, peak editing, calibration etc.</p> <p>p) PC with latest processor, other configuration and Window Operating System, Laser Printer and UPS.</p>	
4	<p>INDUCTIVELY COUPLED PLASMA OPTICAL EMISSION SPECTROMETER (ICP-OES)</p> <p><u>Technical Specifications:</u></p> <p><u>A. General Specification:</u></p> <ul style="list-style-type: none"> • High Resolution true simultaneous ICP-OES along with cooling system for spray chamber, sample introduction system, RF generator and auto sampler and should be able to determine all major and trace elements (Viz. Na, Ca, Mg, K, As, Fe, Mn, Pb, Zn, Cu, Cd, Cr, Co, Ni, Sr, Ba, Hg, Se etc.). in diverse kind of water and sediment samples, like drinking water, waste water, sediments, river water, seawater etc. <p><u>B. Essential technical features:</u></p> <ol style="list-style-type: none"> 1. Instrument: The instrument must be a true simultaneous, echelle grating with polychromator, reading bench top, dual view (radial and axial) ICP system. 2. System Details: The system must be equipped with Charge Injection Devices (CIDs) or Charge Coupled Devices (CCD) detector and should be capable of selecting any of the wavelengths between 170-850 nm range or suitable range to cover all elements. 3. Optics view: The system must have a computer and software control dual-viewing optics. Should be able to use any of the wavelengths between 170-850 nm in the radial, axial or mixed viewing modes in a single run. 4. Interlock facility: The instrument must have the facility to monitor gas pressure and flows, interlocks water flows and plasma stability. The interlocks must be continuously monitored automatically during running and if any interlock is interrupted, the plasma should shut down automatically. 5. RF Generator: Should have software controlled RF generator with RF matching and must run at a frequency of 27-40 MHz. The RF generator must have at least a power output of 750-1350 watts or better range for operation. Fully computer controlled power adjustment is required and power output must be $\leq 10\%$. 6. Mas flow controller: Software controlled MFC for Plasma, Auxiliry, Nebulizer & makeup gas. 7. Plasma Torch: Standard Plasma Torch manufactured from high quality quartz glass and fully software adjustable torch (03 Nos). 8. Sample introduction system: Duo sample introduction kit for analysis organic and volatile organic materials and should be comprised of dedicated tubing, Torch, Nebulizer, Spray chamber along with Oxygen Gas MFC. 9. Peristaltic pump: A multi channel peristaltic pump which can support variable flow rates, with separation of samples. 10. PFA /Inert Kit: It must include a PFA nebulizer, PFA injector, PFA spray 	1

	<p>chamber, Inert Torch and tubing's for high resistance to acids.</p> <p>11. Integrated Hydride generating accessories should be quoted for analyzing Hydride for better analysis efficiency of arsenic (As), selenium(Se) and mercury (Hg)</p> <p>12. Organic Kit: Organic sample kit with dedicated nebulizer, spray chamber, injector torch, oxygen gas mass flow controller.</p> <p>13. HF/Inert kit with dedicated tubing, Torch, Nebulizer, Spray chamber.</p> <p>14. Detector</p> <ul style="list-style-type: none"> • Able to measure major and minor concentrations& entire wavelength range in a single analytical run/step. • Should have over range protection and fully automated detector cross calibration with good linearity • The user should have easy access to the detector for regular cleaning. • Detector should be having minimum life of 3 years without replacement. <p>15. System control and data acquisition:</p> <ul style="list-style-type: none"> • The system should perform auto optimization of plasma parameters like plasma power, plasma gas flow etc. • The instrument software should allow auto - tuning to enable the instrument to function continuously. <p>16. Report Generation: Output results formatted in mixed concentration units e.g. ppt, ppb, ppm etc and matrix specific databases</p> <p>17. Standard and Accessories for the instrument</p> <ul style="list-style-type: none"> • A 250 ml 1000 ppm, Multi-element NIST traceable standard. (ideally a 24-30 elemental standard: which should must include Na, Ca, Mg, K, As, Fe, Mn, Pb, Zn, Cu, Cd, Cr, Co, Ni, Sr, Ba etc.). • Fume hood, 10KVA UPS with minimum three years warranty and 30 min backup, • Four (04) Argon cylinders, one(1) oxygen cylinder and one (01) N2 gas cylinder or suitable gas cylinder in case of purging should be quoted with gas purification panels, stabilizer and regulator. • Switchboards/power devices and gas lines should also be included in quotation <p>18. Computer system and software</p> <ul style="list-style-type: none"> • PC and windows based, multitasking software package. • Branded PC & Printer <p>19. Auto sampler:</p> <ul style="list-style-type: none"> • Capacity 200 vials or more • Facility for automatic active rinsing 	
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	Sensors, ESP SCANNER, DATA LOGGER, With Data Handling and Interpreting portable computer .	
2.	<p>Computerized Low Speed Sub Sonic Wind Tunnel</p> <p>Specification: Type of Tunnel: Low Speed, Open Circuit, Suction Type Test Section Size: 600 mm x 600 mm x 2000 mm with Acrylic Windows on Both Sides. Honey Comb Section: 1800 Sq, 25mm Square Sections Arranged in the Frame with Mesh Screen Effuser (Inlet Duct): Inlet Dimension of 1800 mm x 1800 mm Contoured to 600 mm x 600 mm, material: FRP Diffuser: Inlet Dimension of 600 mm x 600 mm To 1200 mm Dia, material: FRP Contraction Ratio: 9:1 Velocity: 45m/s Velocity Measurement: Pitot tube with 1d Movement Connected to Digital Indicator Pressure Measurement: Multi Bank Manometer Tunnel Balance: 3 Components (Lift, Drag & Side), External Type Angle of Incidence: To Change the Angle of Attack for the Models by Manual Method Smoke Generator: To Visualize the Pattern of the Flow Over the Different Models at Low Speed (0-4 M/S) Mounted below the Test Section. Power: 20 Hp Drive: Axial Flow Fan Driven by A.C Motor with A.C Drive for Speed Control</p>	1set
3	<p>Wind Tunnel Facility (B) Test section of 1.5m square Low Speed Wind Tunnel Measurement capability :- Conventional Digital manometer, 200 port ESP scanner, Hotwire and hot-fi lm anemometer, 35 channel simultaneous unsteady pressure acquisition, Flow Visualization:- Surface oil flow, tuft flow, smoke wire, laser sheet, chemical sublimation Flow Diagnostics:- Two-component LDV, Three component PIV.</p>	1set
4	<p>Acoustic Doppler Current Profiler for measurement of flow (velocity and discharge) in rivers and channels consisting of a robust, reliable, ultrasound Doppler current profiler, Bluetooth transmitter, a boat to hold the profiler, a watertight PDA (Personal Digital Assistant) and hoisting cables. The measurement is to be carried out using the classic verticals process. At the required vertical positions, the instrument should be able to measure both the vertical velocity distribution and the water depth. All measured data are to be transferred to the PDA via Bluetooth and processed online then and there using the software. After the measurement is complete, the discharge is to be computed immediately. The instrument is to be operated easily on cable ways, from bridges or from the edge / Banks of Canal /River. The user positions the boat at the respective individual verticals and monitors/controls the measurement using the PDA.</p>	1set

	<p>Technical data</p> <ul style="list-style-type: none"> • Acoustic frequency: 2 MHz / 1 MHz ○ Cell size: 0.05m to 2 m / 0.3 m to 4 m • • Water depth range: 0.4 m to 20 m • Water velocity measurement Measuring range: • -5 m/s to 10 m/s • Resolution: 1 mm/s • Accuracy: • 1% of the measured value or 0.5 cm/s • Batteries: for boat/PDA • Operating time: more than 24 h <p># Boat to be supplied: glass fiber-reinforced plastic material Size: approximately...1000 mm x 500 mm x 250 mm Weight: around 10 kg</p> <p># Cableway with accessories are to be supplied for 600m wide river (to be quoted inclusive and separately, both)</p> <p>Radio connection:</p> <ul style="list-style-type: none"> • Type: Bluetooth Class 1 • Range: up to 150 m <p>PDA of latest specifications for acquiring, handling, storing and manipulating Data :</p> <ul style="list-style-type: none"> • Operating temperature: up to +60 °C -- Operating system: Windows Mobile -- Functions: deployment planning, data retrieval, ASCII conversion, online data collection and graphical display <p>Software for PDA</p> <ul style="list-style-type: none"> -- Operating system: Microsoft Windows -- Functions: data processing, data manipulation, interpretation and storage. 	
5.	<p>Current Meters:</p> <p>(a) Propeller type (b) Cup Type (to be quoted separately) Velocity Range: 0.02 to 9m/s Depth : 0.1 to 30m With all accessories like cable, recorder/ datalogger, transmitter etc.</p>	5 sets each
6.	<p>Electronic Depth Gauge: Depth range : 0 to 300mm. and 0 to 600mm</p>	5 sets each
7.	<p>Electrical Analogy Apparatus</p> <ul style="list-style-type: none"> • Transparent Tray: 400mm x 400mm x100mm deep. • Probe traversing: moving in two planes. • Copper Strips: 100mm x 300mm/100mm x 150mm - 1 mm. • This apparatus is used along with Analogue Field Plotter to plot flow lines in the tray typical models can be arranged. 	2 sets

	<ul style="list-style-type: none"> • Voltmeter: Range: 5 amp. 	
8.	<p>Heleshaw Apparatus</p> <ul style="list-style-type: none"> • Working Section : Made of two laminated glass / acrylic sheets which are closely spaced and fixed in a leak proof moulding • Flow table : Width = minimum 300mm, Length = minimum 500mm, • Dye Tank With Flow Control : Stainless steel tank with minimum 1L capacity Dye injection facility • Sump Tank : Stainless steel tank with minimum 40L capacity • Water circulation : 0.5HP pump (minimum) • Flow control valve and bypass valve to regulate the flow • Obstacles : Different shapes 	2 sets
9.	<p>Ultrasonic Water Depth Sensor to measure upto depth of 30m with high accuracy (1mm) with accessories like data logger, cable, Sensor holding corrosion proof rod and PDA</p>	3 sets
10.	<p>Soil Tensiometer with datalogger and accessories Maximum measuring depth of 200 cm; Measuring accuracy of ± 2.5 hPa; Measuring range of 0 to 850 hPa ; Reading accuracy of 1%</p>	4 Sets
11.	<p>Portable Digital Ultrasonic Pipe Flow measuring instrument For Pipe sizes from 25mm to 3000mm, 25 mm to 5000mm external diameter; 0.1 to 20 m/s; temperature range: -30 to 150degree Celsius. With all accessories like mounting pads, clamping fixtures, sensors, datalogger, Data storage , Handling and interpreting PDA, extension cables of 20m.</p>	2 sets
12.	<p>Micro Manometer with Pitot Tube : Micro manometer to accurately measure air/water flow with Pitot tube with memory and software for data processing / display with backlight / simultaneous indicator of water/air flow and speed, pressure and environmental temperature Technical specifications: Pressure: Measurement ranges 50 mbar Resolution 0.01 mbar Accuracy ± 0.3 % of the measuring range Maximum pressure 10 psi Response time 0.5 seconds Unit selection mbar, psi, inH₂O, mmH₂O or Pa Water/Air velocity: Measurement ranges 1 ... 80 m/s Resolution 0.01 m/s Accuracy ± 2.5 % of the measurement value</p>	3 stes

	<p>Units selection m/s, ft/min, km/h, mph or knots</p> <p>Flow</p> <p>Measurement ranges 0 ... 99999 m³/min</p> <p>Resolution 0.001 ... 100 m³/min</p> <p>Accuracy ±3 % of the measurement value</p> <p>Unit selection m³/min or ft³/min</p>	
TRANSPORTATION ENGINEERING LABORATORY		
1	<p>Gyratory Compactor. Application Standard: ASTM D6925 / AASHTO T312 /SHRP M002/EN12697-10/EN12697-31</p> <ul style="list-style-type: none"> • Specimen Dia 100 mm & 150 mm, Compaction Height: 0 to 200 mm • Mould Dimensions: 100 mm & 150 mm Dia, 250 mm Height • Gyratory Angle: 0 to 2.4° • Number of Cycles: 5 To 60 work cycles /min • Vertical load on 150 mm Dia: Adjustable from 10 to 900 KPa • Vertical Load on 100 mm Dia: Adjustable from 23 to 1500 KPa Height, load and angle verification kit, Automatic specimen extractor unit built in 	1
2	<p>Pressure Aging Vessel. Application Standard: AASHTO R-28, ASTM 6521, and EN14769</p> <ul style="list-style-type: none"> • Touch-Screen Controller with front panel user interface for complete control and monitoring • Operating pressure range of 2.1 ±0.1mPa, • Temperature range of 80°—115°C, with resolution of 0.1°C. 	1
3	<p>Rolling Thin Film Oven. Application Standard: EN 12607-1 / ASTM D2872-12 AASHTO T240</p> <ul style="list-style-type: none"> • Temperature Range : Ambient to 200°c • ventilation device • Air Flow Adjustment : 4000 ml/min • Air Pressure Gauge : Range 0 – 100 PSI • Rotation speed -:15 RPM 	1
4	<p>Automatic Marshal Compactor.ASTM D1559/AASHTO T245</p> <ul style="list-style-type: none"> • Falling weight of 4.5kg • Drops from a correct height of 457 mm • Speed: Normally 50 impacts in 55-60 seconds • Stationary mass on sample (g) 7850 ± 50 	1
5	<p>Diesel Powered Pavement Core Drilling Machine.</p> <ul style="list-style-type: none"> • Bit Diameter: Varying from 25mm to 200mm • Maximum depth of core: 700mm • Drill Speed: 475 & 800 R.P.M. 	1

	<ul style="list-style-type: none"> • Guide Shafts : 50mm dia • Screwed Spindle : 20mm dia • Drill Wrenches : Included, Water Tank • Drill bit of 100 mm , 150 mm diameter 	
6	Asphalt mixer. <ul style="list-style-type: none"> • Bowl capacity 10 liters • Mixing capacity 4 liters • Spindle speeds (r.p.m.):115 to 400 • Electrically operated, fitted with heavy jacket 	1
7	Asphalt Pavement Analyzer. Application Standard: EN 12697-22 AASHTO T-324 <ul style="list-style-type: none"> • Wheel load: 705 N • Wheel speed: 20-30 cycles/minute. • Temperature control range: from ambient up to 75°± 1 °C • Table travel: 230 mm • Rut depth transducers range: 25 mm ± 0.1 mm accuracy • Slab thickness: adjustable from 38 to 120 mm 	1
8	Radar Speed Gun . <ul style="list-style-type: none"> • Speed measured 10-200 KPH from 400 Meters, Accuracy: +/- Two KPH • Speed radar speed measuring unit within-built memory. • Complete with carry case, tuning fork, two batteries, charger, battery holder, download leads, handbook and calibration certificate. 	1
9	Stripping Value Apparatus IS 6241 <ul style="list-style-type: none"> • Rate of vertical plane rotation approximately 100rpm • 4 bottles of approximately 400 cc 	1
10	Universal Penetrometer EN 1426; ASTM D5; AASHTO T49 <ul style="list-style-type: none"> • Stainless steel penetration test cone 35 mm long • Measuring Range 0-50 mm • Resolution 0.01 mm • Test Load 100 g (plunger 97.5 g + 2.5 g penetration needle) • Test Time 5 seconds (adjustable from 0.1 to 999sec.) 	1
11	Flash & Fire Point Test Apparatus Standard: As Per IS 1209 <ul style="list-style-type: none"> • Cleveland open cup apparatus • Fully Automatic Control 	1
12	Video camera (Semi Professional)- <ul style="list-style-type: none"> • Durable and waterproof to withstand extreme environments and conditions • Record 1080p and 720p video. • Internal memory expandable upto 128GB 	1
13	Aggregate Impact Testing Machine (IS: 2386-IV 9377) <ul style="list-style-type: none"> • Hammer weight= 13.75±0.25 kg • Height of Fall=380±5 mm • Rod Diameter= 230 mm long × 10 mm 	1

14	Nuclear Density Gauge : As per ASTM D 6938, D 2950, C 1040 & AASHTO T 310	1
15	Portable axle weigh pad with Automatic recording <ul style="list-style-type: none"> • Capacity upto 60 ton • Type: Digital • Load Cells: ESPD-30, TM-969 • Accuracy: Nearly equal to 0.1% 	1
STRUCTURAL ENGINEERING LAB		
1	Drop Weight Test Including DAQ System & High Frequency Receiver: Experimental Setup for Drop Weight Test including DAQ system & high frequency receiver High Speed Digital Dynamic Data Acquisition System for Strain Measurement: Number of Channel: 10 Nos Sampling Speed: 100 KS/S Each Channel Incorporates A/D converter for simultaneous measurement; Waveform Data stored in digital values High Speed & Large data transfer by LAN interface; Bridge Voltage: DC 0.5, 2, 5 V; Frequency response: DC 100 Khz; Dynamic Strain Gauge as below: Strain Gauge 350 Ohm & SG Adhesive Drop Weight Test Setup including: 3 nos 10 Kg Weight, Rope & Pulley arrangement to lift & drop the weight on the experimental product with all the necessary accessories.	1 Set
2	LVDT <ul style="list-style-type: none"> • ± 25 mm with digital display Analog O/P and • ± 50 mm with digital display Analog O/P 	1 Set
3	High Resolution Camera: <ul style="list-style-type: none"> • 24.1 mp Dx-format CMOS sensor • 7 fps • 51 point AF system • ISO range 100-6400 < 25600 equivalent > • Expeed 3 image processor • 1.3X crop mode Dual SD card slot • Without OLPF for maximum sharpness • Magnesium-alloy body • 18 – 105 mm lens 	
4	Data Acquisition System Specification (32-Channel Version) Capacity- Up to 4 Input Cards. 32 channels maximum Configurations-Bench-top	1 Set

	<p>LCD Display-64 x 128 white LED-backlit displays LED Panel-32 individual red/green LEDs; one per channel Keypad- Membrane. 20-key; 12-key numeric keypad, 5 keynavigation keypad, and three soft-keys Input Power-11–32 VDC, 30A max Power Indication-Green LED (illuminated when power is on) Ethernet Interface-IEEE 802.3, 802.3u 10Base-T, 100Base-TX, half-andfull-duplex, auto-detect Compact Flash® Capacity - 1 GB supplied (removable) Processor- 250 MHz floating point digital signal processor Memory-64 MB SDRAM Internal Communication - Asynchronous command bus, synchronous data bus System Synchronization Connections: Sync In, Sync Out Topology: Daisy-chain Cable Connection: TIA/EIA RJ-45, Category 5 Max. Distance: 100m System Calibration Reference Firmware-controlled Drift: 1.9 ppm/°C ± 0.6 μV/°C typical, 9.4 ppm/°C ±2.1 μV/°C maximum Resolution: 150 μV nominal Voltage Range: ±5V Dimensions-7.5 H x 7.1 W x 13.5 D in (190 x 180 x 343 mm) Weight-10.1 lb (4.6 kg)</p> <p><u>STRAIN GAGE INPUT CARDS</u> Channels-Eight per card Inputs Software selectable for S+/S-, VCAL+/VCAL-,or excitation Strain Gage: 120Ω, 350Ω, 1000Ω quarter-bridges;60Ω to 5000Ω half-and full-bridges Input Impedance: 220 MΩ nominal each input Source Current: ±5 nA per volt excitation Analog Output (Model 7003-8-SG-A Only) Fixed Gain: 50.3 V/V ±1% Output Range: ±10V min Output Load: 2000Ω min Bandwidth: DC to 4.2 kHz (-3 dB ±0.25 dB)</p> <p>Input Connector Eight-pin TIA/EIA RJ-45 (Amp type 554739 orequivalent) Amplifier Zero Temperature Stability: ±1 μV/°C RTI, after60-minute warm-up DC Gain Accuracy and Stability: ±0.05%;±50 ppm/°C (1 year without</p>	
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	<p>periodic VCAL)</p> <p>Analog Input (Including Full-Scale Balance):</p> <p>Low Range: ± 50 mV</p> <p>High Range: ± 220 mV</p> <p>Linearity: $\pm 0.02\%$ of Full Scale</p> <p>Common-Mode Rejection: >90 dB (DC to 60 Hz)</p> <p>Common-Mode Voltage Range: ± 12V typical</p> <p>Balance</p> <p>Type: Software (mathematical)</p> <p>Range: Full ADC range</p> <p>Excitation</p> <p>Selection: Software controlled</p> <p>Resolution: 1 mV</p> <p>Accuracy: ± 4 mV typical (Firmware measure excitation variations during arming process)</p> <p>Current: 50 mA max. per channel</p> <p>Over-current limited</p> <p>Over-current indication</p> <p>Load Regulation: $<0.05\%$ of full scale for 10% to 100% of full scale load with remote sense</p> <p>Temperature Stability: ± 10 ppm/$^{\circ}$C</p> <p style="text-align: center;">Quarter-Bridge Completion</p> <p>Selection: Firmware controlled</p> <p>Accuracy and Drift:</p> <p>120Ω and 350Ω: $\pm 0.01\%$, 2.8 ppm/$^{\circ}$C max.</p> <p style="text-align: right;">1 kΩ: $\pm 0.01\%$, 1.6 ppm/$^{\circ}$C max. (socketed)</p> <p>Shunt Calibration</p> <p>Selection: Firmware controlled</p> <p>Configuration:</p> <p>Internal: P- to D120, P- to D350, P- to D1000</p> <p>Remote: RcalA to RcalB</p> <p>Sockets: Tin-plated</p> <p>Levels: Simulates 10,000 $\mu\epsilon$@ GF = 2.0</p> <p>Values:</p> <p>P- to D120: 5940Ω $\pm 0.1\%$</p> <p>P- to D350: 17,325Ω $\pm 0.1\%$</p> <p style="text-align: right;">P- to D1000: 49,500Ω $\pm 0.1\%$</p> <p>System Calibration</p> <p>Firmware controlled</p> <p>Calibration voltage: Supplied by Model 7000-SM-VC voltage calibration card</p> <p style="text-align: center;">Type: Ten-point calibration</p> <p>Size:</p> <p>6.5 L x 6.5 W x 0.9 H in (165 x 165 x 23 mm)</p> <p>Weight:</p> <p style="text-align: center;">0.45 lb (0.2 kg)</p>	
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THERMOCOUPLE INPUT CARD

Channels- Eight per card

Inputs:

Supported Thermocouple Types: J, K, T, E, N, R, S, B

Cold-junction compensation, software-selectable, Open-sensor detection

Input Impedance: 220 M Ω nominal each input

Input Connectors

Five-position connector with screw terminals

Amplifier

Zero Temperature Stability: $\pm 2 \mu\text{V}/^\circ\text{C}$ RTI, $\pm 10 \mu\text{V}/^\circ\text{C}$ RTO, after 60-minute warm-upDC Gain Accuracy and Stability: $\pm 0.1\%$; $\pm 30 \text{ ppm}/^\circ\text{C}$ Linearity: $\pm 0.02\%$ of Full ScaleCommon Mode Rejection (DC to 60 Hz): $>90 \text{ dB}$ Common Mode Voltage Range: $\pm 12\text{V}$ typical

Measurement Range and Resolution

Range: $\pm 81.9 \text{ mV}$ Resolution: 1°C minimumAccuracy: $\pm 2^\circ\text{C}$

Size: 6.5 L x 6.5 W x 0.9 H in (165 x 165 x 23 mm)

Weight: 0.45 lb (0.2 kg)

HIGH LEVEL INPUT CARD

Channels: Eight per card

Inputs

Differential

Input Impedance: 220 M Ω nominal each inputInput Bias Current: $\pm 0.5 \text{ nA}$ typical ($\pm 2 \text{ nA}$ max.)

Input Connector

Eight-pin RJ-45

Amplifier

Zero Temperature Stability: $\pm 2 \mu\text{V}/^\circ\text{C}$ RTI, typical, $\pm 10 \mu\text{V}/^\circ\text{C}$ RTO, after 60-minute warm-upDC Gain Accuracy and Stability: $\pm 0.1\%$; $\pm 30 \text{ ppm}/^\circ\text{C}$ Linearity: $\pm 0.02\%$ of Full ScaleCommon-Mode Rejection (DC to 60 Hz): $>90 \text{ dB}$ Common-Mode Voltage Range: $\pm 12\text{V}$ typical

Measurement Ranges and Resolution

Range: $\pm 10\text{V}$ Resolution: $100 \mu\text{V}$ effective

Excitation

Selection: Software controlled

Bipolar Range: 0 to $\pm 12 \text{ VDC}$ (24 VDC total)Unipolar Range: 0 to $+12 \text{ VDC}$ Accuracy: $\pm 0.1\%$ of full scale using remote sense

	<p>Current: 50 mA max. Over-current/over-temperature protected Load Regulation: <0.05% of full scale (bipolar mode) for a load variation of 10% to 100% of full scale load (with remote sense) Temperature Stability: Better than ± 30 ppm/$^{\circ}$C Dimensions: 6.5 L x 6.5 W x 0.9 H in (165 x 165 x 23 mm) Weight: 0.45 lb (0.2 kg)</p> <p><u>LVDT CARD</u> Channels: Eight per card Inputs Six-, five-, four- and three-wire transducers Input Impedance: 220 MΩ nominal each input with 0.001 μF parallel to both inputs Input Bias Current: ± 0.5 nA typical (± 2 nA max.) Input Connector: Eight-pin RJ-45 Amplifier Zero Temperature Stability: ± 2 μV/$^{\circ}$C RTI, typical, ± 10 μV/$^{\circ}$C RTO, after 60-minute warm-up DC Gain Accuracy and Stability: $\pm 0.25\%$, ± 30 ppm/$^{\circ}$C Common-Mode Rejection (DC to 60 Hz): >90 dB Common-Mode Voltage Range: ± 12V typical Post Demodular Filter Type: Low-Pass Frequency: 1.0 kHz @ -3 dB Number of Poles: Six Topology: Butterworth Measurement Range and Resolution Range: ± 5 VRMS Resolution: 50 μVRMS effective Excitation Selection: Software controlled Frequency: 2500, 5000, or 10000 Hz sine wave Amplitude: 3 VRMS Accuracy: $\pm 0.5\%$ of full scale typical Current: 50 mA max. Over-current/over-temperature protected Load Regulation: <0.1% of full scale for a load variation of 10% to 100% of full scale load Temperature Stability: Better than $\pm 0.05\%$/$^{\circ}$C Size: 6.5 L x 6.5 W x 0.9 H in (165 x 165 x 23 mm) Weight: 0.45 lb (0.2 kg)</p> <p><u>ANALOG INPUT CARD</u> Channels: Eight per card A/D Converter Quantity: Eight (one per channel) Architecture: Sigma-delta</p>	
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	<p>Resolution: 24 bits Conversion Rate: Radix-10: 40k samples/second/channel Radix-2: 40.96k samples/second/channel Data Recording Rates 2048, 1024, 512, 256, 128, or 64 samples/second/channel (radix-2) 2000, 1000, 500, 200, 100, or 10 samples/second/channel (radix-10) Pre-Trigger Buffer Type: SDRAM, firmware-controlled Depth: 645,276 samples/channel Analog Anti-alias Filter Type: Low-pass Frequency: 3.5 kHz @ -3 dB Number of Poles: Three Topology: GIC, constant delay Processor Type: 32-bit floating point digital signal processor 250 MHz operating frequency RAM Type: SDRAM Size: 64 MB Program and Calibration Data Storage Type: Flash Memory Size: 1 MB Data Storage Type: Sandisk Ultra-Series II® CompactFlash Quantity: One per card Capacity: 1 GB supplied. Removable Size: 6.8 L x 6.5 W x 0.7 H in (173 x 165 x 18 mm) Weight: 0.35 lb (0.16 kg) The data acquisition system can be configured with (1) software, (2) instrumentation hardware, and (3) personal computer. Software: Windows-based personal computer Instrumentation hardware: compatible Scanner with Analog Input Card Personal computer: latest computer with at least 4 GB RAM, 500 GB Hard disk,</p> <p><u>STRAIN SMART SOFTWARE</u></p> <ul style="list-style-type: none"> • StrainSmart Main Operating Program • Offline Data Presentation Program • Interactive Help System 	

SURVEYING LAB		
1	<p>TOTAL STATION</p> <p>Telescope :</p> <p>Magnification - 30x , Resolving power - 3"</p> <p style="padding-left: 40px;">Image: Erect, Field of view:1°30'(2.7m at 100m),</p> <p style="padding-left: 40px;">Focussing range 1.7 m to infinity</p> <p style="padding-left: 40px;">Reticle illumination: 5 brightness levels</p> <p>Angle measurement:</p> <p>Display Resolution 0.5"</p> <p>Accuracy 5"</p> <p>Dual-axis/Quadruple axis compensator</p> <p>Measuring range (under average conditions)</p> <p>Reflector-less 500m: Reflective sheet 500m: One prism 1.7 to 3500m</p> <p>Measuring time- 1s</p> <p>Display / Keyboard- Graphic LCD, backlight, contrast adjustment /</p> <p>Alphanumeric keyboard with function keys</p> <p>Control panel location on single face</p> <p>Data storage- Internal memory Min. 10,000 points</p> <p>Plug-in memory device USB flash memory</p> <p>Bluetooth modem included</p> <p>Optical plummet Magnification: 3x, Minimum focus: 0.3m from tribrach bottom</p> <p>Operating temperature -20 to +50°C</p> <p>Power supply- Battery operating time (20°C) Min. 30 hours</p>	5
2	<p>DIGITAL PLANIMETER</p> <p>Roller type with computing function, Batt-E, SCALE Memo, Hold cm², m², km², in², ft², acre etc. Unit and Scale value., Maximum 10m²(Scale 1:1)</p> <p>Measuring Range Maximum vertical width: 325 mm Horizontal roller rotating length: 30 m, Within +/-0.2 % (Within +/-2/1000pluses), Approx. 30 hours of continuous operation,</p>	5
3	<p>Imaging Rover to work with Robotic Total Station and RTK GPS.</p> <p>The imaging rover with forward and downward looking cameras should be able to take 360-degree panorama of at least 60MP for terrestrial photogrammetry. The accuracy of the points collected from the rover should have the accuracy of at least 1 cm at a distance of 10m. The imaging rover should be supplied with rugged tablet PC with inbuilt camera, GPS and should have latest Windows OS. The rover should have tilt sensor, magnetic compass, gyrometer, accelerometer and inbuilt storage. The field software should be able to handle TS and RTK GPS together with imaging rover. The software to process the data should be supplied with capability to process GPS and ETS data together. The software should be able to automatically extract the point cloud from the panorama taken by the camera.</p> <p>RTK-enabled kinematic GPS with two receivers, control unit, radio modem, tripod and other accessories and processing software with the following specifications</p>	1set

	<p>Advanced GNSS chip with 400 channels, high precision multiple correlators for pseudorange measurements, signal-to noise ratio in dB-Hz, suitable for low elevation tracking. The receiver should be able to track all signals from GPS, GLONASS, Galileo, QZSS, Omnistar and BeiDou. The post processing software should also have capability to post process GPS, GLONASS, QZSS and BeiDou data for static, fast static and RTK survey. The receiver should have the following accuracies: Static: -- Hz: 3mm+0.1ppm, V: 3mm+0.4ppm RTK: -- Hz: 8mm+1ppm, V: 15mm+1 ppm The receiver should have inbuilt webUI accessible through serial and Bluetooth ports. It should be able to act as wifi hotspot to be able to configure through mobile phone in field using any Android device. The control unit should also have inbuilt GPS and camera. The receiver should have inbuilt tilt sensor to apply automatic tilt corrections and satellite RTK functionality. The receiver and camera should have mounting facility to attach them together. IP65 complied Robotic total station with detachable/ attachable control unit and software to control TS and RTK GPS simultaneously in field. Automatic rotation speed of the machine should be at least 100 degrees per second. The control unit should be able to operate the machine in robotic mode and data sync services on web in real time.</p> <p>Minimum Specifications: LEAST COUNT: Standard mode -Distance 2 mm or better ACCURACY: ANGLE 5" or better COMPENSATOR: Dual Axis COMPENSATOR RANGE: Should be 5' or better DISTANCE MEASUREMENTS: Accuracy with or without reflector in standard mode: In prism mode 2 mm + 2 ppm In DR mode 2 mm + 2 ppm Using 1 prism: Up to 5 km or more DR mode on White Card (90% reflective): Up to 2 km or more Robotic Range to passive prisms: 600m or more The total station should have detachable control unit, Optical Plummet, should have Laser Class 2 Pointer, and should be able to apply atmospheric corrections.</p>	
4	<p>Stereoscope:</p> <ul style="list-style-type: none"> • Objectives : 2x & 4x • Eyepieces : WF 10x & 15x • Magnification : 20x to 60x. <p>Accessories For Stereo/Stereo Zoom Microscopes:</p> <ul style="list-style-type: none"> • Spare Eypiece: WF10X-15X-20X (paired) • Auxillary Objective: 0.5X & 2X for Stereo Zoom Microscopes. • Dark Field Attachment: consisting of special system and movable Gem clamp. • Universal Stand: for convenient examination of large parts or specimen. • High Intensity Flourescent Ring Illuminator: with circular flourescent tube & power supply. • Space circular flourescent tube: High intensity circular tube for illuminator. 	3

	<ul style="list-style-type: none"> • Spare Lamp: 20Watts halogen lamp for incident illuminator. • Eyepiece with graticules: Micrometer disc, cross line, graph, eccentric circles etc. • Polarising Attachment: for examination of geological specimen under polarised light. • Gliding Stage: For quick scanning of the specimen in x-y direction. • Fibre Optic illuminator: Single light guide. • Fibre Optic illuminator: Double light guide. • Fibre Optic illuminator: Ring light guide. • 1 Incident Halogen illuminator: Spot light halogen illumination for Stereo Microscopes. • Dark Field Attachment for Embryology: consists of dark field system and a adapter for petri-dishes 	
5	<p>Laser Distance Measuring Instrument</p> <p>Measuring Range: 0.05m - 100m, XRange power technology; Measuring Accuracy: ± 1.5mm, dust and splash water protected; Bluetooth smart for data transfer to smart phones and tablets, clear illuminated 3-line display; Automatic multifunctional end-piece to measure out of corners and from edges; Area, volume, wall-area, perimeter, Pythagoras, stake-out, 10 point memory with camera app (for android), data should be able to be processed in versatile ways</p>	5
6	<p>Differential Global Positioning System with Receiver and Rover units</p> <p>Receiver accuracy:</p> <ul style="list-style-type: none"> • Static horizontal accuracy: ± 3mm+1ppm • Static vertical accuracy: ± 5mm+1ppm • RTK horizontal accuracy: ± 1cm+1ppm • RTK vertical accuracy: ± 2cm+1ppm • Code differential positioning accuracy: 0.45m • Single positioning accuracy: 1.5m • Receiver :28/54 channels, function to update to 72 channels • Advanced multi-path effect restraining technology <p>So that it realizes two positioning systems (GPS+GLONASS)</p> <p>Physical specification:</p> <p>Operational environment</p> <ul style="list-style-type: none"> • Built-in GSM/GPRS/CDMA module • Receiver sensitivity: < -106 dBm • Protocol: Compatible with GSM/GPRS Phase2/2+ <p>Controller specifications</p> <ul style="list-style-type: none"> • Rustproof and waterproof; Shockproof:1.2m naturally drop • Processor: PXA 270520MHz 32bit RISC CPU • Storage: 128M, support SD card and CF card, extension to maximum • Screen: color touch LCD Wireless Communication: Bluetooth • Data communication: SD card USB communication <p>Compatible GPS RTK Base and Rover unit</p>	2sets