



**NATIONAL CENTRE OF EXCELLENCE IN GEOLOGY  
UNIVERSITY OF PESHAWAR**

Peshawar-25130, NWFP, Pakistan  
Phone: +92-91-9216427; 9216429 Fax: +92-91-9218183  
Web: <http://nceg.upesh.edu.pk/>

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Last date of tender is **March 24, 2016 upto 12:00PM**  
Opening date of tender is **March 24, 2016 at 12:30 PM**

Price= Rs.2000/-

**(Firms downloading this file from NCEG site will have to deposit an amount of Rs.2000/- as the Tender Document fee at the time they submit their bids. Firms submitting tenders documents through post/courier should send it before the last date of opening**

## **TENDER DOCUMENTS FOR THE PURCHASE OF ITEMS**

(Note: Please provide a soft copy of all documents in a USB/CD drive along with hard copy of the offer.

**Document Issued By:**

**NCEG Official**

**Dated:    /    / 2016**



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**Terms & Conditions**

**1) INVITATION TO BID**

- The Director National Centre of Excellence in Geology invites bids for the items as per attached list.
- Bids must be submitted in sealed envelopes, including its due date on the face of the envelope.
- Earnest money @ 2% of the total bid cost shall be submitted with the tender without which the quoted bid will not be considered.
- The quoted price shall be inclusive of all duties / taxes.
- The Director, National Centre of Excellence in Geology, reserves the right to add, delete or amend any part of the tender documents during the bidding period.

**INSTRUCTION TO BIDDERS/GENERAL CONDITIONS**

**2) SUBMISSION OF BIDS**

- Bids in sealed envelope should reach the office of the director on or before the due date.
- Bids sent through courier should be delivered at least half an hour before the scheduled time of opening.
- After the bids / quotations are opened, no bidder shall be allowed to revise, propose or request any changes in bid, unless the committee decides to do so.
- The bidder or authorized representative shall sign on each page of the tender document. No corrections and overwriting are allowed.
- Item(s) should be quoted ANNEXURE-wise separately. Preference will be given to the firm(s) quoting maximum number of equipment ANNEXURE wise, along with installation and commissioning/Turnkey solution. However, NCEG reserves the right to opt any item from any bidder for the required items.
- ***Bidders are requested to read carefully the terms and conditions and sign the Tender Form in token of having understood and accepted the same in all respects. All or any of the provisions of the terms and conditions may be changed/altere d/modified/deleted/added or amended by the Centre as and when deemed suitable/necessary.***
- While quoting tender rates, the items should be given numbers as are numbered in the Tender Document.
- The tender Rate shall be item wise. And rate will be on both FOR basis in Pak Rupees and C&F basis *Peshawar Air Port. / NCE in Geology premises.*
- Prices of optional accessories should be quoted separately.
- *Taxes levied by the Government and freight charges, if any, shall be paid by the bidder and must be included in the quoted prices.*
- Bidder is responsible for timely delivery of bids. This office will not be responsible for misplacement / tampering / non-attendance delay or any other incident in case the bids are not delivered at the designated place & time.
- The bidders should be either established firm or sole distributor / authorized agent of the manufacturer having after sale service facilities, preferably, in Peshawar and/or Islamabad/Rawalpindi.
- The payment of equipment is coupled with installation / commissioning of equipment; therefore, supplier should make sure that bid is complete in all respects including consumables etc.
- The bidders must enclose original Performa Invoice / Quotation from their Principals or authorization certification of the Principal, failing which their offers will be ignored.
- **Bidders should preferably have office, workshop facilities and after sales services preferably in Peshawar and/or Islamabad/Rawalpindi.**
- Bidders must have trained engineers to provide after sales service. Copy of Training Certificate should be submitted along with their offer.

Note:

- Certificate of the Principle Vender.
- Only those suppliers will be entertained who have previously supplied similar equipments in Pakistan.
- ***Training of Two end users will be the responsibility of the bidder, in case of winning the tender.***

The price is to be quoted, essentially indicating the following:

- a. Original Country of origin.
- b. Estimated gross / net weight, dimension & volume of offered item.
- c. Delivery period.
- d. Original technical literature.
- e. List of Clients to whom the same natures of equipment are supplied in recent two years.



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- f. The supplier must submit a certificate that the equipment supplied are according to international standards at time of delivery, otherwise no supply will be accepted by the client and the call deposit will be forfeited.
- 3) **BID VALIDITY**  
All offers shall remain valid for 180 days from the date of opening of bids, until any further extension required by the client.
- 4) **ACCEPTANCE/REJECTION**  
The Director National Centre of Excellence in Geology reserves the right to reject all bids at any time prior to the acceptance of bids. The grounds of rejection will be communicated to the bidder(s) upon request. However, Director NCEG shall not be liable to provide any justification of those grounds.
- 5) **RATE ESCALATIONS**  
Quoted price shall remain valid, firm, and irrevocable and fixed till the fulfillment of obligations by the supplier and will not be subject to escalation on any account.
- 6) **TECHNICAL LITERATURE & SAMPLES**  
If applicable/required, the Bidder (s) shall submit the following:  
a. Data/Fact sheets of the equipment.  
b. Original technical literature/Evaluation Software (s)
- 7) **EVALUATION**  
Evaluation will be done on item-wise basis unless specified otherwise. The Director National Centre of Excellence in Geology, for timely delivery or economic reasons/compatibility, may:  
a. Split the tendered items/ quantities among more than one supplier.  
b. Form a package of tendered items/quantities.  
c. Omit, Decrease or increase any item of Bid.
- 8) **PURCHASE ORDER**  
Purchase order of quoted material shall be placed on fulfillment of conditions mentioned at above.
- 9) **DELIVERIES**  
a. Free delivery at the following location is required, unless specified otherwise:  
a) Director National Centre of Excellence in Geology, University of Peshawar, Peshawar, Pakistan  
b. The supplier shall replace defective material/software/hardware at his / her risk and cost. Including transportation duty, taxes etc.  
c. The material shall be in original/sealed packing to ensure delivery without any damages during transit. .  
d. The supplier shall be responsible for and shall provide part of the work and services/functions and equipment related to packing, handling and general transportation requirements.  
e. If any of the software/hardware is discovered to be damaged or unacceptable at the point of embarkation or disembarkation, the supplier shall be responsible for replacement of the software/hardware free of any charges and costs to the buyer / client.  
f. Time of Delivery of all equipment will be Maximum 90 days (FOR) and 180 days (C&F) after the date of issuance of purchase order.  
g. **The equipment should be new and the vendor/supplier will ensure originality of the procurement channel as well as equipment.**  
h. The Equipment shall be supplied in packed form and shall only be opened in the presence of the Purchase Committee/NCEG Official. Working manuals and other related literature shall accompany the equipment in original at the time of delivery.
- 10) **SCOPE OF SUPPLY**  
a. The bidder shall supply/deploy equipment/items, of the specifications given in the attached Annexure-II, III, IV, V, VI, VII, VIII, IX, X, XI, XII, XIII, XIV, XV, XVI.  
b. The bidder shall also be responsible for their installation, calibration, free service and the supplies at least one year from the date the equipment makes warranty functional.  
c. **All equipment should be accompanied by service manuals of the equipment/item separately in English.**  
d. In case installation at the times of supply/delivery is not possible; the vendor/supplier has to fulfill the same on the new installation date, given by Technical/Concerned Person of the NCEG.
- 11) **INSPECTION**  
Pre-delivery inspection may be carried out at the premises of supplier (s) and / or post delivery inspection at office of Director, by the Technical Committee/NCEG official.
- 12) **PAYMENT**



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The supplier, after delivery of goods and its acceptance/satisfactory report shall submit invoice to this office, containing relevant information i.e.

- a. Purchase order number and date
- b. Item number
- c. Quantity
- d. Price
- e. Delivery challan indicating delivery date.
- f. Sales tax return invoices.
- g. No Interim payment will be made.

**13) TAXES**

- a. **Income tax as applicable** under the prevailing Government rules will be deducted at source (except where the supplier provides an income tax exemption certificate).
- b. Quoted price shall be inclusive of all taxes, especially **GST 17%** will be applicable.
- c. Stamp duty of 1% will be deducted from the final bill.
- d. Professional tax shall be deducted as applicable.

**14) LIQUIDATED DAMAGES**

- a. If supplier fails to deliver ordered material within the stipulated period / scheduled time specified in purchase order, The Director, without prejudice to any other remedies, shall deduct from the bills or any other due payments / guarantees, as liquidated damages, a sum equivalent to 0.1% per day of the undelivered goods up to maximum 10% of the bid price & forfeit 2% earnest money.
- b. The liquidated damages shall also be applicable for the cancelled quantity of goods.
- c. Whenever liquidated damages become payable, in the event that delivery of all goods and equipment is not made within the time period specified except on account of force majeure, the buyer shall quantity the same and shall serve notice to the supplier requiring payment thereof.
- d. If the supplier fails to remit payment within ten (10) days of receipt of such notice, the buyer shall forth-with become entitled to recover the same.

**15) SECURITY DEPOSIT/RETENTION MONEY/PERFORMANCE SECURITY**

10% Amount of bill price shall be deducted or bank guarantee provided by supplier & the same should be released after the issuance of FAC / Satisfactory report.

**16) MAINTANANCE PERIOD**

Maintenance period is one year from the date of successful installation.

**17) INSTLLATION & COMMISIONING**

- a. **Please note that system/supply should be completed in all respect in terms of hardware, software and accessories/spare parts. Any deficiency in acquisition of desired results at the time of installation and subsequent functioning will be the responsibility of the supplying firm/company, without any additional cost. All the supply should be based on National Centre of Excellence in Geology University of Peshawar.**
- b. The supplier will be responsible for installation, testing Commissioning and one year smooth running of equipment. And also arrange free of cost training for the buyer/client.

**18) CONDITIONAL BIDS**

Conditional, incomplete bid will not be accepted.

**19) BID BOND/ EARNEST MONEY**

- The bidder shall furnish, as part of his bid, earnest money equal to 2% of quoted price with their offer in the form of demand draft/ pay order in favour of Director, National Centre of Excellence in Geology, University of Peshawar, Peshawar.
- The earnest money shall be denominated in Pak rupees and shall be in the form of Demand Draft, Pay Order or Call Deposit issued by a Pakistani scheduled Bank or branch of a Foreign Bank, acceptable in favour of the National Centre of Excellence in Geology, University of Peshawar, Peshawar.
- In case of alternate prices, earnest money will be based on the maximum quoted price of the same item.
- The Demand Draft shall be returned to unsuccessful bidders.
- **The Earnest Money will be forfeited if a bidder withdraws his bid during the period of his bid validity or fails to supply the machinery / equipment ordered by the university.**

**20) SIGNING OF BIDS**

The person signing the bid shall initial all the pages of the bid, where entries are made and attach Tender Document cost receipt in original.

**21) PURCHASER'S RIGHT TO ACCEPT OR REJECT ANY OR ALL BIDS**

The National Centre of Excellence in Geology, University of Peshawar, Peshawar (Purchase Committee) reserves the right to reduce or increase the quantity, accept or reject any bid and to stop the bidding process



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and reject all bids, at any time prior to award of supply order without incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidders of the ground for such actions.

**22) CONVENING**

Unsolicited advice/clarification and any personal approaches at any stage of evaluations/purchase process are strictly prohibited and may lead to disqualification.

**23) PERFORMANCE SECURITY**

- Within one week of issuance of the purchase order for C&F equipment only, the successful bidders shall furnish to National Centre of Excellence in Geology, University of Peshawar, the performance security bond as per Annexure-I, equivalent to 10% of the bid price in the form of a bank guarantee, before opening of LC.
- The performance security shall be payable to the National Centre of Excellence in Geology, University of Peshawar, as compensation for any loss resulting from the supplier's failure to complete its obligation.
- The performance security will be discharged by the National Centre of Excellence in Geology, University of Peshawar, and returned to the supplier after completion of the supplier's performance obligations under the contract.
- The security will be retained for one National Centre of Excellence in Geology, University of Peshawar, year starting from the date of successful installation and operation of the machinery / equipment.

**24) CALIBRATION OF EQUIPMENT**

- It will be the responsibility of supplier to arrange standards / consumables required for the calibration of the equipment at the time of installation.
- No TA/DA claim will be entertained by NCEG, in case of after sale services, whenever it requires within the premises.
- ***In case of non-conformity with desired specification, the item shall be replaced by the supplier free of cost.***

**25) WARRANTY**

- The supplier shall furnish at least one year after sales service / warranty for successful operation of equipment(s) / item(s) from the date of installation.
- In case of Malfunctioning / defect in any equipment / item, the supplier shall replace them free of cost within 30 days; otherwise the supplier will return the entire paid amount to National Centre of Excellence in Geology, University of Peshawar immediately.

**Note:**

***By signing this agreement, you acknowledge that you have read and understood, and agree to be bound by, the terms and conditions as outlined in the agreement and confirming that your company/organization terms and conditions stand eradicated.***

Dated: \_\_\_\_\_

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

Company Name: \_\_\_\_\_

Contact No: \_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

E-Mail: \_\_\_\_\_

Signature and official Seal: \_\_\_\_\_

**NCEG Official & Signature** \_\_\_\_\_



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**Bidders are required to provide a comprehensive solution both in terms of efficiency, utilization and economic as well.**

**Note:**

1. Please note that system/supply should be completed in all respect in terms of hardware, software and accessories/spare parts. Any deficiency in acquisition of desired results at the time of installation and subsequent functioning will be the responsibility of the supplying firm/company, without any additional cost. All the supply should be based on National Centre of Excellence in Geology University of Peshawar.
2. Please provide individual item prices (wherever possible) for item-wise comparison
3. The Equipments of which specifications are not given above, the suppliers are requested to quote all the models, which they can supply.
4. Submission of Data/Fact sheets, explaining the function and specification, of each equipment quoted is necessary.
5. The quotes should include all the accessories needed for the proper functioning of each equipment for the given task. The successful tenders will have to accept / abide by all the responsibilities regarding installation and proper functioning of the equipments and training to the end user.
6. Installation, commissioning and training of the end users on these systems will be responsibility of the supplier. The contract shall be liable to be cancellation if the supplier does not meet this condition.
7. The tender Rate shall be item wise. And rate will be on both **FOR basis in Pak Rupees and C&F basis Peshawar Air Port/NCE in Geology Premises.**
8. The bidders shall have to provide a certificate from the principle vendor a certificate that all the equipments are according to ASTM standards.
9. The cost should be inclusive of all the taxes as admissible as per rules.
10. **The specifications of the items where appropriate are given in this tender document. However, firms are encouraged to quote also the better quality items, if available in the market.**





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**ANNEXURE-I**

**PERFORMANCE BOND**

Director  
NCE in Geology  
University of Peshawar, Peshawar

Dear Sir,

RE: AGREEMENT DATE : \_\_\_\_\_ BETWEEN YOURSELVES  
& M/S \_\_\_\_\_ No. \_\_\_\_\_ In consideration of your having concluded  
a CONTRACT evidenced by purchase order No. \_\_\_\_\_ dated \_\_\_\_\_ with  
m/s. \_\_\_\_\_ (SUPPLIER) for  
\_\_\_\_\_ and in consideration of value received from the SUPPLIER, we agree and  
undertake as follows:-

1. To make unconditional payment of \_\_\_\_\_ or unconditional payments from time to time as called upon totaling the said sum of \_\_\_\_\_ being 10% (Ten Percent) of the CONTRACT price mentioned in the said Purchase Order/ Agreement upon your written demand(s) without further recourse, question or reference to SUPPLIER the event of Supplier's default in compliance with its obligatory liabilities and responsibilities arising under and in pursuance of the warranties and guarantees committed by it in the said Purchase Order / Agreement.
2. To accept written intimation(s) from you as sufficient evidence of the existence of a default or non-compliance as aforesaid in the part of SUPPLIER and to make payment accordingly within fifteen (15) days of receipt of the written intimations.
3. To keep this guarantee in full force from the date of this guarantee up to two years after the date of installation and successful operation of equipment.
4. No grant of time or other indulgence to or composition or arrangement with SUPPLIER in respect of the performance of its obligations under and in pursuance of the said Agreement / Purchase Order of any Clause thereof, with or without notice to us shall in any manner discharge or otherwise, howsoever, affect this guarantee and out liabilities and commitments hereunder.
5. This guarantee shall also cover obligations of the SUPPLIER so far as liquidated damages is concerned, as provided in Agreement / Purchase Order any recovery on account of liquidated damages shall not reduce the value of 10% (Ten Percent) provided herein.
6. This guarantee shall be binding on us and our successors-in-interest and shall be irrevocable.

Yours faithfully,

\_\_\_\_\_  
Bank Seal



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**Tender Form**

**Lab Equipment's under the PC-1 Project "Strengthening of NCE in Geology, University of Peshawar".**

<b>S.No</b>	<b>Name of Laboratory</b>	<b>Annexure/Page No</b>
1	Environmental & Soil Science lab	Annexure II/8
2	Economic Geology/Ore Processing /Exploration Geochemistry Lab.	Annexure III/9
3	GIS/RemoteSensing Lab	Annexure IV/12
4	Petroleum Geology/Sedimentology Lab	Annexure V/13
5	GeoTechnical Engineering Lab	Annexure VI/16
6	Igneous & Metamorphic Lab	Annexure VII/18
7	Structure Geology Lab	Annexure VIII/19
8	Hydrogeology /Climatology/Hydrology Lab	Annexure IX/23
9	Hydro-Geophysics/Seismology Laboratory	Annexure X/26
10	Gemology Lab	Annexure XI/27
11	Security Items (Search lights, Walkthrough Gate), Burgler Alarm System)	Annexure XII/32
12	Other Office Equipment (UPSs, UPS Batteries, Aluminum Glass Partitioning, Construction of Generator Room)	Annexure XIII/33
13	Desktops/Laptops	Annexure XIV/34
14	Consumables	Annexure XV/35
15	Cameras and GPS	Annexure XVI/36

Note: Firms are required to provide Annexure wise quotations, complete in all aspects of accessories, consumables and requirements of the labs.





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Annexure II

**ENVIRONMENTAL & SOIL SCIENCE LAB**

Sr. No	Item Name	Specifications/Description	Qty
1	Constant Climate Chamber with light module.	Light module for the constant climate chamber with temperature control, Thermoelectric (Peltier) cooler module, dimmable LED light, two color temperature, ensure optimum growth of plants, protect the environments and low energy consumption, humidity control and light, LED light module with an average intensity of illumination of 10,000 lux, cold light (5500 K) or a combination of cold white and warm white light (2700 K), cooled incubator, the storage chamber IPS. <b>With all necessary accessories</b>	1
2	Bench Top Centrifuge	Speed 15000 rpm, Removable disk, capacity upto 6 angle rotar, efficient refrigerator machine, temperature controlled and adjustable, Variable sizes 50mL to 1 mL <b>With all necessary accessories</b>	1
<p><b>Note: All the above equipment(s)/instrument(s) should have the above specs or of better quality. Bid should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b></p> <p><b>The fixation of the equipment data plate from factory must be permanent and non-removable, and the data shown on it must be embossed/engraved or printed permanently, that guarantees the data cannot be altered.</b></p>			



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Annexure III

**ECONOMIC GEOLOGY/ORE PROCESSING /EXPLORATION GEOCHEMISTRY LAB**

Sr. No	Item Name	Specifications/Description	Qty
1	ICP-MS with isotopes facility/speciation.	<p><b><u>Specifications for Inductively Coupled Plasma/ Mass Spectrometer</u></b> Bench top ICP-MS system for measurement of trace and ultra-trace level elements, qualitative and quantitative measurement in variety of samples including environmental, sea and brine water, geochemical, and foods samples etc. Must meet the following specification</p> <p><b>Sample Introduction System</b> Quartz, low volume, peltier cooled or air cooled, temperature controlled, spray chamber.</p> <p><b>Inductively Coupled Plasma Ion Source</b> The ion source shall consist of 27MHz or 40MHz RF generator and have an output power up to 1600 watts, controllable. An easy mount, or demountable ICP torch with a 2 - 2.5 mm (or more) internal diameter injector.</p> <p><b>ICP-MS Interface</b> The sampling and skimmer cones should be constructed with high purity Ni with apertures of &gt;1 mm and &gt;0.4 mm diameter respectively.</p> <p><b>Ion focusing System and Collision/Reaction Cell</b> Extraction and off-axis design of the ICP-MS should provide high sensitivity and low backgrounds, Should have easy access for routine cleaning. Should have appropriate protection of the reaction cell and be able to reduce all type of polyatomic interferences using kinetic energy discrimination in He mode and/or reaction mode using any reactive gas regardless of the matrix.</p> <p><b>Vacuum system</b> Powerful and efficient low maintenance vacuum system is required. It should provide efficient evacuation of the system having fully automatic operation and control of entire vacuum system without user intervention and with standby mode to reduce pump speed when idle.</p> <p><b>Quadrupole Mass Spectrometer</b> True quadrupole should operate at high (at least 2.5- 3MHz) frequency. Mass range: 250 amu or better, Slew rate (Li to U, without intervening peaks): at least 50,000 amu/s or better Abundance Sensitivity (at Cs): Low Mass side: <math>1 \times 10^{-6}</math> or better High Mass side: <math>1 \times 10^{-7}</math> or better</p> <p><b>Detector Assembly</b> High speed and dual mode detector system, capable of measuring both low concentrations such as Cd down at ppt level and high concentrations of a monoisotopic element such as Na upto 10,000 ppm. The detector must have a minimum dwell time 100µsec and dynamic range at least 10 order of magnitude or more and the detector should have a guaranteed lifetime of at least two year from date of shipment.</p> <p><b>Guaranteed Performance</b> Factory test data or Certificate of Guaranteed Performance should be provided with ICP-MS system by the suppliers. Soft wares: ICP-MS System should be capable to upgrade with Laser Ablation or Chromatographic system. All the required/ complete data set of software and hard wares with the ICP-MS system should be provided along with the main instrument.</p> <p><b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the</b></p>	1



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		<b>necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	
2	Laboratory Spectrophotometer.	<p>A. The power requirements 100/240 Vac, 50/60 Hz.</p> <p>B. The wavelength capability 190-1100 nm.</p> <p>C. The characteristics of the optical system</p> <ol style="list-style-type: none"> <li>1. Accuracy 5 mAbs at 0.0-0.5 Abs, &lt;1% at 0.5-2.0 Abs at 546 nm</li> <li>2. Linearity: 0.01 nm at &lt;2 Abs (with neutral glass at 546 nm)</li> <li>3. Bandwidth: 2nm</li> <li>4. Wavelength accuracy: +/- 1 nm</li> <li>5. Wavelength Reproducibility: &lt; 0.1 nm</li> </ol> <p><b>Machine should be capable of measuring Multi parameters/elements</b> <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b></p>	1
3	Portable dry filter air sampler.	<p>Depth 16 cm, Height 30 cm, Width 17 cm. Power Requirements 82 - 265 Volt (47 - 63 Hz). Weight 3.5-5 kg with battery</p> <p><b>Additional Specifications :</b> <b>Operating principle</b> Electret filter media, built-in mass flow sensor for consistent sampling rates</p> <p><b>Air Collection rate</b> 100 or 200 LPM</p> <p><b>Inlet</b> Built-in omnidirectional aerosol inlet "super-sampling inlet"</p> <p><b>Collection efficiency</b> 1.0 Mm dia: 95% 3.0 Mm dia: 86.9%</p> <p><b>Temp./humidity range</b> 5 to 70°C in non-condensing environments</p> <p><b>Power Source</b> Rechargeable</p> <p><b>Power Consumption</b> 18 hrs continuous 200 Lpm &gt;4 days intermittent mode</p> <p><b>Connectors</b> Military CCSI</p> <p><b>Mounting</b> Built-in tripod extends to 40" at inlet</p> <p><b>Filter Recovery Method</b> Wet Foam Elution</p> <p><b>Final Sample volume</b> 7 mL</p> <p><b>Recovery efficiency</b> 86-95%</p> <p><b>Recovery time</b> 20 seconds</p> <p><b>Sample-to-sample carryover</b> 0% (completely disposable)</p> <p><b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b></p>	1
4	Portable Spectrophotometer	<p>General</p> <ul style="list-style-type: none"> <li>• Optical System: Reference beam, spectral</li> <li>• Photometric Accuracy: ± 0.003 Abs @ 0.0 - 0.5 Abs</li> <li>• Photometric Linearity: &lt; 0.5 % (0.5 - 2.0 Abs)</li> <li>• Photometric Measuring Range: 0 to 3 Abs (wavelength range 340 – 800 nm)</li> <li>• Operating Humidity: max. 80 % relative humidity (non-condensing)</li> <li>• Operating Mode: Transmittance (%), Absorbance and Concentration</li> <li>• Operating Temperature: 10 to 40 °C</li> <li>• Power supply: 4 x AA size Alkaline</li> </ul> <p>4x NiMH rechargeable Battery* Power supply*: 110 - 240 V; 50/60 Hz (* optional Module required.</p> <ul style="list-style-type: none"> <li>• Battery Requirements: 4, AA size alkali cells Operating</li> </ul>	1



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		<p>Conditions: 10 to 40 °C (50 - 104 °F), max. 80 % relative humidity (non-condensing)</p> <ul style="list-style-type: none"> <li>• Wavelength Calibration: Automatic</li> <li>• Wavelength Range: 340 to 800 nm</li> </ul> <p>Specific</p> <ul style="list-style-type: none"> <li>• The consumables and reagents needed for the analysis all the parameters</li> <li>• All the accessories needed for routine analysis and routine service purpose.</li> </ul> <p>Machine should be capable of measuring Multi parameters/elements <b><i>Machine should be capable of measuring Multi parameters/elements</i></b> <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b></p>	
5	<b><u>Microwave digestion system:</u></b>	<p>Microwave Digestion of routine samples with optimum control under high pressure that can process 30-40samples simultaneously.</p> <p>The system must have the capability of digestion under high-pressure and a built in system which can permanently record the temperature of all vessels (and each vessel separately) with accurate internal temperature control.</p> <p>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</p>	1
<p><b>The fixation of the equipment data plate from factory must be permanent and non-removable, and the data shown on it must be embossed/engraved or printed permanently, that guarantees the data cannot be altered.</b></p>			



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Annexure IV

**GIS/REMOTESENSING LAB**

Sr. No	Item Name	Specifications/Description	Qty
1	Portable Spectroradiometer (PSR)	Spectral Range 350 - 2500 nm with all accessories and required software Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.	1
2	ARCGIS	ArcGIS Desktop (Basic), Old Name: ArcView ver. 10x, Including Spatial Analyst and 3D Analyst extensions, Single Use License	1
3	Mobile GIS Device	Integrated 3.75G cellular data, text, and voice capability, 8 megapixel camera with geotagging and dual LED flash, Bluetooth® v2.1 with enhanced data rate, Wi-Fi (802.11b/g/n), Multi-touch 4.3 inch WVGA sunlight-readable Gorilla® glass display, Integrated speaker and microphone, • Processor - 1 GHz, Memory - 512 MB RAM and 16 GB built-in storage, Battery - 3.7 V, 3.3 Ah, 12.2 Wh, Long-life, rechargeable Li-ion polymer battery, MicroSD memory card slot (supports up to 32 GB), Windows Embedded Handheld 6.5 or Android 2.3.4 "Gingerbread" in English • High-sensitivity GPS receiver and antenna • with all accessories and software	1+2+ 3+1
4	Software	eCognition Essentials Latest Version with all the extensions	1
5	Software	ENVI Latest version with all the extensions	1
6	Differential GPS	Channel: 200 or More Satellite track L1, C/A, L2E, L2c, L5, GLANOSS L1, C/A, L1P, L2, SBAS, L1, C/A, L5, GIOVE-A: Reverse COMPASS: Reversed B1, QPSK B1-B2, MEMORY: 256MB & SD Card Slot/ GSM including RTX Static Horizontal Accuracy: 3mm+ 1ppm RMS Static vertical: 3.5mm+0.4ppm RMS Fixed RTK horizontal accuracy: 10 mm + 1 ppm Fixed RTK vertical accuracy: 20 mm + 1 ppm RMS Blue tooth from rover to controller Controller Display screen 10.9 cm (4.3 inch) memory 512MB, Processor 1GHz Controller with survey software/SD Card/GSM Compatible/ export data in dxf software and csv Data Formats: CMR, CMR+™, CMRx, RTCM 2.x, RTCM 3 Frequency: 410-470mhz Emitting power 0.5 to 1W Range internal: 0.5 to 5 km Range external: 25to 30 KM Software for Data Processing GNSS (licensend) Accessories: wooden Tripod Stand, Alluminium Tripod Stand, Optical Tribrach, Pole for Receiver, RTK GPS should be including with one base one rover including external radio, data controller, oper	



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Annexure V

**PETROLEUM GEOLOGY/SEDIMENTOLOGY LAB**

Sr. No	Item Name	Specifications/Description	Qty
1	Polarizing Research Microscope	<p>Trinocular Polarizing Research Microscope With Transmitted &amp; Reflected Microscopy Consisting of:</p> <p>Light sources above 50 Watts halogen Lamp / or powerful LED P-1 Intermediate tube, 1/4 Lambda &amp; Tint Plate Achromat Strain-free Condenser Lenses Trinocular Tube (100-20/80-100) Filter, 45mm, Wide-field eyepiece 10X, 10X CM Filter sliders 25mm NCB11, 25mm ND4/ND16, 25mm GIF Dia polarizer for XY-POL High quality TU Plan Fluor EPI Polarizing Objectives or an equal grade. TU Plan Fluor EPI P 5X, TU Plan Fluor EPI P 10X, TU Plan Fluor EPI P 20X Achromat P 40X, TU Plan Fluor EPI P 50X, TU Plan Fluor EPI P 100X, Achromat P 100X (Oil) Circular graduated Stage with Stage adppter, Including Right handle rotatable Square Ceramic Stage with slide holder Polarizer for above COMPENSATOR: Senarmont Compensator, Quartz Wedge Compensator Including Digital imaging with research &amp; teaching tools (Stand alone) Colored Camera Effective pixels (5.07 m pixels) or above Sensitivity: 2400 lx, F5.6 or greater; equivalent to ISO 260 A/D conversion: 12-bit Inbuilt 8.3" LCD touch screen or above size with on Screen menus, Touch / mouse operation should be possible, USB Mouse with real time marking Two USB ports, two options of internal &amp; external Key pads for the inputs RGB Output port for multi-media or a variety of external monitors Ethernet port (100Base-Tx) to share research online world wide Direct Printing port CF Memory Card pencil drawing, Real time Internet facility, differential cell counting, and a variety of measurements like scale display, distance measurement, point to line distance, X-Y Scale display, Cross hairs, Grid lines, circular measurement, area measurements, distance between two points, point to line distance, distance between circle to circle distance, pitch, super impose, angle intersection, Bright field, Phase Contrast and Dark field observations, two Screen split display should be possible, data entry, direct print function without using extra computer. Capable to directly attach with Multimedia projector &amp; external PC monitor or large screen Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</p>	2
3	Stereo Microscope	<p><b>Optical system:</b> apochromatic optical system -<b>Zoom:</b> Motorized -<b>Zoom ratio:</b> 25:1 -<b>Zoom range:</b> 0.63–15.75x -<b>Aperture diaphragm:</b></p>	2



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		<p>Zooming body built-in</p> <p><b>-Total Magnification</b> (Using 10x eyepieces) 3.15-315x (Depending on objective used)</p> <p><b>-Eyepieces (F.O.V. mm):</b> C-W 10xB(22) , C-W 15x(16) , C-W 20x(12.5) , C-W 30x(7)</p> <p><b>-Tubes (Eyepiece/Port):</b> P2-TERG 100 Trinocular Tilting tube (100/0 : 0/100), P2-TERG 50 Trinocular Tilting tube</p> <p><b>-Stages</b> P-SXY64 Stage , C-SSL Dia-sliding Stage , C-TRS Tilting Stage</p> <p><b>-Epi-Fluorescence Attachments:</b> 4 filter cubes mountable, Fly eye lens built-in, P2-EFLM Motorized Epi Fluorescence Attachment</p> <p><b>-Epi-Fluorescence light sources</b> HG Precentered Fiber illuminator Intensilight C-HGFIE HG/C-HGFI HG (130W)</p> <p><b>-Episcopic light sources</b> C-FLED2 LED Light source for fiber illuminator</p> <p><b>-Episcopic Illuminators</b> P2-FIRL LED Ring Illumination Unit</p> <p>Use with Fiber light source, P2-CI Coaxial Epi Illuminator , P2-FIR Ring Fiber Illumination Unit, C-FDF Flexible Double Arm Fiber Illumination Unit</p> <p><b>-Observation methods</b> -(Episcopic) Coaxial Epi Illuminator, -Epi Fluorescence Illuminator, -Ring LED Illuminator -(Diascopic) Simple Polarizing observation (with P2-POL Simple Polarizing Attachment), -Dark Field observation (with P-DF LED Dark Field Unit), -Oblique light observation</p> <p><b>-Imaging System:</b> digital imaging system 50" FHD (1920x1080) LED</p>	01
4	Professional Stage Micrometers (Steel-Body)	<p>One transmitted light stage micrometer (100 microns)</p> <p>One reflected light stage micrometer (1000 microns)</p>	1 1
5	PVC Acid Digestion Laboratory Fume Hood	<ol style="list-style-type: none"> <li>1. Built in Wash down system with internal piping and spray nozzles behind the baffle and remote control fixture on the left side</li> <li>2. Integral work surfaces and drainage troughs for thorough rinsing after use</li> <li>3. The liners must be made of HF resistant material e.g. Type 1 unplasticized polyvinyl chloride (u-PVC) or polypropylene (PP)</li> <li>4. Sashes must also be made up of HF resistant material (e.g. polycarbonate sash)</li> <li>5. By pass airflow design</li> </ol>	1





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		6. Local electrical standard 7. Pre-wired T8 fluorescent lighting, light switch and blower switch according to local electrical standard 8. Underground acid neutralizing tank made up of HF and HCL resistant materials with PH meter 9. Fume neutralizing assembly. <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	
6	Cathode luminescence (CL) Microscope	CL-Microscope, High sensitive CCD-camera, Coating facility. <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	1
7	Laser Range Finder	Maximum Measurement Range > 1000m Magnification (x)= 7 Field of View= 5.00	2
8	England Finder Greticule	For Studying Palynology Slides	
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Annexure VI

**GEO-TECHNICAL ENGINEERING LAB**

Sr. No	Item Name	Specifications/Description	Qty
1	Permeability of Rocks.	Constant pressure system 3500kPa oil/water Nylon tubing 4 x 6 mm dia 20 m coil Hoek triaxial cell NX 54.7 mm Permeability end caps for NX triaxial cells Low friction pressure maintainer for lateral pressure in the Hoek triaxial cells Mohr's grad. Burette 25 ml Support base 200 x 130 mm rod 10 mm dia x 500 mm Double sleeve metal/glass <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	1
2	Dynamic Pneumatic System for static and dynamic triaxial system.	Cyclic system and load frame Automatically PC controlled dynamic triaxial system with double acting pneumatic actuator and load frame. Complete with PC, 16 channels data acquisition unit and software. - Conforming to ASTM D3999 and D5311 - To perform UU, CU, CD standard triaxial tests, Stress Path, Cyclic loading, dynamic shear strength and deformation, liquefaction potential, shear modulus and damping ratio Transducers submersible load cell to be used with Dynatriax (dynamic triaxial system) Axial displacement transducer to be used with Dynatriax (Dynamic Triaxial system) De airing block suitable for banded triaxial cells Automatic volume change apparatus allowing remote flow control. Compatible with WF automatic Static/Cyclic triaxial systems Triaxial cell Triaxial cell for 70 mm dia. Sample sizes - Banded chamber - Including pillar and anvil for strain dial gauge or transducer - Accessories Conforming to the specimen size Complete accessories for 50 mm dia. Sample Pressure system with Air compressor and treatment unit. De airing system Foreign training of 2 staff members <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	1
3	Ultrasonic pulse velocity tester battery operated	Conforming to EN 12504-4 and ASTM C597 24 kHz testing head 150 kHz testing head 24 columns serial printer, rechargeable battery operated. External battery charger and batteries included. 110-230V/50-60Kz/1ph Serial cable for printer connection.	1
4	Autoclave	Maximum temperature 200°C , pressure = 15atm, capacity 150liters Complete with pressure gauge, pressure regulator, temperature regulator, control switches, safety valve	1
5	Pneumatic piezometers	Sensitivity 0.1% F.S Displacement 0.002 cc	5



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		Standard Resolution 1 kPa / 0.1 psi or 0.1 kPa / 0.01 psi with C-108 readout. Range 0-2000 kPa / 0-200 psi with standard C-108 readout and T-102 tubing Linear Range 21-2000 kPa / 3-200 psi with standard C-108 readout and T-102 tubing Max Range 0-14,000 kPa / 0-2000 psi	
6	Speedy moisture tester	20 g cap. , complete with electronic balance, accessories and carrying case	1
7	Rock classification hammer	Impact energy of 0,74 Joule (Nm). Ideal to test small sized, sensitive and thin walled materials. Complete ASTM rock cradle and Calibration anvil	1

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Annexure VII

**IGNEOUS & METAMORPHIC LAB**

Sr. No	Item Name	Specifications/Description	Qty
1.	Scanning Electron Microscope with EDX spectroscopy system image capturing and coating facilities.	Electron optics, specimen stage with motorised control of XYZ rotate and tilt (3 to 70 degrees), large specimen chamber that can accommodate specimens up to 250 mm diameter and 45 mm tall, vacuum system, chamber and column suspension, microscope control and hardware, PC interface, scanning and imaging, integration with external systems (e.g. EDX and EBSD detectors), beam blanker, secondary electron imaging, backscattered electron imaging, accelerating voltage range, current range, Frame memory, selectable image file format, variable pressure range, carbon and gold coating facility, installation and training on the equipment.	1
3	Radon Gas Detector with safety Siren.	Radon Gas Detector with safety siren capable of measuring and storing concentration data of radon gas in rooms, houses and other inbuilt environments for long and short term durations, complete in all respects. The system should be capable of analyzing the samples with maximum precision and accuracy. <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	10
4	Isotope Ratio Mass Spectrometer	1. Isotope analysis system for measuring isotopic ratios of all the stable isotopes in all kinds of geological and environmental materials/samples. 2. The system should be capable of analyzing the samples with maximum precision and accuracy. <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	1
5	Igpet Software		1
6	Tim Hollands Software (Thermocalc)		1
7	AX (Softwares)		1
8	CIPW norm calculations (software)		1
9	Mineral Recalculation Software		1
10	Petrograph Software		1
11	Iimat (Microsoft Excell)		1
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Annexure VIII

**STRUCTURE GEOLOGY LAB**

Sr. No	Item Name	Specifications/Description	Qty
A	IT Equipment		
1	Branded Desktop Computers (Windows Based)	Branded Desktop Computers (HP/Dell/Lenovo) Processor: Intel® Xeon® octa core E5 Series Processor with minimum 12MB Cache Min. 16GB RAM Professional Class Motherboard (Q or C-Series) with min. 4 SATA and 4SAS ports 1TB 7200 RPM HDD Dual Layer DVD RW +/- Graphics: Intel HD Graphics Chassis with support for installation of 4xHDDs (in addition to DVD Drive) and with a min. 450w power supply. 27" FHD (1920x1080) LCD/LED Wireless keyboard and mouse <i>Windows 7 74-bit Support is required</i> <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	8
2	PCI/PCIe Graphics Card	Graphics card supporting CIDA 4.x with minimum of 1GB Memory	1
3	27" Monitors	27" Monitors with VGA and DVI support. FHD (1920x1080) resolution	1
3	Desktop Computers (All in one machines), (Windows Based)	HP/Dell/Lenovo All-in-One Machines comprising of 27" FHD (1920x1080) Screens , Core i7processor (3-6M Cache) Processor, 8GB RAM, 1xGigabit NIC, built-in Wi-Fi, 1TB 5400/7200 RPM HDD, Wireless keyboard and mouse <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	2
4	Macintosh Computers (Mac OS and windows based)	27-inch LED-backlit Retina display quad-core Intel Core i5 processors, 1TB or 3TB Fusion Drive or up to 1TB flash storage (SSD) Wireless Keyboard and Magic Mouse or Magic Trackpad <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	2
5	Printer (A3-Colour)	Print on various paper types and sizes from 3.5 x 5 inches up to 13 x 19 inches , Maximum letter print speeds up to 33 ppm black, 32 ppm color2, replacing only the individual ink cartridge that runs out. <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	1
6	Scanner (A3)	Large format color scanner for images and documents, Scanning area: A3 11.7-in x 16.5-in (29.7cm x 42cm), Resolution 1200x1200dpi /can be interpolated to 9600dpi, USB 2.0 connectivity for reliable, fast transfer, Supports Win 7, XP, Vista; Mac OSX <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	1



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7	External Hard Drive (Portable)	Fast file transfers with USB 3.0, Compatible with USB 3.0 and USB 2.0, Powered by USB port, Automatic and cloud backup, Password protection and hardware encryption, With carrying case	2
8	Drafting Machine (A1 Desktop Top)	Double hinged 360 degree drafting head, Easy board fitting via clamp-on brackets, 15 click stops with intermediate locking, Adjustable zero facility, Smooth free-wheeling action, Horizontal and vertical locking, Complete with scales Assembly, Drawing board A1 ext size 1100 x 650 with 22mm thick drawing board, A1 size 6 position deluxe stand with rubber feet ensuring good grip and to protect desk surfaces from scratching. <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	1
9	Tracing Glass Table	30 x 42" glass top 38" wide base Tilts to 45 degrees with adjustable height <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	1
<b>B</b>	<b>Software</b>		
1	Move Software (Midland Valley)		1
2	GeoGraphix (Landmark)		1
3	Dynel® 2D software		1
4	Poly3D		1
5	VoxelGeo (Paradigm)		1
6	GeoSec (Paradigm)		1
7	RockWorks (RockWare)	Latest 32/64bit version	1
8	RockWare GIS Link (RockWare)	Latest 32/64bit version	1
9	Rock Ware Stereo Stat (From RockWare)		1
10	SpheriStat (From RockWare)	Latest 32/64bit version	1
11	Surfer®	Latest 32/64bit version	1
<b>C</b>	<b>Numerical modeling software</b>		
<b>1</b>	2D Numerical Modelling Software (Structural)	Capable of doing 2D numerical modelling of 2D data on faults and folds.	1
<b>2</b>	3D Numerical Modelling Software (Structural)	Capable of doing 3D numerical modelling of triangular elements for analyzing 3D data on faults and fractures.	1
<b>3</b>	2D Numerical Modelling Software (Stratigraphic)	Capable of doing 2D numerical modelling of Eustacy, Subsidence Rate and Sediment Supply Rate.	1
<b>4</b>	3D Numerical Modelling Software (Stratigraphic)	Capable of doing 3D numerical modelling and simulation of long term evolution of sedimentary processes.	1
<b>D</b>	<b>Field Equipment</b>		
1	Field Tablet (XC6 DMSR)	Beyond MIL-STD-810G Testing - 7' Drop Spec (Water/Dust-proof), 4th Gen Intel Core i5 Processor, Communications Suite with 4G LTE, Best Sunlight, Readable Display: 1300 NITs, Multi-Touch Display, Full Shift Battery Life: Up to 8.5 Hours, Single or Dual RAID Configurable SSDs: Up to 256 GB HazLoc Certified for Explosion-Prone Environments, Specially designed for In-Field Upgrades Active Cooling, Industrial Sealed Fan, Full Microsoft® Windows® 8.1 Professional or Windows® 7 Professional <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	1



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2	Geological compass (with Pocket Transit Com-Pro Compass)	Precise pocket compass (with Pocket Transit Com-Pro Compass) with NdFeB rear earth magnet and sapphire jewel bearing, Claimed Weight: 5.7 oz, Bubble Level, Sighting Hole, Adjustable Declination <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	4
3	Geological Hammer (with Leather Sheath)	Rock hammer with a leather-wrapped handle, Solid steel construction; pointed tip, Head weighs 22-Ounce and 7-Inch long, Overall length 13-Inch; weighs 1-Pound 14-Ounce <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	4
E	<b>Analogue Modelling Equipment</b>		
1	Digital Camera (DSLR) with full accessories	7D MK II Digital SLR Camera Body , 20.2 MP CMOS sensor and ISO 100-16000 High speed continuous shooting up to 10.0 fps 65-point all cross-type AF system Dual Pixel CMOS AF, 24-105mm L Zoom Lens 75-300mm III Zoom Lens 2pcs 32GB Class 10 Memory Cards High Speed Card Reader 3pc Deluxe Filter Kit (UV + CPL + FLD) 4pc Macro Lens Kit (+1, +2, +4, +10) Extra Replacement Battery Charger Extra High Capacity Replacement Battery Deluxe Camera Backpack 58" Professional Size Tripod	3
2	Laser Interferometer with full accessories and software	Capable of measuring objects, moving with speeds up to 7m/s with the standard resolution of 100pm. Capable of automatic compensation of environmental conditions at the rate of one hundred thousand times per each second. Capable of measuring vibrations of frequency up to 50 kHz. Capable of measuring long (tens of meters) and extremely short (hundreds of picometers) distances, for detecting very high and indefinitely slow movement, for monitoring vibrations, measuring angle, comparing distance, testing straightness, flatness, squareness, parallelism. Can be used in scientific laboratories, and in the open air. Can be controlled by a PC, tablet or a smartphone. Must be user-friendly and portable, must have built-in wireless connectivity and can work with or without PC connection. Laser type: HeNe laser with frequency stabilisation Wavelength accuracy up to 0.005ppm Short term stability up to 0.001ppm Long term stability up to 0.001ppm Output power 900μW Maximum axis length 80m (linear optics) Maximum velocity up to 7m/s (linear optics) Resolution 100 pm Laser source MTBF 20000 hours Compensation of environmental conditions Real time compensation with wireless sensors 1x air temperature sensor 1x air humidity sensor 1x air pressure 3x material temperature sensor Size 45mm x 70mm x 255mm - laser head 30mm x 60mm x 145mm - power supply Weight 1200g - laser head 500g - power supply, With Free software updates	1
3	2D Analogue Modelling Deformation Rig (Simulation apparatus)	Specialized apparatus set-up consisting of metal base plate and glass side walls. Operated with the help of electric stepper motor. Can be used in research laboratories for simulation of faults and related structures.	1
4	3D Analogue Modelling Deformation Rig	Specialized apparatus set-up consisting of metal base plate and glass side walls. Operated with the help of electric stepper motor. Can be used in	1





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	(Simulation apparatus)	research laboratories for simulation of faults and related structures in 3D.	
5	Slicer (for cutting the gelled models)	Specialized apparatus set-up consisting of metal base plate and metal side walls. The height must be adjustable and fitted with a metal wire (or better material) for cutting the gelled sand box models. Fitted with a digitally controlled push mechanism.	1
6	Adjustable Hydraulic Platform Truck/Hand Truck	Fitted with four composite wheels, two fixed and two locking castors for easy rolling over rough workshop and warehouse floors, One-piece hydraulic unit controlled by large rear mounted foot pedal, Safety release mechanism positioned on handlebar for smooth controlled descent, With non-slip platform cover for added load security, Can be used as a mobile service bench	1

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Annexure IX

**HYDROGEOLOGY /CLIMATOLOGY/HYDROLOGY LAB**

Sr. No	Item Name	Specifications/Description	Qty
1	Groundwater Level, Temperature and Conductivity (LTC) logger (3-in-one)	<p>Level Sensor: with 10 meter range, 0.1% (FS) accuracy and autotemperature compensation</p> <p>Temperature Sensor: should have a range of 10-40°C at 0.1°C resolution and an accuracy of <math>\pm 0.1^\circ\text{C}</math></p> <p>Conductivity Sensor: with a range of 0-80,000 <math>\mu\text{s/cm}</math>, having 2% accuracy, 500 <math>\mu\text{s/cm}</math> to 50,000 <math>\mu\text{s/cm}</math> calibrated range, resolution 1<math>\mu\text{s}</math>, temperature compensation 0-40°C and specific conductance at 25°C.</p> <p>Battery: must last for at least five years at 5 minute sampling rate.</p> <p>Operating Temperature: should be in the -20°C to 80°C</p> <p>Clock Accuracy: <math>\pm 1</math> minute/year from 0 to 40°C</p> <p>Data points reading: more than 15000</p> <p>Communication: Must be able to communicate to USB and RS232 interface</p> <p>Sampling mode: Linear, (5 sec to 99 hrs), Real Time View, Future Start</p> <p>Barometric Compensation: preferably in-built (automatic)</p> <p><b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b></p>	4
2	Water level meter	<p>Must be non-stretch PVDF flat tape with stainless steel conductors, the tape must be permanently laser-marked in meters with subdivisions as millimeters, sensitivity of probe must be adjustable to conductivity, optimum results in cascading water, components must be rugged and corrosion proof. Must have its own carrying case.</p> <p><b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b></p>	1
3	Barologger	<p>Sensor: must be having an accuracy of <math>\pm 0.05</math> kPa with superior low noise stability of reading and be capable of measuring in units of psi, kPa, mBar, °C, and °F. It must have automatic temperature compensation from -10 to +50°C.</p> <p>Temperature sensor: must be accurate to <math>\pm 0.05^\circ\text{C}</math> and have Resolution of 0.003°C.</p> <p>Battery: pre-installed battery lasting for at least 10 years working life and capable of operating within a temperature range of -20°C to 80°C.</p> <p>Data Collection: must be having enough memory to record more than 40,000 data readings</p> <p>Communication: Must have Optical Infrared Interface convertible to RS-232, USB or SDI-12 at more than 19,200 bps rate.</p> <p>Sampling Rate: 1/8 sec to 99 hours.</p> <p><b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b></p>	1
4	Flow-through downhole field fluorometers (probe)	<p>Must have the following:</p> <p>Number of optics: 4</p> <p>Turbidity measurement: 0.2 to 100 NTU</p> <p>Detection limit: <math>2 \times 10^{-11}</math> g/ml typical (uranine)</p> <p>Measuring interval: 9 sampling rates from 2 sec up to 20 min</p> <p>Recording time: several weeks</p> <p>Memory capacity: 2GB</p> <p>Serial output for PC: RS232 and USB adaptor cable</p> <p>Power supply: Lead battery 6 or 12 volt, 12-24 Ah</p>	2



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		Consumption: 1.5 mA (standby mode) Analog-digital conversion: 24 bit unipolar Connection: 50 meter cable Sonde Casing: stainless steel Integrated thermometer: 0.01 C sensitivity <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>																															
5	Signal cable (50 meter) with spool for Fluorometer GGUN-FL24	30 meter is included as standard but additional 20 meters must be bought along with a spool <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	2																														
6	Water-proof data logger for the Fluorometer (GGUN-FL24) with No Display	with removable PC-compatible CompactFlash memory. Ten sampling rates (2 s to 15 min). No display. Best for very low power consumption. <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	2																														
7	Serial-USB adopter for the Fluorometer FL-24	USB-serial adaptor cable for PC without serial port (COM, RS232).	2																														
8	Tracer Dyes	Uranine (Na fluorescein)--500g. Tinopal (CBS -CL)-- 2 kg (\$11x2kg) <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	1 2																														
9	Water Pollution Testing Kit	<table border="1"> <thead> <tr> <th>Test</th> <th>Methodology</th> <th>Testing Range</th> </tr> </thead> <tbody> <tr> <td>Dissolved Oxygen</td> <td>Modified Winkler method</td> <td>0.2 to 10.0 ppm (0.2 ppm interval)</td> </tr> <tr> <td>Hardness total hardness</td> <td>E.D.T.A. reagent system</td> <td>0 to 200 ppm</td> </tr> <tr> <td>Carbon Dioxide</td> <td>Measure free carbon dioxide</td> <td>0 to 50 ppm</td> </tr> <tr> <td>Alkalinity</td> <td>Phenolphthalein (P) and Total (T) Alkalinity, in terms of CaCO<sub>3</sub></td> <td>0.0 to 200 ppm</td> </tr> <tr> <td>Chlorides, including salinity test procedure</td> <td>Potassium chromate-silver nitrate reaction</td> <td>0 to 200 ppm</td> </tr> <tr> <td>pH</td> <td>Octet comparator (bi-color reader)</td> <td>3.0 to 10.0</td> </tr> <tr> <td>Nitrate-Nitrogen</td> <td>Quartet comparator method (the modified APHA reagent system)</td> <td>0.2 ppm to 1.0 ppm</td> </tr> <tr> <td>Phosphate</td> <td>Quartet comparator method (the absorbic acid method)</td> <td>0.2 ppm to 1.0 ppm</td> </tr> <tr> <td>Silica</td> <td>Octet comparator method (the modified APHA reagent system)</td> <td>0.5 ppm to 10.0 ppm</td> </tr> </tbody> </table>	Test	Methodology	Testing Range	Dissolved Oxygen	Modified Winkler method	0.2 to 10.0 ppm (0.2 ppm interval)	Hardness total hardness	E.D.T.A. reagent system	0 to 200 ppm	Carbon Dioxide	Measure free carbon dioxide	0 to 50 ppm	Alkalinity	Phenolphthalein (P) and Total (T) Alkalinity, in terms of CaCO <sub>3</sub>	0.0 to 200 ppm	Chlorides, including salinity test procedure	Potassium chromate-silver nitrate reaction	0 to 200 ppm	pH	Octet comparator (bi-color reader)	3.0 to 10.0	Nitrate-Nitrogen	Quartet comparator method (the modified APHA reagent system)	0.2 ppm to 1.0 ppm	Phosphate	Quartet comparator method (the absorbic acid method)	0.2 ppm to 1.0 ppm	Silica	Octet comparator method (the modified APHA reagent system)	0.5 ppm to 10.0 ppm	1
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		<p>Ammonia-Nitrogen      Octet comparator procedure (the Nessler method)      1.0 ppm to 8.0 ppm</p> <p>Sulfide      Octet comparator method (the Pomeroy reagent system)      0.2 ppm to 20.0 ppm</p> <p><b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b></p>	
10	Water Pollution Testing Kit Refill	<p>refill kit</p> <p><b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b></p>	1
11	Acoustic Doppler Current Profiler for Rivers and Channel flow	<p>Range: <math>\pm 10</math> m/s Resolution: 0.1 cm/s Accuracy: <math>\pm 1\%</math> of measured velocity, <math>\pm 0.5</math> cm/s Up to 100 range cells River Surveyor Hardware Features: (5 frequencies- 5 Mhz to 500kHz) 8 bit A/D conversion Transducer shading for minimal sidelobes Compass/tilt sensor 12-24 VDC Power -5° to 45°C Operating Temperature River Surveyor Hardware Options: Four-beam Janus transducer head Low-profile ADP housing Internal recorder River Surveyor Software features: Windows 95/98/NT compatible Bottom tracking DGPS Interface External compass input Real time discharge calculations Discharge estimation for unmeasured areas Discharge summary output file Vessel track with velocity vectors Bathymetry profile</p> <p><b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b></p>	1

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Annexure X

**HYDRO-GEOPHYSICS/SEISMOLOGY LABORATORY**

Sr. No	Item Name	Specifications/Description	Qty
1	TROMINO@3G	<ul style="list-style-type: none"> <li>• 3 velocimetric channels with adjustable dynamic range (up to <math>\pm 1.5</math> mm/s <math>\sim</math>) and lower sensitivity (up to <math>\pm 5</math> cm/s)</li> <li>• 3 accelerometric channels</li> <li>• 1 analog channel (e.g., external trigger for MASW/refraction)</li> <li>• built-in GPS receiver, internal and/or external antenna for positioning and absolute timing/synchronization among different units</li> <li>• built-in radio transmitter/receiver module for indoor/outdoor</li> <li>• synchronization among different units and alarm transmission (e.g., signal above threshold levels)</li> <li>• NEW! Radio triggering system for MASW/refraction</li> <li>• built-in calibration and check-up system</li> <li>• 0.1, 1024] Hz on all channels (up to 32 kHz on 2 channels) with A/D conversion &gt; 24 real bits</li> </ul>	01
2	GMS-18-63: NetQuakes Seismic Recorder, 3 Channel	<ul style="list-style-type: none"> <li>• Int. Triaxial Accelerometer AC-63i</li> <li>• Full Scale Range <math>\pm 2</math> g std. (<math>\pm 0.5, 1, 3</math> g optional)</li> <li>• Removable CF Memory Interface</li> <li>• incl. 2 GByte Memory Card for Data Storage</li> <li>• uCLinux Operating System, 32 MB RAM</li> <li>• Wired Ethernet incl. Cable and Connector</li> <li>• incl. 12 VDC, 7.0 Ah Battery</li> <li>• 12 VDC External Power Supply, UL, 100-240 VAC</li> <li>• incl. Mounting Base Plate.</li> <li>• GPS Receiver for RS-232 with 20 m cable</li> </ul>	03
3	<b>VE-53-BB: Triaxial Broad Band Seismometer</b>	<ul style="list-style-type: none"> <li>• 0.2 Hz (5 s) to 160 Hz Frequency Response</li> <li>• 2x500 (1000) V/m/s Output Sensitivity</li> <li>• 20 Vpp full differential signal output</li> <li>• Single bolt mounted enclosure with 3 leveling screws</li> <li>• incl. 2 meter Cable, Cable Inlet and Connector</li> <li>• GPS Receiver for RS-232 with 20 m cable</li> <li>• Signal Transmission for upto 70 meters</li> <li>• One Unit required in Combination with Intercon</li> </ul>	03
4	<b>GMS-24: Seismic Recorder, 3 CH, 24-Bit</b>	<ul style="list-style-type: none"> <li>• Removable CF Memory Interface</li> <li>• incl. 2 GByte Memory Card for Data Storage</li> <li>• uCLinux Operating System, 32 MB RAM</li> <li>• Wired Ethernet incl. Cable and Connector</li> <li>• incl. 12 VDC, 7.0 Ah Battery 12 VDC External Power Supply, UL, 100-240 VAC</li> </ul>	03



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Annexure XI

**GEMOLOGY LAB**

Sr. No	Item Name	Specifications/Description	Qty
1	DLTrinacocular Microscope	-Video CCD Camera adapter -Still Camera adaptor and all essential accessories. - Digital 12V system eliminates spike and flicker irregularities which reduces eye fatigue - Leica StereoZoom Magnification from 10x to 64x - 47,000+ lux exceeds the needs for diamond examination while satisfying the requirements for colored gems - Darkfield and brightfield illumination using LCD intensity read-out for recall of the previous intensity setting -Wider stage mount promotes optimum wrist positioning and hand comfort and includes custom stone holder - Three ports for mounting optional overhead lamp -Exclusive stationary power cord for 345 degree base rotation; 100V-240V global electrical compatibility	02
2	Presentation Scope/Simple Microscope	-Magnification: 10x-30x -Adjustable dark field illumination -Iris diaphragm for illumination and control -Overhead spot illumination -Custom stoneholder -Rubber eyeguards -Universal 100V-240V for global electrical compatibility	10
3	Stereo Microscope	Digital 12V system eliminates spike and flicker irregularities which reduces eye fatigue -Leica StereoZoom Magnification from 10x to 64x -47,000+ lux exceeds the needs for diamond examination while satisfying the requirements for colored gems - Darkfield and brightfield illumination using LCD intensity read-out for recall of the previous intensity setting -Wider stage mount promotes optimum wrist positioning and hand comfort and includes custom stone holder -TWO ports for mounting optional overhead lamp - Exclusive stationary power cord for 345 degree base rotation; 100V-240V global electrical compatibility - 0.7–4.5x zoom objective - Total magnification 7–45x -Transmitted light, Cold light source with light conductor, Dark-field	02
4	Refractometer	-Built-in monochromatic filter. - RI 1.79 liquid included.	05
5	Digital Refractometer	-at least 200 gemstones database -Refractive index range between 1.30-3.30 or above	01
6	Diffraction Spectroscopes	-Fixed slit and focus - Slim with steel body	20
7	Large diffraction spectroscopy	- Fixed slit and focus - Stand. - Steel body	02
8	Specific gravity balance	-Digital -S.G finding range 0.1-150ct or above	02
9	Portable Polariscope	- Fixed - Built-in illumination	10
10	Chelsea Colour Filter		20
11	Standard Triplet Loupe	-Magnification 10-20x -18mm	20



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12	Tweezers	-Side locking -Stainless steel	20
13	Gemstones Faceting Unit	With Polishing laps (Cu, Tin, leather) and 180, 300, 600, 1200 mesh size laps	01
14	UV lamp LW/SW	-Optional Multispec Short wave and Long Wave UV lamp -Contrast control spectacles block ultraviolet radiations -Viewing large cabinet -High intensity	02
15	Fibre Optic light	-Rheostat, Double arm. -Cold source -Additional lamp	10
16	Hardness pencils	- Hardness Range 1-10 -Sharp pointed -Including hardness testers material e.g. 3.5, 4.5, 5.5 and above -Streak plate	02
17	Refractive index (R.I.) fluid	-1.79 R.I. range	10
18	Conoscope for interference figure		05
19	Calcite Dichroscope	- Having wide view -small size -Back plastic body	20
20	London Dichroscope		10
21	Monochromatic LED Light for Refractometer	-Battery operated	10
22	Portable Gems testing instruments Kit	-10x loupe, tweezers, stone cloth, spectroscope, dichroscope, Chelsea Colour Filter, folding polariscope, flexi light, flat light and conoscope rod.	10
23	Contrast Control Spectacles		05
24	Ultrasonic cleaner	-Medium size	01
25	Diamond Sure	-Be able to differentiate Natural Diamonds from Synthetics and its stimulants -Capable of testing loose or mounted diamonds from 0.1-10ct size -IEC main supply lead -Compact, protection and handy carry case -Spare fiber optic cable -Cotton gloves/Tools -1 year parts/service warranty	01
26	Diamond View	-Able to distinguish between types of natural diamonds, synthetic diamonds and its types e.g. HPHT and CVD. -Capable to look at the surface fluorescence by illuminating with strong S-W-UV light. -Standard magnification range for diamonds ranging from 0.05-10ct range. -All size vacuum holders used for loose and mounted diamonds -Main power adapter cable with plug -USB A-B cable -IEEE fine wire 6 pin cable -Software CD (Window7 complaint) -Calibration samples( Calcite and ball bearing) -Quick start Guide -User manual guide -1 year parts service/warranty	01





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27	Diamond Plus	<ul style="list-style-type: none"> <li>-Capable to test HPHT Natural Diamonds, few synthetic and irradiated diamonds</li> <li>-Loose stones testing ability from 0.05-10ct</li> <li>-Compact, protective and handy carry case</li> <li>-IEC main supply lead</li> <li>-2 sample holders</li> <li>-3 sample holder pins</li> <li>-Pair of tweezers</li> <li>-1 Year parts/service warranty</li> </ul>	01
28	Digital Stereomicroscope ( for photomicrography)	<ul style="list-style-type: none"> <li>-<b>Optical system:</b> Apochromatic optical system</li> <li>-<b>Zoom:</b> Motorized</li> <li>-<b>Zoom ratio:</b> 25:1</li> <li>-<b>Zoom range:</b> 0.63–15.75x</li> <li>-<b>Aperture diaphragm:</b> Zooming body built-in</li> <li>-<b>Total Magnification</b> 3.15-315x</li> <li>-<b>Eyepieces</b> (F.O.V. mm): C-W 10xB(22) , C-W 15x(16) , C-W 20x(12.5) , C-W 30x(7)</li> <li>-<b>Tubes (Eyepiece/Port):</b> Trinocular Tilting tube , Trinocular Tilting tube</li> <li>-<b>Stages</b> Dia-sliding Stage ,Tilting Stage</li> <li>-<b>Fluorescence Attachments:</b> 4 filter cubes mountable, Fly eye lens built-in, Motorized Epi Fluorescence Attachment</li> <li>-<b>Fluorescence light sources:</b> HG Precentered Fiber illuminator Intensilight (130W)</li> <li>- <b>light sources:</b> LED Light source for fiber illuminator</li> <li>-<b>Illuminators:</b> LED Ring Illumination Unit Use with Fiber light source, Flexible Double Arm Fiber Illumination Unit</li> <li>-<b>Observation methods</b> -Coaxial Illuminator, -Fluorescence Illuminator, -Ring LED Illuminator -(Diascopic) Simple Polarizing observation (with Simple Polarizing Attachment), -Dark Field observation , -Oblique light observation</li> <li>-<b>Imaging System:</b> Stand alone digital imaging system for teaching/research purpose. 50" FHD (1920x1080) LED</li> </ul>	01



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Annexure XII

**SECURITY ITEMS**

<b>Sr. No</b>	<b>Item Name</b>	<b>Specifications/Description</b>	<b>Qty</b>
1	Security Walk Through Gate	Min 25-33 zones, , LCD display, with remote control (50M), IP 55/56 compliance, fully compliant with the NIJ-0601.02 and NIJ-0601.03 Standards	3
2	Hand Held Metal Detector		4
3	Road Blocker with Manual Control Button	Length Approx. 18 ~ 22 Ft (Depending on Site), Electrical Control unit Section, Hpu/ Ecu mounting platform	3
4	Anti-Fog High Beam Search Lights		10
5	Bullet Proof Jackets		10
6	High Beam Torches		10
7	Burglar Alarm System		01
8	Road Barrier		03
9	Vehicle Search Mirror		03
10	Anti-dark goggles		10



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Annexure XIII

**Other Office Equipment**

Sr. No	Item Name	Specifications/Description	Qty
1	UPS 3kva	3kva Long Backup UPS (Min. 1hr backup @70%load)	1
2	Sealed Dry UPS Batteries (preferably not China Make)	12v7amp 12v26amp 12v12amp 12v24amp 12v40amp	80-140 60-100 60-100 20-40 16-32
3	Aluminum Glass Partitioning	Aluminum-Glass Partitioning per square ft. rate is required with 1.66 mm thick aluminum and 5mm thick glass. Rate must include all installation/labour charges. Estimated running sqft could be about 1400-1500ft. False ceiling per square ft rate is required (estimated total area could be about 700-800 sqft). Cast must include all installation/labour charges.	/sqft
4	Cable Ladder	Cable ladder and cable tray (inside IT Centre). Per sqft rate is required. Expected length of the tray could go for about 50 running feet.	/sqft
5	16MM2 four core cable	Pure Copper	160m
6	150MM2 four core cable	Pure Copper	100m
7	25MM2 four core cable	Pure Copper	70m
8	50MM2 four core cable	Pure Copper	50m
8	Access Layer Network Kit	An access layer network kit comprising of crimping tools, cutters, network cable testers, power meters	01
9	Canon IPF-815 Cartridges	Matte Black, Black, Cyan, Magenta, Yellow Full Set (330ml)	02
10	Datacenter monitoring center	Comprising of Audio input, CAN bus, 19" rack mountable, CAN RJ-12 ports, Dry contacts board VT48, Alarm beacon LED, Dual-core ARM Cortex-A7 / 1GHz / 1GB, HDMI Port, along with Analog Temp, Humidity, AC Voltage, Smoke, PIR Sensor etc	01



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Annexure XIV

**Desktops/Laptops**

<b>Sr. No</b>	<b>Item Name</b>	<b>Specifications/Description</b>
1	Core i5/i7 Laptop	15.6" Professional Series Laptop Antiglare LED Backlit Screen (No Touch) Min. 2GB nVidia Graphics Card Intel Core i7/ 5 <sup>th</sup> generation processor 8GB/16GB RAM 1TB 7200 RPM Harddisk DVD RW± USB 3.0 ports 9 Cell Battery Original Company Manufactured Carrying case Local Warranty No Operating System
2	Desktop	Intel 4 <sup>th</sup> Generation Core i3 4GB RAM 500 GB HDD DVD RW+- Professional Chassis with 300Watt power supply 23" or higher LCD/LED USB Keyboard+Mouse



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Annexure XV

**CONSUMABLES/CHEMICALS**

Sr. No	Item	Description	Qty
1	Dichloromethane		30 liters
2	Methanol		5 liters
3	n-hexane		10 liters
4	HPLC grade water		5 liters
5	HPLC grade methanol		5 liters
6	HPLC grade Acetonitrile		5 liters
7	Standards for total Nitrogen, phosphorus, hormones	for bacterial Petroleum hydrocarbons (Aromatic/n-paraffin), Pesticides	
8	QTs KITS		01 no.
9	Nutrient Broth Agar		1 kg
10	KBr/Silica Gel	for fractionation	1 kg
11	Sample injecting Syringe for GC-FID	Shimadzu	01
<u>12</u>	Cylinder with gas for Helium/Nitrogen/Hydrogen/oxygen SiliaSep OT, TMA Acetate 10 g		
13	70mL fractionation Cartridges	Box of 16 Cartridges	
14	Membrane Filter syringe for HPLC		
15	FTIR sample preparation assembly		1
16	Standards for petroleum hydrocarbons	n-paraffin standards Mix C10, C12, C14, C16 analytical standards 500 mg	1
17	Cellulose Thimble		01 box



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Annexure XVI

**CAMERAS AND GPS**

Sr. No	Item	Description	Qty
1	Digital Camera (DSLR)	Camera body and two lenses At least 15MP, 1 wide angle and 1 macro lens. <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	1
2	Field camera (GPS enabled)	Waterproof up to 100ft; freeze proof to 14 degrees Fahrenheit; shockproof for drops up to 7 feet 5x optical zoom wide-angle glass lens, Capable of taking up to 5 shots per second, Built-in Wi-Fi and NFC, Built-in GPS, mapping, Electronic Compass and Points of Interest (POI) <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	1+2
3	GPS (with built in camera)	3-Inch sunlight-readable, touchscreen display with multi-touch capability, Dual-band GPS/GLONASS satellite positioning, Sensors (3-axis compass, accelerometer, barometric altimeter), ANT or Bluetooth technology - wirelessly share routes, tracks, waypoints, geocaches, custom maps and photos between units Dual orientation - auto switching between landscape or portrait views, Dual battery system -2 AA batteries or NiMH battery pack charged, 8MP (or more) autofocus camera (650, 650t only) with LED flash/torch and digital zoom <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	1
4	GPS (with built in camera)	Rugged, IPX7-waterproof handheld navigator with high-sensitivity, GPS receiver, 1.6 x 2.2 inch color display, Built-in 3-axis tilt-compensated electronic compass, Barometric altimeter with precise altitude, Compatible with Garmin's wide array of detailed topographic, marine and road maps, 4.3GB onboard memory for downloading, 5-megapixel (or more) autofocus camera with automatic geotagging for easy navigation back to favourite photo spots, 2.6" 65K color TFT Display, 5 mp autofocus digital camera with automatic geo-tagging, Preloaded topographic maps. Waterproof, Worldwide base map with shaded relief. <b>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.</b>	1+3