



**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/>

Last date of tender is **July 27, 2015 upto 12:00PM**

Opening date of tender is **July 27, 2015 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: / / 2015



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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/altered/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.
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".

S.No	Name of Laboratory	Annexure/Page No
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/15
6	Igneous & Metamorphic Lab	Annexure VII/19
7	Geophysics Lab.	Annexure VIII/20
8	Structure Geology Lab	Annexure IX/21
9	Hydrogeology /Climatology/Hydrology Lab	Annexure X/25

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. With all necessary accessories	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 With all necessary accessories	1
3	Column for GC	Column: 30m x 0.25 mm ID x 0.25 µm with inner coating of dimethyl poly-siloxane Column: 60 m x 0.25 mm ID capillary column coated with a 0.25 µm 5% phenyl 95% methyl Poly-siloxane stationary phase	1
4	Digital Sonicator Ultrasonic liquid processor	Generator, convertor and 1/2 inches or 13 mm diameter probe/horn Cup Horn and Microplate Horn Frequency 20khz	1
5	Laboratory Fume hood	Metal steel, stainless steel, Safety Glass: 1/4" Laminated; PVC: Extruded Polyvinyl Chloride White chemical resistant, fiberglass reinforced thermostat resin sheet. Flame spread rating; 13 Width 48 inches.	1
6	Standards for petroleum hydrocarbons	Crude oil quantitative standards---2mL	1
7	Standards for petroleum hydrocarbons	n-paraffin standards Mix C10, C12, C14, C16 analytical standards 500 mg	1
8	FTIR Shimadzu accessories.	Autosampler, NIST library and soil sample holders	1
9	5β-cholanic acid and Silicycle OT, TMA, Acetate 10 g 70 ml cartridges.	For removal of naphthalene from crude oil samples.	1

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.

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.



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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>The ICP-MS must be composed of, at least, the following basic parts:</p> <ul style="list-style-type: none"> •Sample introduction system •Inductively coupled plasma ion source •ICP-MS interface •Interference removal system •Quadrupole mass analyser •Detector •Vacuum production system <p>Technical Features:</p> <ul style="list-style-type: none"> -The ICP-MS Instrument should be bench top. -Must employ a single exhaust vent with flow <7.0 m³/min -3-ways peristaltic pump -High frequency triple quadrupole mass spectrometer -For safety reasons, use a not-reactive carrier gas for all analytes and for all kind of matrices (i.e. more than 40 elements) -Possibility to interface the instruments with other techniques such as: High Pressure Liquid Chromatography (HPLC), Gas Chromatography (GC), FlowField Fractionation (FFF).Mass design should include Quadrupole mass filter, quadrupole Ion Deflector and triple cone interface. <p>Mass Analyzer should be :</p> <p>Triple quadrupole Design with Collision/Reaction Interface (CRI) for routine and interference-free analysis of samples common to environmental, food, agriculture, geochemical, petrochemical, clinical, pharmaceutical, metals and semi-conductor applications.</p> <p>In addition to the normal mode, the instrument must be provided with Collision mode using He& H₂ & Reaction mode using O₂, NH₃, CH₄, CH₃Cl Quadrupoles rods should be gold metallized Ceramic Rods.</p> <ol style="list-style-type: none"> 1. Mass Range : at least 285 amu or better 2. Resolution : User adjustable from 0.5 to 1.2 amu or better 3. Mass calibration stability: 0.05 amu per day 4. Scan speed: 5000 amu/s 5. Minimum dwell time: 200 μs <p>Plasma Interface:</p> <p>The plasma interface should have triple cones (sampler, Skimmer and hyper skimmer).Water cooled plasma interface of triple cone design for stability including individual and independent cooling of the cones for faster warm-up, improved stability, and faster cool down should be offered. Sampler cone with Orifice diameters 1.1 mm and 0.5 mm skimmer cone.</p> <p>Ion Detector Assembly:A fully digital dual stage discrete dynode electron multiplier detector should be provided covering 9orders of magnitude /1.5GHz, over a concentration range of 0.5 ppt to 500 ppm under the same operating conditions and without any change in mass analyzer resolution.</p> <p>RF Generator:The ICP –MS source should include a crystal controlled solid-state, air-Cooled RF Generator operating at 40 MHz delivering a RF power output of 0.6 to 1.6 KW or better.</p> <p>Vacuum System:System should be of 4-stage having computer controlled single stage roughing pumo and triple inlet turbo-molecular pump.</p> <p>ICP-MS other components: Auto sampler with rack configuration providing up to 300 vial positions, able to operate with either 14 mL than</p>	1



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		<p>50 mL tubes, and possibility to be covered Adequate, low noise and low heat emission chiller/heat exchanger, to be placed outside the Clean Room at 1 meter distance ICP-MS including all hardware components, sample preparation kit and software should be capable of analyzing elements and isotopes.</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>	
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"> 1. Accuracy 5 mAbs at 0.0-0.5 Abs, <1% at 0.5-2.0 Abs at 546 nm 2. Linearity: 0.01 nm at <2 Abs (with neutral glass at 546 nm) 3. Bandwidth: 2nm 4. Wavelength accuracy: +/- 1 nm 5. Wavelength Reproducibility: < 0.1 nm <p><i>Machine should be capable of measuring Multi parameters/elements</i></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
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>Additional Specifications :</p> <p>Operating principle Electret filter media, built-in mass flow sensor for consistent sampling rates</p> <p>Air Collection rate 100 or 200 LPM</p> <p>Inlet Built-in omnidirectional aerosol inlet “super-sampling inlet”</p> <p>Collection efficiency 1.0 Mm dia: 95% 3.0 Mm dia: 86.9%</p> <p>Temp./humidity range 5 to 70°C in non-condensing environments</p> <p>Power Source Rechargeable</p> <p>Power Consumption 18 hrs continuous 200 Lpm >4 days intermittent mode</p> <p>Connectors Military CCSI</p> <p>Mounting Built-in tripod extends to 40” at inlet</p> <p>Filter Recovery Method Wet Foam Elution</p> <p>Final Sample volume 7 mL</p> <p>Recovery efficiency 86-95%</p> <p>Recovery time 20 seconds</p> <p>Sample-to-sample carryover 0% (completely disposable)</p>	1



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		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.	
4	Portable Spectrophotometer	<p>General</p> <ul style="list-style-type: none"> • Optical System: Reference beam, spectral • Photometric Accuracy: ± 0.003 Abs @ 0.0 - 0.5 Abs • Photometric Linearity: $< 0.5\%$ (0.5 - 2.0 Abs) • Photometric Measuring Range: 0 to 3 Abs (wavelength range 340 – 800 nm) • Operating Humidity: max. 80 % relative humidity (non-condensing) • Operating Mode: Transmittance (%), Absorbance and Concentration • Operating Temperature: 10 to 40 °C • Power supply: 4 x AA size Alkaline 4x NiMH rechargeable Battery* Power supply*: 110 - 240 V; 50/60 Hz (* optional Module required). • Battery Requirements: 4, AA size alkali cells Operating Conditions: 10 to 40 °C (50 - 104 °F), max. 80 % relative humidity (non-condensing) • Wavelength Calibration: Automatic • Wavelength Range: 340 to 800 nm <p>Specific</p> <ul style="list-style-type: none"> • The consumables and reagents needed for the analysis all the parameters • All the accessories needed for routine analysis and routine service purpose. <p><i>Machine should be capable of measuring Multi parameters/elements</i> 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

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.



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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, <ul style="list-style-type: none"> • 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
4	Software	eCognition Essentials Latest Version	1
<p>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.</p>			



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Annexure V

PETROLEUM GEOLOGY/SEDIMENTOLOGY LAB

Sr. No	Item Name	Specifications/Description	Qty
1	Research Microscope	<p>Polarizing microscope with X10, X20, X50, X100 objectives. Replaceable square and rotatable stages. Having transmitted and reflected microscopy options 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
2	Petrographic Digital Point Counter	<p>Minimum step size of 0.5 μm (0.0005 mm). More than 270 degree rotation during analysis. Facility, quickness and precision during quantification. Free movements using the included high-precision joystick. Compatible with main microscope brands (Leica, Olympus, Nikon and Zeiss). Control Software included. Easy USB installation. And Training for the above instrument 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
3	Terrestrial LIDAR Scanner	<p>Very long range up to more than 2,000 m Very high effective measurement rate up to 400,000 meas./sec Eye safe operation in Laser Class 1 Wide field of view, 100° x 360° Fully customizable scan parameters (field of view, laser pulse repetition rate PRR, measurement rate) High accuracy, high precision ranging based on echo digitization and online waveform processing Multiple target capability - unlimited number of targets High-precision mount for optional digital camera On-board inclination sensors Integrated L1 GPS receiver with antenna Interface for external GNSS receiver Integrated compass and laser plummet Various interfaces (LAN, WLAN, USB 2.0) Internal data storage And Training for the above instrument 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
4	Vaccum Impregnation Unit	Vacuum System 0.65 bar	1



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		<p>Air Pressure 4.5 - 6 bar</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>	
5	PVC Acid Digestion Laboratory Fume Hood	<ol style="list-style-type: none"> 1. Built in Washdown system with internal piping and spray nozzles behind the baffle and remote control fixture on the left side 2. Integral work surfaces and drainage troughs for thorough rinsing after use 3. The liners must be made of HF resistant material e.g. Type 1 unplasticized polyvinyl chloride (u-PVC) or polypropylene (PP) 4. Sashes must also be made up of HF resistant material (e.g. polycarbonate sash) 5. By pass airflow design 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. <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
6	Cathodo luminescence (CL) Microscope with EDX spectroscopy system image capturing and coating facilities.	<p>CL-Microscope, High sensitive CCD-camera, Coating facility, EDX spectroscopy system and all other required accessories.</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>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.</p>			



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Annexure VI

GEO-TECHNICAL ENGINEERING LAB

Sr. No	Item Name	Specifications/Description	Qty
1	Carbonate Contact of Aggregate	Gasometer Dietrich-Fruling 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	Potential Reactivity of Aggregate	Reaction container Length comparator digital version. Comprehends digital gauge with output for PC connection Reference rod 294 mm for mould Spare plugs for mould. Pack of 20 pcs. 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
3	Impact Testing Machine	confirming to BS812 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
4	Standard Aggregate Crushing Value Apparatus.	confirming to BS812 75mm and 150mm dia 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
5	Apparatus for measurement of the joint roughness coefficient (Tilt System)	Constant pressure system 3500kPa oil/water 230V/50Hz/1ph Nylon tubing Permeability end caps Nylon tubing 6mm bore x 8mm outside diameter, 10 metre length Mohr's grad. burette Support base Double sleeve metal/glass Low friction pressure maintainer for lateral pressure in the Hoek triaxial cells Sercomp 7, stand alone closed loop automatic control console for up to 2 test frames (extendable to 4 with the suitable upgrade) for compression, flexure, indirect tensile tests. Data acquisition and management software. 230V, 50Hz, 1ph. 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
6	Permeability of Rocks.	Confirming to ASTM D4644 Slake durability apparatus. Pair of mesh drums 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
7	Slake Durability Apparatus.	confirming to ASTM D4644, Slake durability apparatus. Pair of mesh drums 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	1



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		purpose to its full satisfaction.	
8	Skid Resistance Tester	<p>Skid resistance and friction test set (Skid tester) conforming to ASTM E303, including additional scale for PSV, 3 rubber sliders for site use, thermometer, washing bottle, tool set with case for machine assembly, rule, carrying case and traceable certificate of conformity to ASTM E303. Spare mounted rubber slider, TRL rubber, 32mm width Spare mounted rubber slider, TRL rubber, 76mm width Metal base plate for polished stone value specimen clamping Metal base plate for surface friction Spare mounted rubber slider, 4S rubber, 32mm width Spare mounted rubber slider, 4S rubber, 76mm width</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
9	Dynamic Pneumatic System for static and dynamic triaxial system.	<p>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</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
10	Resonant Column/Torsional Shear Testing Configuration.	<p>Combined resonant column/torsional shear device for the automatic determination of damping ratio from half power bandwidth and free vibration decay method. Including floating frame system for large angular and axial specimen deformation measurement. Confining pressure up to 1000kPa. - Aluminium cell with stainless steel columns and acrylic transparent cylinder with 170mm int. dia. and 15mm thickness. - two bottom drainage lines with independent sensor for back pressure. - Load pad for specimen 50mm. - Motor allows large axial and angular deformation - Motor support integral to the inner cylinder to make easy assembling of the parts. - Integration of oscilloscope and function generator in the system data acquisition and control system to ensure consistency.</p>	1



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		<ul style="list-style-type: none"> - two Electro-pneumatic converters for cell and back pressure 1000 kPa. - 10 channels signal conditioning and data recording. - Measurement of volume changes with volumetro and LVDT. - Measurement of axial strain with LVDT. - Three pressure trasducers for cell,pore and back pressure. - sensor for measuring angular deflection with remote reset - MEMS two-axis sensor for the Measurement of the angular acceleration and the level of vertical vibration and noise. - PC Complete with Accessories and monitor. - Software to manage the test, time data acquisition and recording. <p>The system generates a mechanical stress by the electromagnetic motor consisting of 8 coils and 4 magnets NeFeB with frequency range from 0 to 300HZ (for resonat coloum test) and from 0 to 50Hz (for torsional shear test).</p> <ul style="list-style-type: none"> - Maximum torque: 1,2 Nm - Maximum angular deformation: 10° <p>Complete sample accessories for 50 mm dia sample Pressure system system and Resonant column</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>	
11	Ultrasonic Pluse Velocity Tester	<p>Ultrasonic pulse velocity tester battery operated</p> <ul style="list-style-type: none"> - Conforming to EN 12504-4 and ASTM C597 24 kHz testing head 150 kHz testing head <p>24 columns serial printer, rechargeable battery operated. External battery charger and batteries included. 110-230V/50-60Kz/1ph Serial cable for printer connection.</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
12	Digital Camera (DSLR)	<p>Camera body and two lenses At least 15MP, 1 wide angle and 1 macro lens.</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
13	Micro lance, Instant Moisture & Temperature Tester.		2
14	Rock Shear Box Apparatus with control unit.	<p>STANDARDS: ASTM D5607* / ISRM</p> <p>To determine the strength and slope stability of rock size max 115x125 mm or cores max. dia. 102 mm, both in the field and in the laboratory.</p> <ul style="list-style-type: none"> - Pressure transducers for load acquisition, connected to the pumps. - Linear displacement transducer for shear measurement. <p>“Touch-Screen” for data acquisition, visualization, processing and storing, directly connected to PC or printer.</p> <p>Software for test data processing.</p> <p>Accessories:</p> <ul style="list-style-type: none"> • MOULD FORMER, to prepare the specimen in the dimensions and geometry as requested by the shear box. • PRESSURE MAINTAINER, complete with pump, to absorb volume changes of the specimen and to allow a 	1



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		<p>constant load to be maintained during the test.</p> <ul style="list-style-type: none"> • Set of 4 linear displacement transducers, complete with supports, for vertical displacement measure, conforming to ASTM D5607 Standard. • British Gypsum Crystacal Plaster, for casting specimens into mould assembly, 25 kg bag. 	
15	Rock classification hammer	Impact energy of 0,74 Joule (Nm). Ideal to test small sized, sensitive and thin walled materials. Suitable to test also rock core samples.	1
16	Universal Electric Core Drilling Machine	<p>Comprising: UNIVERSAL DRILLING FRAME COMPLETE ELECTRIC MOTOR COMPLETE Coring angle: 0 to 360°. The excursion is 550 mm. Electric motor at three speeds: 670, 1140, 1580 rpm with speed reducer. The height of the vertical column = 1000 mm, pre-built for extension column connection ACCESSORY: EXTENSION COLUMN, 1000 mm long, For drillings over 1 meter from the ground. Supplied complete with clamping devices. Cadmium plated for rust protection. Diamond Bits DIAMOND BIT, CONCRETE, DIA. 152 MM DIAMOND BIT, CONCRETE, DIA. 100 MM EXPANDER COUPLING DIA 100 MM, EXPANDER COUPLING DIA. 152 MM CORE EXTRACTOR DIA. 100 MM CORE EXTRACTOR DIA. 152 MM</p>	1

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Annexure VII

IGNEOUS & METAMORPHIC LAB

Sr. No	Item Name	Specifications/Description	Qty
1	Fluid Inclusion Studies Microscope Setup	A microscope capable of performing fluid inclusion studies in all types of rocks and minerals with transmitted white light , transmitted IR light and reflected light complete with stage, colour digital camera ,computer and all other necessary requirements for the study of fluid inclusion. The system should be capable of analyzing the samples with maximum precision and accuracy 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	High Purity Germanium Detector N Type	A High Purity Germanium Detector N Type (HPGe Detector) capable of measuring radionuclides in ppm, % , Becquerel (Bq), picocuries (pCi) and CPS units in solids, liquids, gases and all types of geological and environmental samples. The system should be capable of analyzing the samples with maximum precision and accuracy. 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
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. 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.	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. 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
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

GEOPHYSICS LAB

Sr. No	Item Name	Specifications/Description	Qty
1	Geo Electrical Instrument	<p>Application of the instrument should include Minerals Exploration, Groundwater Exploration, Engineering Studies and Academic and Scientific Research. The instrument should have following specifications.</p> <p>Natural field measurements from 10 Hz to 90k Hz; Transmitter: frequency range from 1k Hz to 70 k Hz; Magnetic fields measurement with induction coils; Approximate depth of investigation from 5m to 1km; Portable with rapid setup and teardown; In-field display and printout of 1D inversion, 2D depth section, sounding curves, signal amplitudes, phase, and coherency curves</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>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.</p>			



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Annexure IX

STRUCTURE GEOLOGY LAB

Sr. No	Item Name	Specifications/Description	Qty
A	IT Equipment		
1	Desktop Computers (Windows Based)	Processor: Intel® Xeon® Processor E31241 v3 (8M Cache, 3.50 GHz) 80W Hard Drive: 1TB 7200rpm Hard Disk Drive, RAM: 8GB DDR3 1600MHz RAM, Optical Drive: Super Multi 8X DVD+/R/RW Dual Layer, Chipset: Intel C226 Chipset, Graphics: Intel HD Graphics 4600, Front Ports: 2 x USB 3.0, Rear Ports: 1 x VGA, 2 x DisplayPort, 2 x USB 2.0, 4 x USB 3.0, 1 x Serial, 1 x RJ45, 9in1Media Card Reader, RAM Capacity: 32GB Max Ram, Storage Capacity: Up to 8TB with standard disk bay configuration; Up to 16TB with optional disk bay configuration, Expansion Slots: PCIe 3.0 x16, PCIe 2.0 x1, PCIe 2.0 x16, PCI 2.3, Operating System: Windows 7 Professional x64bit, with upgrade to Windows 8.1 Pro 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.	8
2	(Monitor Screens)	27" Screen Size PLS 300cd/m ² Brightness 1,000: 1 (Typ) Contrast Ratio Mega Dynamic Contrast Ratio 1920 x 1080 Resolution 5ms (GTG) Response Time 16.7M Colour Support 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.	8
3	Desktop Computers (All in one machines), (Windows Based)	Core i7-4150T processor (3M Cache, 3.0 GHz) Processor 3.0 GHz(3 MB cache) 8GB DIMM 1000 GB 5400 rpm Hard Drive 27-Inch 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.	2
4	Macintosh Computers (Mac OS and windows based)	27-inch (diagonal) LED-backlit Retina display 3.5GHz quad-core Intel Core i5 processors Turbo Boost up to 4.4GHz, 1TB or 3TB Fusion Drive or up to 1TB flash storage (SSD) ² , Wireless Keyboard and Magic Mouse or Magic Trackpad 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.	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 color ² , replacing only the individual ink cartridge that runs out. 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
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 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
7	External Hard Drive	Fast file transfers with USB 3.0, Compatible with USB 3.0 and USB 2.0,	2



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	(Portable)	Powered by USB port, Automatic and cloud backup, Password protection and hardware encryption, With carrying case	
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. 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
9	Tracing Glass Table	30 x 42" glass top 38" wide base Tilts to 45 degrees with adjustable height 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
B	Software		
1	Move Software (Midland Valley)		1
2	GeoGraphix 2015 (Landmark)		1
3	Dynel® 2D software		1
4	Poly3D		1
5	VoxelGeo (Paradigm)		1
6	GeoSec (Paradigm)		1
7	RockWorks16 (RockWare)		1
8	RockWare GIS Link 16 (RockWare)		1
9	Rock Ware Stereo Stat (From RockWare)		1
10	SpheriStat3.2 (From RockWare)		1
11	Surfer® 12		1
C	Field Equipment		
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 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	Field camera (GPS enabled)	Waterproof up to 100ft; freezeproof 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) 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



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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 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
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. 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
5	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 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.	4
6	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 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.	4
D	<i>Analogue Modelling Equipment</i>		
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	Capable of measuring objects, moving with speeds up to 7m/s with the standard resolution of 100pm. Capable of automatic compensation of	1



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	software	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	
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 (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 in 3D.	1
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 Plateform 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

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.



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Annexure X

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 $\pm 0.1^\circ\text{C}$</p> <p>Conductivity Sensor: with a range of 0-80,000 $\mu\text{s}/\text{cm}$, having 2% accuracy, 500 $\mu\text{s}/\text{cm}$ to 50,000 $\mu\text{s}/\text{cm}$ calibrated range, resolution 1μs, 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: ± 1 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>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>	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>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
3	Barologger	<p>Sensor: must be having an accuracy of ± 0.05 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 $\pm 0.05^\circ\text{C}$ 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>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
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: 2×10^{-11} 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>	2



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		<p>Power supply: Lead battery 6 or 12 volt, 12-24 Ah 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 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>																									
5	Signal cable (50 meter) with spool for Fluorometer GGUN-FL24	<p>30 meter is included as standard but additional 20 meters must be bought along with a spool 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																								
6	Water-proof data logger for the Fluorometer (GGUN-FL24) with No Display	<p>with removable PC-compatible CompactFlash memory. Ten sampling rates (2 s to 15 min). No display. Best for very low power consumption. 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																								
7	Serial-USB adopter for the Fluorometer FL-24	USB-serial adaptor cable for PC without serial port (COM, RS232).	2																								
8	Tracer Dyes	<p>Uranine (Na fluorescein)--500g. Tinopal (CBS -CL)-- 2 kg (\$11x2kg) 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 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 CaCO₃</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> </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 ₃	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	1
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		<p>Phosphate Quartet comparator method (the absorbic acid method) 0.2 ppm to 1.0 ppm</p> <p>Silica Octet comparator method (the modified APHA reagent system) 0.5 ppm to 10.0 ppm</p> <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>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>	
10	Water Pollution Testing Kit Refill	<p>refill kit</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
11	Acoustic Doppler Current Profiler for Rivers and Channel flow	<p>Range: ± 10 m/s Resolution: 0.1 cm/s Accuracy: $\pm 1\%$ of measured velocity, ± 0.5 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</p> <p>River Surveyor Hardware Options: Four-beam Janus transducer head Low-profile ADP housing Internal recorder</p> <p>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 Bathymmetry profile</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
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