



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

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

Last date of tender is **July 21, 2016 upto 12:00PM**

Opening date of tender is **July 21, 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 LABORATORY EQUIPMENT
SINGLE STAGE – TWO ENVELOP BID**

(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

- 1.1. The Director National Centre of Excellence in Geology invites bids for the laboratory equipment as per attached annexures.
- 1.2. Technical and Financial Bids must be submitted in separate sealed envelopes, including its due date on the face of each envelope.
- 1.3. Earnest money @ 2% of the total bid cost shall be submitted with the tender without which the quoted bid will not be considered.
- 1.4. The quoted price shall be inclusive of all duties / taxes.
- 1.5. 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. Eligible Bidders/Suppliers

- 2.1. This Invitation for Bids is open to all Bidder/Suppliers meeting the following requirements:
 - 2.1.1. Duly Registered with Federal Board of Revenue.
 - 2.1.2. Manufacturer or authorized representative of the manufacturer.

3. Qualifications of the Bidder/Suppliers

- 3.1. The Bidder/Supplier shall provide documentary evidence that;
 - 3.1.1. The bidder/supplier has financial, technical, supplying, demonstration, fixing etc. capability necessary to perform the contract and has successful performance history in accordance to the nature of supplies in these bidding documents as described in Bill of Quantities.
 - 3.1.2. In case the bidder/supplier offering the supplies that the bidder/supplier did not manufacture or otherwise produce, the bidder/supplier has been authorized by the manufacturer or producer of such supply; and
 - 3.1.3. The Bidder/Supplier meets the qualification criteria listed under 9.2.1 b.

SUBMISSION OF BIDS

4. Documents Constituting the Bid

- 4.1. The bids submitted by the bidder, in two sealed envelopes, shall comprise the following:

(A) Envelop -1 (Qualification documents alongwith Technical Proposal);

To qualify the bidder and ensure Technical Responsiveness of the bid, Envelop-1 containing Qualification documents along with Technical Proposal shall be opened first. To facilitate the evaluation of the same, bidders must submit the following documents:

(a) Qualification Documents shall comprise;

- i. Supplier/Vender Company profile (showing Origin, Head Office, Branches, Vision, Mission, Management, Directors, Personals, and other necessary information);
- ii. Written power of attorney authorizing the signatory of the bid to act for and on behalf of the Supplier;
- iii. Certificate as bidder is Manufacturer or authorized representative of the manufacturer;



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- iv. Experience record regarding in hand and previous contracts;
- v. Status of linkages/supplies with/to other Govt. Organizations;
- vi. Organization Chart and CV's of Personal for completion of successful supplies, fixing, demonstration, and after sales service etc.;
- vii. Affidavit as the firm is eligible to participate in the bidding and is not black listed.
- viii. Copy of registration with Federal Board of Revenue and Excise and Taxation Department.

(b) Technical Proposal shall be furnished taking into account;

- i. To examine whether the supplies offered by the bidder comply with the specifications (Technical Provisions) of the Bidding Documents. For this purpose, the bidders shall provide Technical Proposals in shape of Brochures, Catalogues, Printed Literatures, and other Supporting Documents etc. for comparison with the data prescribed by the Employer in Technical Features/Criteria/Specification.
- ii. Certificate for providing after sales service.

(c) Certificate that Bid Security has been attached to the financial proposal without showing the amount of bid security.

(B) Envelop -II (Financial Proposal)

- a) Dully filled-in Form of Bid along with complete set of bidding documents;
 - b) Original form of Bid Security;
- 4.2. Bids sent through courier should be delivered at least half an hour before the scheduled time of opening.
- 4.3. 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.
- 4.4. The bidder or authorized representative shall sign on each page of the tender document. No corrections and overwriting are allowed.
- 4.5. 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.
- 4.6. 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.**
- 4.7. While quoting tender rates, the items should be given numbers as are numbered in the Tender Document.
- 4.8. 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.
- 4.9. Prices of optional accessories should be quoted separately.



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- 4.10. *Taxes levied by the Government and freight charges, if any, shall be paid by the bidder and must be included in the quoted prices.*
- 4.11. 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.
- 4.12. 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.
- 4.13. 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.
- 4.14. The bidders must enclose original Performa Invoice / Quotation from their Principals or authorization certification of the Principal, failing which their offers will be ignored.
- 4.15. Bidders should preferably have office, workshop facilities and after sales services preferably in Peshawar and/or Islamabad/Rawalpindi.**
- 4.16. 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 equipment 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.
- 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.

5. 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.

6. 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.



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7. 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.

8. 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)

9. BID OPENING AND EVALUATION

9.1. Bid Opening

Opening of the bids shall take place in following two stages;

9.1.1. Envelop-I (Qualification Documents along with Technical Proposal)

- a. Prior to open the financial bid of the bidders/suppliers, Envelop-1 (i.e., Qualification Documents along with Technical Proposals) shall be opened by the purchase committee, NCE in Geology.
- b. Qualification Documents along with Technical Proposals shall be evaluated by the committee in accordance to the specified criteria.

9.1.2. Envelop-II (Financial Proposal)

- a. Only the Bids (Financial Proposals) of the Qualified and Technically accepted/responsive as a result 9.2.1.a, 9.2.1.b including withdrawals, substitution and modifications made pursuant to Clause 9.1.1.a, will be opened publically by the Bid Opening Committee in the presence of Bidder/Suppliers representatives who choose to attend, at the time, date and location stipulated in the specifications. The Bidder/Suppliers representatives who are present shall sign attendance sheet evidencing their attendance.
- b. The Bidder/Supplier's name, total Bid Price, any discounts, bid modifications, substitution and withdrawals, the presence or absence of Bid Security, and such other details as the Employer/Purchaser may consider appropriate, will be announced by the Employer/Purchaser at the financial opening of bids.
- c. Employer/Purchaser shall prepare minutes of the bid opening, including the information disclosed to those present in accordance with the Sub-Clause 9.2.1.b.
- d. Financial Proposals shall be evaluated in detail by the by the Committee, constituted by NCE in Geology, for the purpose.

9.2. Evaluation of Bids

Purchase committee, NCE in Geology, shall evaluate the bids, in following two stages;

9.2.1. Envelop -I (Qualification Documents along with Technical Proposal)

- a. To determine the eligibility of the bidder for participation in the bidding, the committee will verify the bidder in accordance to the instructions specified under clause section 2. The Qualification Documents along with Technical Proposals of only eligible bidders shall be evaluated further.
- b. Qualification of the bidders shall be determined in accordance to criteria set herein below from the documents submitted by the bidders, prescribed in section 4. Bidder scoring 50% and above marks shall be declared as pass. Criteria for qualification of bidders/suppliers shall be;



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Sr. #	Category	Weightage/Marks
1.	Registered Office (Peshawar/Islamabad)	35
2.	Experience Record	35
3.	Personnel Capabilities	30
	Total:	100

Further detailed criteria for each category shall be as mentioned in bid data sheet;

- c. Technical Proposals of the qualified bidders shall be placed for evaluation. For this purpose, the Brochures, Catalogues, Printed Literatures, and other Supporting Documents etc. submitted by the bidders shall be compared with the data in Technical Features/Criteria/specifications as envisaged in the bidding documents. It is expected that no major deviation/stipulation shall be taken by the bidders; otherwise the proposal shall be rejected.

9.2.2. Envelop -II (Financial Proposal);

- a. Financial proposal of only Eligible, Qualified and Technically Responsive bidders duly opened by the bid opening committee shall be placed for evaluation by following steps mentioned herein below;
- A. Preliminary Examination of Bids and Determination of Responsiveness;
- b. Prior to the detailed evaluation of bids (Financial proposals);
- i. **the Employer/purchaser will examine the Bids to determine whether;**
- Required sureties have been furnished,
 - The documents have been properly signed,
 - The Bid is valid till required period,
 - The Bid prices are firm during currency of contract,
 - Completion period offered is within specified limits,
 - The bids are in order.
- ii. **A Bid will not be considered, if;**
- it is unsigned,
 - its validity is less than specified, or correction for the same is not accepted by the bidders.
 - it indicates that Bid prices do not include the amount of income tax or others shall be added/considered by the evaluation committee,
 - it is not accompanied with bid security,
 - it is received after the deadline for submission of bids,
 - it is submitted through fax, telex, telegram or email,
 - it indicates that prices quoted are not firm during currency of the contract whereas the bidders are required to quote fixed price(s),
 - the bidder refuses to accept arithmetic correction,
 - The submitted bid is conditional,
 - It limits the bidder's obligation in any way under the contract.



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10. DETAILING OF EVALUATION MARKS

10.1. Experience

Credit Marks for experience shall be awarded on the basis of following qualifications:

Sr #	Description	Detailing	Weightage
1	Supplies of similar nature equipment in last 5 years.	5marks/project	15
2	Supplies of similar nature equipment currently in hand.	5marks/project	15
3	Status of linkages/supply with/to Government Organizations.	1mark/department	5
Sub-Total			35

10.2. Personnel capabilities

Credit Marks shall be awarded under this category using the following criteria:

Sr #	Description	Detailing	Weightage
1	Graduates in employment of the firm in relevant field. a) Number of Personnel (5mark/person) b) Experience (one mark/year)	02. 05 years	10 5
2	DAE/Certificate holders in Employment of the Firm in relevant field. a) Number (Three marks/person) b) Experience (in one mark/year)	03. 06 years	9 6
Sub-Total			30

10.3. Registered Offices (Peshawar/Islamabad)

Credit Marks shall be awarded on the basis of the following criteria:

Sr #	Description	Detailing	Weightage
1	Managerial/Administrative Staff	Five marks/person	15
2	Maintenance staff	Five marks/person	10
3	Maintenance facilities	Y	10
Sub-Total			35

11. PURCHASE ORDER

Purchase order of quoted material shall be placed on fulfillment of conditions mentioned at above.

12. 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.



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- 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.

13. 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.
- 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.

14. 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.

15. PAYMENT

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.

16. 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.

17. 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.



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- 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 quantify 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.

18. 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.

19. MAINTANANCE PERIOD

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

20. 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.

21. CONDITIONAL BIDS

Conditional, incomplete bid will not be accepted.

22. 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 favor 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 favor 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.**



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23. 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.

24. 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 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.

25. CONVENCING

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

26. 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.

27. 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.*

28. 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.



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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:-

- a. 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.
- b. 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.
- c. 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.
- d. 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 our liabilities and commitments hereunder.
- e. 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.
- f. 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/14
2	Economic Geology/Ore Processing /Exploration Geochemistry Lab.	Annexure III/15
3	GIS/RemoteSensing Lab	Annexure IV/19
4	Petroleum Geology/Sedimentology Lab	Annexure V/21
5	GeoTechnical Engineering Lab	Annexure VI/26
6	Igneous & Metamorphic Lab	Annexure VII/30
7	Structure Geology Lab	Annexure VIII/36
8	Hydrogeology /Climatology/Hydrology Lab	Annexure IX/38
9	Hydro-Geophysics/Seismology Laboratory	Annexure X/43
10	Gemology Lab	Annexure XI/45
11	Cameras and GPS	Annexure XII/55

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.	Peltier technology for stable and precise long term tests. Temp range---25°C below ambient to +70°, Working temp range--+15°C to +40°C, Humidity without light-rh 10-90%, Humidity Range with light rh 10-85%, Light module cold white 6500-70000kelvin+warm light 2700-3000kelvin LED light strips arranged on the side walls of the interior 14, Illumination strength Programmable controlled dimming from 0-100% of warm white light strips arranged on inside walls of the interior, all necessary accessories. With all necessary accessories	1
2	De Humidifier	Moisture Removal Capacity : 22 Liter/Day Voltage : 220V~50Hz Rated Input Current : 1.8ARated Input Power : 350W Drainage : Tank or Soft Pipe Net Weight : 13.5 KG Gross Weight : 15 KG Refrigerant : R134a Compressor : Rotary compressor Defrost : Automatic defrosting Humidity Control : Automatic humidity control, RH40-90% adjustable	
3	GC-FID QC 2010 Shimadzu Plunger with syringe		
4	n-paraffin standards for petroleum hydrocarbons		
5	sonicator		
6	a column of 30m x 0,25mm x 0,25µm (95%) Dimethyl-(5%) diphenyl polysiloxane		
7	100% Dimethyl polysiloxane 30m x 0.25mm x 0.25µm		
8	HPLC columns C18		
9	Hungate tubes		
<p>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.</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><u>Specifications for Inductively Coupled Plasma/ Mass Spectrometer</u> 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>Sample Introduction System Quartz, low volume, peltier cooled or air cooled, temperature controlled, spray chamber.</p> <p>Inductively Coupled Plasma Ion Source 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>ICP-MS Interface The sampling and skimmer cones should be constructed with high purity Ni with apertures of >1 mm and >0.4 mm diameter respectively.</p> <p>Ion focusing System and Collision/Reaction Cell 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>Vacuum system 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>Quadrupole Mass Spectrometer 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 50,000amu/s or better Abundance Sensitivity (at Cs): Low Mass side: 1 x 10⁻⁶ or better High Mass side: 1 x 10⁻⁷ or better</p> <p>Detector Assembly 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</p>	1



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		<p>detector should have a guaranteed lifetime of at least two year from date of shipment.</p> <p>Guaranteed Performance 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>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>Machine should be capable of measuring Multi parameters/elements</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>	1



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		<p>Recovery efficiency 86-95%</p> <p>Recovery time 20 seconds</p> <p>Sample-to-sample carryover 0% (completely disposable)</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	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* <p>Power supply*: 110 - 240 V; 50/60 Hz (* optional Module required.)</p> <ul style="list-style-type: none"> • 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>Machine should be capable of measuring Multi parameters/elements <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
5	Microwave digestion system	<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



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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, Spectral Resolution ≤ 3 (@350-1000 nm); ≤ 8 nm @1500nm; ≤ 6 nm @2100nm, 512 element Si array and two 256 element extended InGaAs arrays, Noise Equivalence Radiance: $\leq 0.5 \times 10^{-9}$ W/cm ² /nm/sr@400nm, $\leq 0.8 \times 10^{-9}$ W/cm ² /nm/sr@1500nm, $\leq 1.0 \times 10^{-9}$ W/cm ² /nm/sr@2100nm, with all the required accessories and data collection softwares 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	Instrument for mobile GIS	Instrument for collection GIS data in the field enables with Camera, GPS, Wireless communication, Compass, accelerometer with all the accessories	2
3	Field laptop	Core i5 or above, 8 GB RAM, Built-in GPS, HD Graphics, >8 hours battery backup, High resolution webcam	1
4	Time lapse camera setup for monitoring of landslides, glaciers, physical processes	18MP or more camera with 18-55mm zoom lens, Fiberglass Housing, Solar power equipment's for backup power, rough terrain mounting hardware and other accessories.	1
5	Differential GPS	Differential GPS with required hardware's and software's	1
6	Instrument/sensors for displacement measurement	Instrument/sensor to measure and monitor the ground displacements in hilly area	1
7	GIS Computer Workstation	HP Z440 WORKSTATION OR EQUALIENT Intel® Xeon® E5-2637 v4 3.5GHz 15MB 2400 4C CPU, 700W 90% efficient chassis, 32GB DDR4 RAM, 4TB SATA 7200RPM, First Graphics Card: NVIDIA Quadro K420 2GB DL-DVI(I)+DP, Second Graphics Card: NVIDIA Quadro K420 2GB DL-DVI(I)+DP, High Performance GPU Computing NVIDIA Tesla K40 1st Compute Processor - PCIe x2, DVD Dual Layer Writer, Standard USB Keyboard & Mouse, Gigabit LAN, System Supported LCD/LEDs (FHD Resolution: 1920x1080)x2	1



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	<p><i>Note: Such system is required to support intensive graphics and compute operations required for Geospatial analysis using ArcGIS, ENVI & Erdas Imagine.</i></p>	
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Annexure V

PETROLEUM GEOLOGY/SEDIMENTOLOGY LAB

Sr. No	Item Name	Specifications/Description	Qty
1	Trinocular Polarizing Microscope	<p><u>FOR EPI SCOPIC / DIASCOPIIC MICRSOCOPY</u></p> <ul style="list-style-type: none"> • Precentered lamp house • Quintuple Centering Nosepiece • Power Cord (220-240V) • P-1 Intermediate tube • P-CL 1/4 Lambda & Tint Plate • Achromat Strain-free Condenser • Trinocular Tube T light distribution 100/0, 20/80,0/100 • Filter, 45mm, GIF • Wide field eyepiece: CFI 10X and CFI 10X CM • Universal Epi-illumination • Precentered lamp house • Powerful halogen Lamp <ul style="list-style-type: none"> • 25mm NCB11 • 25mm ND4/ND16 • 25mm GIF • Dia polizer FOR XY-POL <p><u>Objectives</u></p> <ul style="list-style-type: none"> • CFI Plan Achromat UW 2X (wide angle) • TU Plan Fluor EPI P 5X • TU Plan Fluor EPI P 10X • TU Plan Fluor EPI P 20X • CFI Achromat P 40X B equivalent • TU Plan Fluor EPI P 50X • TU Plan Fluor EPI P 100X 	2



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		<ul style="list-style-type: none"> • CFI Achromat P 100X (Oil) B <p><u>Two stages are required</u></p> <p>1- Circular graduated Stage with Stage adopter</p> <p>2- Right handle square stage (Attachable mechanical stage not acceptable)</p> <ul style="list-style-type: none"> • LV-PO Polarizer for LV-UEP 12 <p><u>Compensator</u></p> <ul style="list-style-type: none"> • P-CS Senarmont Compensator • P-CQ Quartz Wedge Compensator <p><u>WITH</u></p> <p>DIGITAL CAMERA SYSTEM</p> <p>(Standalone & Latest touch system) Should have 5.00 or above Effective m. pixels colored camera, with in-built display screen above 8 inches with research & Teaching tools</p> <p>And can work with & without attaching external computer</p> <p>With inbuilt internet online facility, one slot for SD card memory and two or more slots for USB</p> <p>Sensitivity: 2400 lx, F5.6 or greater; equivalent to</p> <p>ISO 260 A/D conversion: 12-bit</p> <p>Power Supply: 240V, 50-60Hz</p> <p>Capable to directly attach with bigger screen Multimedia projector</p> <p>All above system should be complete / ready to use.</p>	
2	Digital Stereo Microscope	<ul style="list-style-type: none"> • Advance Research Fluorescence Stereomicroscope (Motorized) • Optical System: Parallel-optics type (zooming type) • Apochromatic Optical system • Zoom : Motorized • Zoom Ratio: 25:1 or above • Zoom Range: 0.63X- 15.75X or above • Aperture diaphragm: Zooming body built in 	2



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	<ul style="list-style-type: none">• Total Magnification: Using 10 X eyepiece 3.15-315 or above• Eyepieces: C-W 10x B, F.O.V (22)• Tubes: Trinocular Tilting tube with simultaneous view in tube head & display screen• Control Box• Remote Controller• AC Adapter• Power Cord (220-240V)• Trinocular Tilting Tube <p><u>Eye pieces:</u></p> <ul style="list-style-type: none">• C-W 10 Eyepiece 10X (2 pcs.)• C-W 30X Eyepiece pair <p><u>Objectives:</u></p> <ul style="list-style-type: none">• Plan Apo 0.5X (NA: 0.078, W.D.: 71mm) or better• Plan Apo 1X (NA: 0.156, W.D.: 60mm) or better• Plan Apo 2X (NA: 0.312, W.D.: 20mm) or better <p><u>Focus Unit:</u></p> <ul style="list-style-type: none">• Motorized Focus Unit (Up 96mm/Down 4mm) or above• Power Cord E (220-240V) Set <p><u>Base/stand:</u> LED Diascopic Illumination Base</p> <p><u>Nose Piece:</u> Intelligent Nosepiece to hold two lens or more</p> <p><u>Stages:</u></p> <ul style="list-style-type: none">• Tilting stage• XY Stage with transparent glass base <p><u>Essential Episcopic and Diascopic Units:</u></p> <ul style="list-style-type: none">• Episcopic: Ring LED Illuminator (or equivalent), Epi Fluorescence Illuminator	
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	<ul style="list-style-type: none"> • Diascopic: Simple polarizing attachment Including Motorized Epi fluorescent Attachment (or equivalent) <p><u>Darkfield Observation:</u></p> <ul style="list-style-type: none"> • Dark Field Unit complete set • Power Cord E (220-240V) <p><u>Epi-Fluorescence light source (Fiber illuminator):</u></p> <ul style="list-style-type: none"> • HG Precentered Fiber illumination Intensilight (Motorized Model) • HG CONTROLLER • HG LAMP • HG Fiber (1500mm) • Power Cord BE (220-240V) • Light shading Plate <p><u>Filter Cubes:</u></p> <ul style="list-style-type: none"> • GFP-B Filter Cube • RFP Filter Cube • GFP-L Filter Cube • BF Filter Cube (Bright Field, with /4 plate) <p><u>WITH</u> DIGITAL CAMERA SYSTEM (Stand alone & Latest touch system) Should have 5.00 or above Effective m. pixels colored camera, with in-built display screen above 8 inches with research & Teaching tools And can work with & without attaching external computer With inbuilt internet online facility, one slot for SD card memory and two or more slots for USB Sensitivity: 2400 1x, F5.6 or greater; equivalent to ISO 260 A/D conversion: 12-bit Power Supply: 240V, 50-60Hz</p>	01
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		<p>Capable to directly attach with bigger screen Multimedia projector</p> <p>All above system should be complete / ready to use.</p> <p>LED Screen 40” for online teaching to be supplied locally</p>	
3	PVC Acid Digestion Laboratory Fume Hood	<ol style="list-style-type: none"> 1. Built in Wash down 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 un-plasticized 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



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Annexure VI

GEO-TECHNICAL ENGINEERING LAB

Sr. No	Item Name	Specifications/Description	Qty
1	Water distillation unit for lab	4litrs/hr	1
2	Hydraulic Fracturing Tester	<p>To perform hydraulic fracture, well bore stability, and rock permeability tests.</p> <ul style="list-style-type: none"> • 70 MPa cell and fracture pressure capacity • Hydraulic balance for hydrostatic stress state, • can also be used to apply deviatoric stresses • for anisotropic stress state with up to 140 MPa • vertical stress on NX diameter specimen • 32 electrical feed-through lines • 7 fluid ports (5 specimen, 2 cell) • Lift mechanism to facilitate specimen setup • Systems built to customer specifications 	
3	Standard Penetration Test Kit – 30 meters	<p>Tripod – 1 set</p> <p>Automatic Drive weight 63.5 kg</p> <p>Anvil (Jar Block)</p> <p>SPT Rod 1.5 mt.</p> <p>Drive weight Rod 1.5 mt.</p> <p>Shelby tube</p> <p>Drilling rod AW or BW type of different size</p> <p>Winch</p> <p>Electrical motor</p> <p>Stand for Motor & winch</p> <p>Wire rope</p> <p>Pulley</p> <p>Nut & bolts</p>	1



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		Spanner Chain wrench & Pipe wrench	
4	Accelero-graphs (3)	Int. Triaxial Accelerometer AC-73i Full Scale Range ± 2 g std. ($\pm 0.5, 1, 3$ g optional) Removable CF Memory Interface Incl. 8 GB Memory card for data storage uCLinux operating system, 32 MB RAM Wired Ethernet incl. cable and connector Inc. 12 VDC, 7.0 Ah Battery 12 VDC external power supply, UL, 100-240 VAC Incl. mounting base plate GPS receiver for RS-232 with 20 m cable	3
5	SOILSPY Rozina	24+1 channel Sampling rate: 89 kHz per channel in continuous mode A/D Conversion: 25 bit @ 128 Hz Output Frequency: 256, 512, 1024, 2048, 4096, 8192, 16384, 32,786 Recording length: Continuous no limits for fs <2,048 Hz Stack mode – selectable at all frequencies Dynamic range: 142 dB Common mode rejection: >90dB Max channel no.: 255 (nominal) Dedicated software	1
6	Soil water characteristic cell	15 bar maximum suction 71 mm maximum specimen diameter 50 mm maximum specimen height	1
7	Universal automatic compactor	For CBR, Standard & Modified Proctor test	1



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		With noise reduction cabinet	
8	Specimen flatness gauge	With dial gage support for measuring flatness of specimens up to 200 mm in height. Includes electronic digital dial gage 0.01 mm (0.0005") resolution	1
9	LVDT calibration	<ul style="list-style-type: none"> • Digital display readout • Spring loaded linear displacement (non rotational) • 25 mm (1 inch) travel range • 0.001mm (0.000050 inch) resolution • Measure absolute or relative displacements • Accept LVDTs with 3/8", 3/4", and 7/8" body diameter 	
10	Riffle boxes	<ul style="list-style-type: none"> • 7mm slot width • 30mm • 50mm • 64mm 	1
11	Organic content	Organic impurities test bottles ASTM C40 Colour standard glass scales ASTM C40	1
12	Laboratory coring machine and bits	Laboratory coring machine, 2 speed, complete with water inlet Diamond core bit for diameter; 21.46, 30.10, 42.04, 54.74 and 63.5mm	1
13	Water bath BS1337-2	Digitally controlled water bath temperature range ambient to +60°C. 230V, 50-60Hz, 1ph Cover with cooling coil, Adjustable try	1
14	Plate bearing test apparatus (Electronic)	500 kN capacity hydraulic jack, spherical seat, hand pump and pressure gauge, complete with carrying case. Datum bar, dial gauges and load plates to make a complete plate bearing test apparatus.	1
15	Lightweight deflectometer for Dynamic deformation	Complete with loading mechanism, load plate (300X20mm), Electronic settlement measuring instrument	1



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	modulus of soil ASTM E2835-11		
16	Sample cart	Base size in range of 610X910X860m Steel with rubber wheels	1
17	Relative density of cohesion less soil	Mold set (0.5) cubic feet Relative density gauge set Vibrating table (vibration frequency 3600 rpm.) amplitude range 0.05 to 2.6 mm Vibrating type electromagnetic Separate amplitude control panel 12.5 and 25mm dia pouring devices	1
18	Autoclave (for concrete)	Maximum temperature 200C, pressure = 15atm, capacity 150liters Complete with pressure gauge, pressure regulator, temperature regulator, control switches, safety valve	1



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Annexure VII

IGNEOUS & METAMORPHIC LAB

Sr. No	Item Name	Specifications/Description	Qty
1.	Scanning Electron Microscope (SEM) with Energy Dispersive X-Ray Spectroscopy System (EDS) and Cathodoluminescence (CL) detector and coating facility	<p><u>General Description</u></p> <p>A Scanning Electron Microscope (SEM) with variable pressure capability (both HV and LV modes and fully automatic electron gun), graphical user interface, digital image store and image processor, monitor, large specimen chamber, 5-axis motorized stage, both secondary electron (SED) and backscatter electron detectors (BED) and fail-safe vacuum system with oil free turbo molecular pump. Onsite upgrade option to permit the microscope to benefit from an increase in specifications as applications develop. The SEM must be equipped with compatible EDS and an optional Cathodoluminescence (CL) detectors and must be complete in all respects for applications in Geology and allied disciplines.</p> <p><u>Further specifications for SEM</u></p> <ol style="list-style-type: none"> 1. Electron Optical Column <ul style="list-style-type: none"> ❖ Resolution at least 3nm, options for both SED and BED with variable vacuum modes should be provided ❖ Pressure range ❖ Control of all lenses for optimum imaging conditions resolution and probe current ❖ Probe current range ❖ Magnification should be continuously variable with operator preset magnification function 2. System Control <ul style="list-style-type: none"> ❖ Microsoft windows multilingual operating system and software for SEM total system control including power supply, lens supplies, scanning conditions, chamber pressure control, stage control and image recording. 	1



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		<ul style="list-style-type: none"> ❖ Joystick stage control 3. Image Mode <ul style="list-style-type: none"> ❖ Secondary Electron image and Backscatter imaging, composition image, topographic image, shadow image, comparison window (snap shot): 4. Digital Image store and image processor 5. Image Display and Record system 6. Image storage 7. Integrated computer environment 8. Sputter Coater (Gold and Carbon) <ul style="list-style-type: none"> ❖ Fully automatic, compact, touch screen controlled rotary pumped sputter coater 9. Specimen preparation kit <ul style="list-style-type: none"> ❖ It should include tools and materials required for mounting samples on the provided stubs 10. Desiccator <ul style="list-style-type: none"> ❖ For reducing water content of vent air 11. Internal Chamber view <ul style="list-style-type: none"> ❖ Door mounted CCD camera with IR illumination for internal chamber viewing. The CCD image should be displayed on the SEM display monitor 12. Control Panel 13. Software Options <ul style="list-style-type: none"> ❖ Adjustable reduced raster, cut and paste, expanded scan rates, graticule, line profile, signal inversion, signal mixing, spot mode, tilt compensation, line scan, dynamic focus, scan rotation, split screen. <p><u>Specifications for EDS</u></p> <p>A latest Energy Dispersive X-Ray Spectroscopy System (EDS) with wide elemental range and high detection limit having capability of Quantitative, Qualitative, mapping, point, multipointing, line and ID analyses and probe tracking etc. The vacuum mode should be auto-function and fully automated. It should be compatible with the SEM and detectors such as CL, SED and BED. It should include a stub mounted standard.</p> <p><u>Specifications for CL</u></p>	
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		<p>A Cathodoluminescence (CL) detector is required which should be compatible with other SEM detectors including secondary and backscattered electron detectors and EDS with wide wavelength range and image process mode should have both bright and contrast features. The CL must be able to function at all SEM magnifications to reveal macro- and micro-texture in rocks (e.g. for sedimentary rocks it should be capable to be used for the following analyses; sediment source, degree of compaction, diagenetic history, differentiation of authigenic and detrital minerals, cementation history and provenance and must be able to facilitate imaging of specimens containing carbonates without artefacts). It should also be capable to carryout analysis such as zircon zonation for geochronology, gemstones, microstructures and fractures, mineralogy and other related geological analyses.</p> <p>Note The installation of the entire system (including SEM, EDS and CL) and training must be included. The SEM with EDS and CL must be equipped in all respect and to be capable to carry out the following investigations;</p> <ol style="list-style-type: none"> 1. Morphology, mineralogy and composition analysis of geological samples. 2. Image core samples in variable pressure mode with the available detectors to obtain maximum structural and compositional information. 3. Cathodoluminescence (CL) imaging of geological samples with clear streak-free imaging of carbonates and other rocks. 	
2	Electret-Passive Environmental Radiation Monitors	Should able to perform the following analysis. Indoor and outdoor radon (b) Thoron (c) Dissolved radon and radium in water (d) Environmental gamma (e) Radon emanating radon concentration in soil samples and in pipes (f) Radon flux from surfaces and building materials	50 each (200)



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		Type Long term (H, S, L, L-OO)	
3	Electret Voltage Reader	The voltage reader shall be accompanied with a case	2
4	Electronic Temper Monitor	The temper monitor shall be accompanied by its software	1
5	Radon Report Manager Software	Should be able to perform QA and Reporting	1
6	Radon Scout Data Logger	With Radon Vision Software, QA plan, instruction manual and Tamperproof case, should be able to record radon, temperature and humidity, complete with accessories.	1
7	Radon in Water Test kit	Should include 2 large measurement jars (3.72 L) with sealing collars, 10 small samples bottles (68 mL) and 136 ml bottles.	1
8	Fluid Inclusion Microscope	<ul style="list-style-type: none"> • modified BX53 stand with built in blue filter and neutral density filters • 3 position trinocular head • long-working-distance condenser • nosepiece with 5x, 10x long-working-distance objectives • long-working-distance 40x objective with cover glass collar • x-y stage on modified carrier, compatible with Linkam heating stage • rotatable analyzer and polarizer • 12 volt 100 watt lamphousing • 5 quartz-halogen bulbs, 12v/100watt • 10x oculars, one with 10mm/100grad • reflected light capabilities • magnification changer (1x, 1.25x, 1.6x, 2.0x) • digital color camera • Linkham THMSG600 Stage complete with digital software package • computer with all interface software and cables • 2 each calibration wafers for standardization at -56.6C, 0.0C, 374C 	1



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		<ul style="list-style-type: none"> • custom top and silver lid for Linkam stage to accommodate 40x objective • special IR heat filter required for fluid inclusion studies • 3 days installation and instruction by fluid inclusion specialist 	
9	HPGe Gamma-Ray Detector with complete accessories	<p>HPGe detector ORTEC GMX Coaxial N-type HPGe Gamma-Ray Detector (Streamline). Useful energy ranges from 3 keV to 10 MeV Efficiency: 35% or better Resolution: @122keV : FWHM 0.715 keV @ 1.33 MeV: FWHM 1.90 keV Peak to Compton Ratio: 52:1 Peak Shape: FW.IM/FWHM: 2.0 FW.OZM/FWHM Typical: 3.0 Endcap Diameter: 70 mm LN2 cooling system for the above HPGe detector Vertical Cryostat (Dipstick type). 4 -in. Cooling Rod Extension; used on dipstick detectors -30Liter Dewar Digital Signal Processing Spectrometer DSPEC 50 with MAESTRO-32 Software, single MCA, and single internal High Voltage Power Supply I Single MCA (DSPEC-50) and dual 1 I MCA (DSPEC-502) versions. I (Highly stable against variations in DIMNEGGE -50 A66-B32 ANGLE- 832 count rate and temperature. PHA and List Mode acquisitions. Automated set-up: Automatic Pole Zero Adjust, Baseline Restorer, and Optimize.1 High throughput capabilities for high count rate applications. Digital spectrum stabilizer. USB 2.0 and Ethernet capability (TCP/IP protocol). Large front panel display for at-aglance system status information. Support for all HPGe detector types, old and new. Detector interface module for Negative bias HPGe detector. Advances software for quantitative analysis Gammavision-32 Gamma-Ray HPGe Spectral Analysis Software for Quantitative Analysis - Compatible with Angle32 (Efficiency calibration Software) - Quantitative analysis functions for use in conjunction with PC-based gamma spectroscopy workstations. - Online help and Operator Menu password protection are included. Advanced gamma-ray analysis software which includes calibration and quality assurance (QA) data collection and analysis, and Continuous display of detector status and state of health information. Complete, fully-integrated high resolution gamma spectroscopy software with complete MCA control, spectrum acquisition, comprehensive spectrum analysis, detector quality assurance, and useradjustable analysis reporting. Provides qualitative and quantitative analysis results Advanced Efficiency Calibration SQftware for HPGe Detectors Generate efficiency</p>	1



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		<p>calibrations for new geometries instantly; no new standards needed. Never again wait for delivery of new standards. Applies to a wide range of detectors and container types. Highly accurate, typically to a few percent. Reduces disposal costs of old radioactive standards. Universal: use with any or all of your HPGe detectors regardless of the vendor! "Efficiency transfer" principle: the best combination of absolute and relative methods. No expensive and time-consuming detector "factory characterization". Simple to use, transparent and verifiable by the user: results traceable to traceable standards. Nuclide Navigator III Master Library Note: The above system requires Standard Sources for calibration to be provided by you Lead shield for low background counting Ring Lead Shield for CFG-PV-1, CFG-PV4 or CFG-SV Cryostat. - Low Carbon Steel casing - 4-inch thick Low Background Lead - Graded Liner : Tin /Copper - Cavity: 11-inch dia. x 16-inch Deep - Top Loading Table-Top Leveling for the Lead Shield Dewar Leveling Stand Needed only for LN2 cooling LN2 storage system 50-Liter Dewar Transfer Line, 12-ft. length Withdrawal Device (50-liter dewar)</p>	
<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 VIII

STRUCTURE GEOLOGY LAB

Sr. No	Item Name	Specifications/Description	Qty
A	IT Equipment		
1	Branded Desktop Computers (Windows Based)	<p>Branded Desktop Computers (HP/Dell/Lenovo)</p> <p>Processor: Intel® Xeon® octa core E5 Series Processor with minimum 12MB Cache</p> <p>Min. 16GB RAM</p> <p>Professional Class Motherboard (Q or C-Series) with min. 4 SATA and 4SAS ports</p> <p>1TB 7200 RPM HDD</p> <p>Dual Layer DVD RW +/-</p> <p>Graphics: Intel HD Graphics</p> <p>Chassis with support for installation of 4xHDDs (in addition to DVD Drive) and with a min. 450w power supply.</p> <p>27" FHD (1920x1080) LCD/LED</p> <p>Wireless keyboard and mouse</p> <p><i>Windows 7 64-bit Support is required</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>	8
2	PCI/PCIe Graphics Card	Graphics card supporting CIDA 4.x with minimum of 1GB Memory	1
B	<i>Analogue Modelling Equipment</i>		
1	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
2	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 research laboratories for simulation of faults and	1



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	(Simulation apparatus)	related structures in 3D.	
3	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
4	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
<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

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



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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> <p>Power supply: Lead battery 6 or 12 volt, 12-24 Ah</p> <p>Consumption: 1.5 mA (standby mode)</p> <p>Analog-digital conversion: 24 bit unipolar</p> <p>Connection: 50 meter cable</p> <p>Sonde Casing: stainless steel</p> <p>Integrated thermometer: 0.01 C sensitivity</p> <p>Note: The equipment/instrument should have the above specs or of better quality. It should be complete in all respect</p>	2



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		including all the necessary attachments, spares and accessories which can serve the purpose to its full satisfaction.																			
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 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																		
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. 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																		
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) 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																		
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</td> <td>Potassium chromate-silver nitrate reaction</td> <td>0 to 200 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	Potassium chromate-silver nitrate reaction	0 to 200 ppm	1
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		<p>salinity test procedure</p> <p>pH Octet comparator (bi-color reader) 3.0 to 10.0</p> <p>Nitrate-Nitrogen Quartet comparator method (the modified APHA reagent system) 0.2 ppm to 1.0 ppm</p> <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>Portable five-beam 3.0 MHz/1.0 MHz acoustic Doppler current profiler /discharge measurement system intended for use from moving boats and other floating platforms in shallow channels. System is provided in a 5 inch (13 cm) diameter Delrin housing and consists of 3.0 MHz velocity measurement transducers in a 4-beam Janus configuration, 1.0 MHz vertical acoustic beam for depth measurement, compass/2-axis tilt sensor, temperature sensor, and 8 GB recorder. Features bottom tracking, internal discharge calculation, RiverSurveyor Live! Windows software for real-time display of current profiles, water depth and computed discharge measurements, and DGPS interface. System includes a power supply and shipping case.</p>	1



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		10-m power & RS232 serial communications cable, compact 8-pin male wet-pluggable to 9-pin D-sub	
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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"> • 3 velocimetric channels with adjustable dynamic range (up to ± 1.5 mm/s \sim) and lower sensitivity (up to ± 5 cm/s) • 3 accelerometric channels • 1 analog channel (e.g., external trigger for MASW/refraction) • built-in GPS receiver, internal and/or external antenna for positioning and absolute timing/synchronization among different units • built-in radio transmitter/receiver module for indoor/outdoor • synchronization among different units and alarm transmission (e.g., signal above threshold levels) • NEW! Radio triggering system for MASW/refraction • built-in calibration and check-up system • 0.1, 1024] Hz on all channels (up to 32 kHz on 2 channels) with A/D conversion > 24 real bits 	01
2	GMS-18-63: NetQuakes Seismic Recorder, 3 Channel	<ul style="list-style-type: none"> • Int. Triaxial Accelerometer AC-63i • Full Scale Range ± 2 g std. ($\pm 0.5, 1, 3$ g optional) • Removable CF Memory Interface • incl. 2 GByte Memory Card for Data Storage • uCLinux Operating System, 32 MB RAM • Wired Ethernet incl. Cable and Connector • incl. 12 VDC, 7.0 Ah Battery • 12 VDC External Power Supply, UL, 100-240 VAC • incl. Mounting Base Plate. • GPS Receiver for RS-232 with 20 m cable 	03
3	VE-53-BB: Triaxial	<ul style="list-style-type: none"> • 0.2 Hz (5 s) to 160 Hz Frequency Response 	03



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	Broad Band Seismometer	<ul style="list-style-type: none"> • 2x500 (1000) V/m/s Output Sensitivity • 20 Vpp full differential signal output • Single bolt mounted enclosure with 3 leveling screws • incl. 2 meter Cable, Cable Inlet and Connector • GPS Receiver for RS-232 with 20 m cable • Signal Transmission for upto 70 meters • One Unit required in Combination with Intercon 	
4	GMS-24: Seismic Recorder, 3 CH, 24-Bit	<ul style="list-style-type: none"> • Removable CF Memory Interface • incl. 2 GByte Memory Card for Data Storage • uCLinux Operating System, 32 MB RAM • Wired Ethernet incl. Cable and Connector • incl. 12 VDC, 7.0 Ah Battery 12 VDC External Power Supply, UL, 100-240 VAC 	03



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Annexure XI

GEMOLOGY LAB

Sr. No	Item Name	Specifications/Description	Qty
1	Trinacoular Microscope	<ul style="list-style-type: none"> -Video CCD Camera adapter -Still Camera adaptor and all essential accessories. -Digital 12V system eliminates spike and flicker irregularities which reduces eye fatigue - Stereo Zoom Magnification from 10x to 64x - Satisfying the requirements for colored gems and Diamonds examinations. - Darkfield and brightfield illumination using LCD intensity read-out for recall of the previous intensity setting -Iris diaphragm for spot examination -Over head lamp fixed on stage -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 -Transmitted yellow Cold light source for gemstone examinations. 	02
2	Presentation Scope/Simple Microscope	<ul style="list-style-type: none"> -Magnification: 10x-30x -Adjustable dark field illumination -Iris diaphragm for illumination and control -Overhead spot illumination -Custom stone holder -Intense yellow transmitted light for gemstone examinations -Rubber eyeguards -Universal 100V-240V for global electrical compatibility 	10
3	Stereo Microscope	<ul style="list-style-type: none"> Digital 12V system eliminates spike and flicker irregularities which reduces eye fatigue -Stereo Zoom Magnification from 10x to 64x -Satisfying the requirements for colored gems and Diamonds 	02



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		<p>examinations.</p> <ul style="list-style-type: none"> - 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 - Iris diaphragm for spot examination -Over head lamp fixed on stage -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 -Transmitted light, Yellow Cold light source with light conductor, Dark-field 	
4	Refractometer	<ul style="list-style-type: none"> -Built-in monochromatic filter. - RI 1.79 liquid included. 	05
5	Digital Refractometer	<ul style="list-style-type: none"> -At least 200 gemstones database -Refractive index range between 1.30-3.30 or above 	01
6	Diffraction Spectroscopes	<ul style="list-style-type: none"> -Fixed slit and focus - Slim with steel body 	20
7	Large diffraction spectroscope	<ul style="list-style-type: none"> - Fixed slit and focus - Stand. - Steel body 	02
8	Specific gravity balance	<ul style="list-style-type: none"> -Digital -S.G finding range 0.1-150ct or above -Satisfy the requirements for gemstones S.G test 	02
9	Portable Polariscope	<ul style="list-style-type: none"> - At least 4x4 inches Dimension -With Conoscope -With additional lamp -100V-240V global electrical compatibility 	10
10	Chelsea Colour Filter		20
11	Standard Triplet Loupe	<ul style="list-style-type: none"> -Magnification 10-20x -18mm 	20



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12	Tweezers	-Side locking -Stainless steel -Grooved holding tips	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 -With Contrast control spectacles block ultraviolet radiations -Viewing large cabinet -High intensity -No flickering	02
15	Fibre Optic light	-Rheostat, Double arm. -Halogen Cold light source -Additional lamp -20 watt or above -100V-240V global electrical compatibility	10
16	Fibre Optic light	Rheostat, Double arm. -Halogen Cold light source -Additional lamp -150 watt or above -100V-240V global electrical compatibility	02
17	Refractive index (R.I.) fluid	-1.79 R.I. range	10
18	Hardness pencils	- Hardness Range 1-10 -Sharp pointed -Including hardness testers material e.g. 3.5, 4.5, 5.5 and above -Streak plate	03
19	Calcite Dichroscope	- Having wide view -small size -Back plastic body	20
20	London Dichroscope		10



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21	Monochromatic Light for Refractometer	-Battery operated -Yellow light	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"> -Capable to test HPHT Natural Diamonds, few synthetic and irradiated diamonds -Loose stones testing ability from 0.05-10ct -Compact, protective and handy carry case -IEC main supply lead -2 sample holders -3 sample holder pins -Pair of tweezers -1 Year parts/service warranty 	01
28	Digital Stereomicroscope (for photomicrography)	<ul style="list-style-type: none"> -Optical system: Parallel-optics type (zooming type) apochromatic Optical system -Zoom: Motorized -Zoom ratio: 25:1 -Zoom range: 0.63–15.75x -Aperture diaphragm: Zooming body built-in -Total Magnification 3.15-315x or above at 10x eyepiece -Eyepieces: 10x pair, 30x pair -Objectives: Plan Apo 0.5X (NA: 0.078, W.D.: 71mm) or better Plan Apo 1X (NA: 0.156, W.D.: 60mm) or better Plan Apo 2X (NA: 0.312, W.D.: 20mm) or better -Tubes (Eyepiece/Port): Trinocular Tilting tube with simultaneous view in tube head & display screen -Control Box -Remote Controller -AC Adapter -Power Cord (220-240V) -Base/stand: Fiber Diascopic Illumination Base complete set. -Stages: 	01



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	<p>Tilting stage</p> <p>XY Stage with transparent glass base with fixed stone holder</p> <p>-Nose Piece: Intelligent Nosepiece to hold two lens or more</p> <p>-Focus Unit:</p> <p>Motorized Focus Unit (Up 96mm/Down 4mm) or above</p> <p>Power Cord E (220-240V) Set</p> <p>Essential Episcopic and Diascopic Units:</p> <ul style="list-style-type: none"> • Episcopic: Ring LED Illuminator (or equivalent), Epi Fluorescence Illuminator • Diascopic: Simple polarizing attachment Including P2-EFLM Motorized Epi fluorescent Attachment (or equivalent) <p>Epi-Fluorescence light source (Fiber illuminator):</p> <ul style="list-style-type: none"> • HG Precentered Fiber illumination Intensilight (Motorized Model) • HG CONTROLLER • HG LAMP • HG Fiber (1500mm) • Power Cord BE (220-240V) • Light shading Plate <p>Filter Cubes:</p> <ul style="list-style-type: none"> • GFP-B Filter Cube • RFP Filter Cube • GFP-L Filter Cube • Filter Cube (Bright Field, with /4 plate) <p>-Observation methods</p> <p>Coaxial Illuminator,</p> <p>Fluorescence Illuminator,</p> <p>(Diascopic) Simple Polarizing observation (with Simple Polarizing Attachment),</p> <p>Dark Field observation ,</p> <p>Oblique light observation</p>	



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		Complete sets for observations. -Imaging System: High resolution digital imaging system with minimum 16.25 mega pixels (effective), Recordable pixels 4908×3264 pixel (full-pixel), 1636×1088 pixel (3×3 pixel averaging). Image format BMP, TIFF, JPEG, etc., with driver/supporting software. Ready to use/standard set with external 50" LED high definition screen for teaching	
29	Immersion cell Microscope	Optical equipment: 10x wide-field eyepieces 1x and 3x objectives 10x and 30x magnification Illumination: Incident by integrated cold light source and transmitted light by dark field illumination Special features: Stone holder glass cuvette and cuvette table horizontal mounting of the microscope head possible. Universal 100V-240V for global electrical compatibility.	2
30	Heavy liquids	Use for separation of minerals/Gemstones S.G range from 2.65 to 4.4	3
31	Color Grading Disc	Flat White, Non-reflecting, acrylic disk	5
32	Diamond Dock	Box with Day light condition optimized by fluorescent light with customized day light conditions. Providing optimal lighting for different colored diamond grading. Approximately 29x14x19" dimension Different diamonds	1
33	Master stones set for Diamond color grading	Typical master set with at least 5 GIA-graded diamonds/C.Z or any other equal diamond color grading set from D to Z color range.	1
34	Heart and Arrow scope	Be able to show heart and arrow as per diamond cutting grade.	10
35	Raman Spectroscope	Spectrometer: Stigmatic single pass spectrograph with the following specification:	



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	<p>Research Grade</p>	<p>Extremely high efficiency 250 mm focal length spectrograph (>30% throughput in spectrograph).</p> <p>Laser spot size continuously variable from 1 to 300 μm (objective and excitation wavelength dependent) with fully optimized beam path.</p> <p>Visible lens set motorized and kinematically mounted for optimized spectral resolution.</p> <p>Unique continually adjustable 'easy confocal' facility using motorised slit with automated signal optimization.</p> <p>Encoder feedback controlled grating stage with dual grating interchangeable magnetic kinematic mount.</p> <p>Unique 'extended scanning' facility for measurement of high resolution spectra with wider wavelength range than can be accommodated on a single CCD view, without any 'stitching' of spectra together. Spectral resolution continuously variable via CCD binning control.</p> <p>Motorized neutral density filters offering 16 different power levels from 0.00005 to 100%.</p> <p>Automation: Fully automated and self validating Raman module as part of the Raman microscope assembly with associated spectrometer hardware.</p> <p>Features include;</p> <p>Real time automated LiveTrack dynamic focusing for both Raman data acquisition and white light video viewing modes.</p> <p>Auto aligns and optimization of input laser power.</p> <p>Auto switch and auto align of laser through pinhole of beam expander unit.</p> <p>Self validation using built-in internal reference sample.</p> <p>Built-in self calibration and intensity correction using neon and white light sources.</p> <p>Motorized switching between laser and white light sample images using integral video.</p> <p>Microscope: Specially adapted Research Grade microscope allowing confocal measurements with 2.0 μm depth resolution (using a 100\times objective). Including:</p>	
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		<p>Reflected light illumination.</p> <p>5×, 20×, and 50× objectives.</p> <p>Long working distance microscope objective;</p> <p>LWD x50 0.5 NA WD 8.2 mm</p> <p>Binocular head with eyepieces and a high resolution colour video camera.</p> <p>Detector: CCD UV extended, deep depletion NIR enhanced (576 x 384 pixels). Peltier cooled to -70 °C. No water or liquid nitrogen required.</p> <p>Software:</p> <p>Instrument control and data acquisition software, fully integrated data analysis and presentation software with image capture software for white light image display and capture.</p> <p>Packing: Packing all system components.</p> <p>Optical table for system:</p> <p>1.2 x 1.5 x 0.11 m optical table with integrated legs</p> <p>Optical table system interface kit</p> <p>Optical table laser interface kit x3</p> <p>Optical table kinematic mount; for multi-line argon ion laser</p> <p>Optical table triple rear arm and interface kit</p> <p>Operating optimized computer:</p> <p>Dual core</p> <p>4 Gb RAM</p> <p>DVD-RW</p> <p>500 Gb HDD</p> <p>Windows 7 Professional (64 bit)</p> <p>50" TFT Colour Monitor</p> <p>Image Capture for viewing and saving on screen white light images</p> <p>Class 1 enclosure: Laser interlocked microscope enclosure to provide Class 1 operation.</p> <p>633 nm laser kit including:</p>	
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		<p>Beam expander optics</p> <p>633 nm edge filter for photoluminescence measurements to 1.1 μm and</p> <p>Raman from 100 cm^{-1} to 1.1 μm</p> <p>633 nm HeNe laser, 17 mW complete with laser line filter</p> <p>830 nm laser kit; including:</p> <p>Beam expander optics</p> <p>1200 l/mm grating assembly</p> <p>830 nm edge filter on kinematic mount to 100 cm^{-1}</p> <p>830 nm HPNIR diode laser 300 mW complete with laser line filter</p> <p>514 /488 /457 nm laser kit; including:</p> <p>Argon ion laser, (50 mW) 514 nm, (50 mW) 488 nm and (10 mW) 457 nm, with remote venting kit, which is kinematically mounted onto the system baseplate. Selection and plasma filters for 514nm and 457 nm.</p> <p>514 nm sub-kit; including:</p> <p>Kinematically mounted, magnetically attached, Rayleigh line rejection filter set for 514 nm excitation, using paired filters, allowing ripple-free measurement of the Raman spectrum to 100 cm^{-1} from the laser line.</p> <p>Additional 1800 l/mm grating on magnetically attached kinematic mount 457 nm sub-kit: including;</p> <p>Kinematically mounted, magnetically attached, Rayleigh line rejection filter set for 457 nm excitation, using paired filters, allowing ripple-free measurement of the Raman spectrum to 130 cm^{-1} from the laser line.</p> <p>Additional 2400 l/mm grating on magnetically attached kinematic mount</p> <p>Warranty:</p> <p>All parts warranty for at least 12 months.</p>	
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Annexure XII

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. 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; 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) 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
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	1+3



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		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.	
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