

## **Tender Notice**

**No. RGIPT/SVR/PC/OT/2020/08**

### **Name of Work:**

**TENDER FOR SUPPLY, INSTALLATION & OPERATION OF  
LABORATORY EQUIPMENT AT COMMON LABORATORY HALL,  
ASSAM ENERGY INSTITUTE, SIVASAGAR**

Vill: Gohain Gaon, Akhoiphutia Road, Dist: Sivasagar,  
Assam, Pin: 785697



## **Rajiv Gandhi Institute of Petroleum Technology**

An Institute of National Importance established under an Act of Parliament  
Mubarakpur, Mukhetia, Bahadurpur Post: Harbanshganj, Jais, Amethi Pin Code- 229 304

**Website: [www.rgipt.ac.in](http://www.rgipt.ac.in)**

**E-Tender No. RGIPT/SVR/PC/OT/2020/08**

**TENDER FOR SUPPLY, INSTALLATION& OPERATION OF LABORATORY EQUIPMENT AT  
COMMON LABORATORY HALL, ASSAM ENERGY INSTITUTE, SIVASAGAR**

<b>S. No.</b>	<b>Particulars</b>	<b>Details</b>
1	Type Mode	E-Tender
2	Tender Type	Two-Part Bid System: Tender should be submitted on the schedule to tender. (i) Techno-Commercial Bid and (ii) Financial Bid  The Financial bid will be opened only of those firms, who will be found technically qualified after evaluation of their technical bids.
3	Mode of submission	Online Mode
4	Name of the job	Tender for Supply, Installation& Operation of Laboratory Equipment at Common Laboratory Hall, Assam Energy Institute, Sivasagar
5	Place of shipping, supply, installation & operation	Assam Energy Institute, Sivasagar (Centre of RGIPT,Jais, Amethi) Vill: Gohain Gaon, Akhoiphutia Road, Dist: Sivasagar Assam Pin: 785697
6	E-Tender Date	22 <sup>nd</sup> December 2020
7	Date and time of Pre-Bid meeting	4 <sup>th</sup> January 2021 at 02.00 pm
8	Last Date and time for submission of E-Tender	18 <sup>th</sup> January 2021 before3.00 pm
9	Date and time for opening of Technical Bids	18 <sup>th</sup> January 2021 at 4.00 pm
10	Date and time for opening of Price Bids	Date will be informed later vide email to only those bidders who will qualify the technical bids & will also be notified in RGIPT website.
11	Bid Address to	The Director Rajiv Gandhi Institute of Petroleum Technology, Mubarakpur, Mukhetia, Bahadurpur POST: Harbanshganj, Jais, Amethi – 229304

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<b>S. No.</b>	<b>Particulars</b>	<b>Details</b>
12	E-Tender processing Fee (ITI Limited)	Rs. 3000/- + (Applicable GST @18%) through e-payment Gateway available on <a href="https://rgipt.euniwizarde.com">https://rgipt.euniwizarde.com</a>
14	Earnest Money Deposit (EMD)	INR 1,48,780/- Through online mode only.
15	Performance Security	10% of the contract value
16	Technical Clarification	Purchase Committee 1. Mr. Chinmoy Jit Sarma (Chairman) 8638292565 2. Miss Sukanya Hazarika (Member Secretary) 8638519645 3. Mr. Rupjit Saikia (Member) 8638699513 4. Dr. Bhaskar Jyoti Medhi (Member) 8011977078 5. Mr. Sekhar Gogoi (Member) 8761010275

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## INTRODUCTION

Rajiv Gandhi Institute of Petroleum Technology invites sealed tenders, as per Two Bid System, from reputed manufacturers or their authorized Indian Agents/representatives, on the terms and conditions as per tender document, for supply, erection, installation, commissioning, testing, demonstration of supplied equipment and training of designated personnel as per specifications of following item(s):

**Note: The place of shipping is Assam Energy Institute, Sivasagar, (Centre of RGIPT, Jais, Amethi), Vill: Gohain Gaon, Akhoiphutia Road, Dist: Sivasagar, State: Assam, Pin: 785697**

Sl. No.	Description (Detailed specification attach at Annexure-A)	Quantity	Place of Delivery	Installation required, if any
a)	UNIT OPERATIONS LAB - I	As mentioned in Annexure A	<b>Assam Energy Institute, Sivasagar, (Centre of RGIPT, Jais, Amethi), Vill: Gohain Gaon, Akhoiphutia Road, Dist: Sivasagar, State: Assam, Pin: 785697</b>	Yes
b)	UNIT OPERATIONS LAB – II			
c)	CHEMICAL REACTION ENGINEERING LAB			
d)	PROCESS INSTRUMENTATION AND CONTROL LAB			
e)	ENGINE LAB			

All offers should be made in English and should be written in both figures and words.

The bidders are requested to read the tender document carefully and ensure compliance with all specifications/instructions herein. Non-compliance with specifications/instructions in this document may disqualify the bidders from the tender exercise. The Director, RGIPT, reserves the right to select the item (in single or multiple units) or to reject any bid wholly or partly without assigning any reason thereof. Incomplete tenders, amendments, and additions to tender after opening or late tenders are liable to be ignored and rejected

**Tenders can be downloaded from [www.rgipt.ac.in](http://www.rgipt.ac.in) and <https://rgipt.euniwizarde.com/>**

E Tendering Helpdesk Number: 011-49606060/8448288988/9650970101/8210817180

E Tendering Helpdesk email ID: ewizardhelpdesk@gmail.com,  
ewizardhelpdesk89@gmail.com

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## **INSTRUCTIONS FOR BIDDERS**

The bidders are required to submit soft copies of their bids electronically on the e-tender Portal, using valid class 3 Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the e-tender Portal, prepare their bids in accordance with the requirements and submitting their bids online on the e-tender Portal.

More information useful for submitting online bids on the e-tender Portal may be obtained at:

<https://rgipt.euniwizarde.com>.

### **REGISTRATION**

1. Bidders are required enroll on the e-Procurement Portal (URL: <https://rgipt.euniwizarde.com>) with clicking on the link "Online bidder Registration" on the e-tender Portal by paying the Registration fee of Rs.2360/- Per vendor/per year.
2. As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
3. Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication with the bidder.
4. Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (**Only Class III Certificates with signing + encryption key usage**) issued by any Certifying Authority recognized by CCA India (e.g. Sify / TCS / nCode / eMudhra etc.), with their profile.
5. Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.
6. Bidder then logs in to the site through the secured log-in by entering their user ID /password and the password of the DSC / e-Token.
7. **The scanned copies of all original documents should be uploaded on portal <https://rgipt.euniwizarde.com>**

### **SEARCHING FOR TENDER DOCUMENTS**

1. There are various search options built in the e-tender Portal, to facilitate bidders to search active tenders by several parameters.
2. Once the bidders have selected the tenders they are interested in, you can pay the form fee and processing fee (NOT REFUNDABLE) by net-banking / Debit / Credit card then you may download the required documents / tender schedules, Bid documents etc. Once you pay both fee tenders will be moved to the respective 'requested' Tab. This would enable the e- tender Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.

### **PREPARATION OF BIDS**

1. Bidder should take into account any corrigendum published on the tender document before submitting their bids.
2. Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid.
3. Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF formats. Bid Original documents may be scanned with 100 dpi with Colored option which helps in reducing size of the scanned document.

4. To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use “My Documents” available to them to upload such documents.
5. These documents may be directly submitted from the “My Documents” area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

### **SUBMISSION OF BIDS**

1. Bidder should log into the website well in advance for the submission of the bid so that it gets uploaded well in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
2. The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document as a token of acceptance of the terms and conditions laid down by RGIPT, Jais.
3. Bidder has to select the payment option as “e-payment” to pay the tender fee / EMD as applicable and enter details of the instrument.
4. Bidder should prepare the EMD as per the instructions specified in the tender document.
5. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the price bid has been given as a standard BOQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BOQ file, open it and complete the white Colored (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BOQ file is found to be modified by the bidder, the bid will be rejected.
6. The server time (which is displayed on the bidders’ dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.
7. All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. Data storage encryption of sensitive fields is done. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid opener public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.
8. The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
9. Upon the successful and timely submission of bid click “Complete” (i.e. after Clicking “Submit” in the portal), the portal will give a successful Tender submission acknowledgement & a bid summary will be displayed with the unique id and date & time of submission of the bid with all other relevant details.
10. The tender summary has to be printed and kept as an acknowledgement of the submission of the tender. This acknowledgement may be used as an entry pass for any bid opening meetings.

### **ASSISTANCE TO BIDDERS**

1. Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.
2. Any queries relating to the process of online bid submission or queries relating to etender Portal in general may be directed to the 24x7 Helpdesk Support. **The contact number for the helpdesk is “011-**

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## SPECIFICATIONS

### 1. UNIT OPERATIONS LAB - I

SL No	Description	Quantity
1.	<p><b>BERNOULLI'S THEOREM APPARATUS</b></p> <p><b>DESCRIPTION :</b> The equipment should be designed and fabricated to demonstrate the Bernoulli's theorem. It should consist of a test section made of acrylic. It should have a convergent and divergent sections. Pressure tapings at different locations in convergent and divergent section. The set-up must be self-contained water re-circulating unit, provided with a sump tank, centrifugal pump etc. An arrangement should be done to conduct the experiment on different flow rates. Flow rate of water is measured with the help of Measuring tank and stopwatch.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>● Test Section : Material Acrylic.</li> <li>● Pyrometer Tubes : Material P.U. Tubes</li> <li>● Water Circulation : ½ HP Pump, Crompton make.</li> <li>● Flow Measurement : Using Measuring Tank with Piezometer in consistent with flow sensor.</li> <li>● Sump Tank</li> <li>● Inlet Tank</li> <li>● Stop Watch : Electronic.</li> <li>● Control Panel Comprises of: Standard make On/Off Switch, Indicator, congruent to software to display on computer. Tanks will be contrived of Stainless Steel 304.</li> <li>● All the Piping should be of corrosion resistant material.</li> <li>● The pressure measuring point should be with quick release coupling and self locking</li> <li>● An ENGLISH instruction manual consisting of experimental procedures, block diagram etc. must be provided along with the Apparatus.</li> <li>● The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	1
2.	<p><b>PIPE FRICTION APPARATUS</b></p> <p><b>DESCRIPTION :</b> The set up should consists of a ½” bend and elbow, a sudden expansion &amp; sudden Contraction fitting from 15mm to 25mm, ball valve and gate valve. Pressure tapings must be provided at inlet and outlet of these fittings under test. A differential manometer must be fitted in the line giving pressure losses of individual fittings. Present set-up must be self-contained with water re-circulating unit, provided with a sump tank and a centrifugal pump etc. Flow control valve and by-pass valve are fitted in water line to conduct the experiment on different flowrates. Flow rate of water is measured with the help of measuring tank and stop watch.</p> <p><b>TECHNICAL DETAILS :</b></p>	1

	<ul style="list-style-type: none"> <li>● Sudden Enlargement : From 15mm to 25mm</li> <li>● Sudden Contraction : From 25mm to 15mm.</li> <li>● Bend : ½”</li> <li>● Elbow : ½”</li> <li>● Ball valve : ½”</li> <li>● Gate valve : ½”</li> <li>● Water Circulation : ½ HP Pump, Crompton make.</li> <li>● Flow Measurement : Using Measuring Tank with Piezometer, consistent with consistent with flow sensor.</li> <li>● Pressure Drop Measurement: Differential water manometer.</li> <li>● Sump Tank</li> <li>● Stop Watch : Electronic.</li> <li>● Control Panel Comprises of : Standard make On/Off Switch, Mains Indicator.</li> <li>● Tanks must be made of Stainless Steel304.</li> <li>● All the Piping should be of corrosion resistant material.</li> <li>● The pressure measuring point should be with quick release coupling and self locking</li> <li>● An English instruction manual consisting of experimental procedures, block diagram etc. must be provided along with the Apparatus</li> <li>● The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint</li> </ul>	
3.	<p><b>REYNOLD’S APPARATUS</b></p> <p><b>DESCRIPTION :</b>  The apparatus should consist of a glass tube with one end having bell mouth entrance; connected to a constant head water tank, at the other end a valve is provided to vary the flow rate. The tank is of sufficient capacity to store water. A capillary tube is introduced centrally in the bell mouth for feeding dye from a small container placed at the top of tank, through polythene tubing. By varying the rate of flow, the Reynolds's number is changed. This also changes the type of flow. Visual observation of dye (Thread) will indicate the type of flow, which can be confirmed from the Reynolds's number computed Present set-up is self-contained water re-circulating unit, provided with a sump tank and a centrifugal pump etc. Flow control valve and by-pass valve are fitted in water line. Flow rate of water is measured with the help of measuring cylinder and stop watch.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>● Tube : Material Borosilicate Glass</li> <li>● Dye vessel : Material Stainless Steel, Capacity.</li> <li>● Capillary Tube : Material Copper/Stainless Steel.</li> <li>● Constant Head Water Tank</li> <li>● Water Circulation : ½ HP Pump, Champion/Standard make.</li> <li>● Flow Measurement : Using Measuring Cylinder with Electronic stop watch consistent with consistent with flow sensor.</li> <li>● Sump Tank</li> <li>● Control Panel Comprising of : Standard make On/Off Switch, Mains Indicator, etc.</li> <li>● Tanks must be made of Stainless Steel304.</li> <li>● All the Piping should be of corrosion resistant material.</li> <li>● The pressure measuring point should be with quick release coupling and self locking</li> <li>● An English instruction manual consisting of experimental procedures, block Diagram etc. must be provided along with the Apparatus</li> <li>● The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint</li> </ul>	1

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4.	<p><b>REDWOOD VISCOMETER</b></p> <p><b>DESCRIPTION:</b> This viscometer must be designed for determining the viscosity of all oils, expressed in Redwood Seconds at the temperature of test as called for by IP 70.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>● The apparatus must be equipped with Electronic Digital Indicator and controller.</li> <li>● FHP Motor Stirrer.</li> <li>● An ENGLISH instruction manual consisting of experimental procedures, block Diagram etc. must be provided along with the Apparatus</li> </ul>	1
5.	<p><b>VENTURIMETER, ORIFICEMETER AND ROTAMETER APPARATUS</b></p> <p><b>DESCRIPTION:</b> The set-up must be designed to study three type of flow measuring devices. These are orifice meter, Venturi meter and rotameter. The set-up must also facilitate the end user to calculate fluid discharge through these devices. By determining the co-efficient of discharge of venturi meter and orifice meter, these devices can be used as a direct flow meter and can be installed in a fluid line. Rotameter to be provided with a pre-calibrated scale. By passing a known flow of fluid through the rotameter and comparing this to provided scale reading, so that end user can recalibrate the rotameter. Pressure taping from venturi meter and orifice meter can be taken out to pressurized differential pressure manometer. The set-up must be self-contained water re-circulating unit, provided with a sump tank, centrifugal pump etc. Water is to be pumped by means of centrifugal pump.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>• Venturi meter : Body Material Acrylic</li> <li>• Orifice meter : Body Material Acrylic</li> <li>• Orifice plate made of Stainless Steel.</li> <li>• Rotameter : Glass Tube Rotameter.</li> <li>• Water Circulation : ½ HP Pump, Crompton make.</li> <li>• Flow Measurement : Using Measuring Tank with piezometer</li> <li>• Sump Tank</li> <li>• Stop Watch : Electronic</li> <li>• Pressure measurement : By Pressurized differential pressure Manometer</li> <li>• Control Panel Comprises of : Standard make On/Off Switch, Mains Indicator etc.</li> <li>• Tanks: Stainless Steel.</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. will be provided along with the Apparatus.</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	1
6.	<p><b>CENTRIFUGAL PUMP</b></p> <p><b>DESCRIPTION:</b> The set-up must be designed to study characteristics of a given centrifugal pump. A speed control arrangement facilitating the end user to operate the centrifugal pump at different speeds.</p>	1

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	<p>To calculate the input power to the motor, an energy meter is provided. The set-up must be self-contained water re-circulating unit, provided with a sump tank, centrifugal pump etc. Flow rate of water is measured with the help of measuring tank with piezometer and stopwatch. The supplied set-up is to be complete in all respect</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>• Pump : Kirloskar make. Capacity 1 HP, Speed 2800 RPM (max), Head 12 m (max.)</li> <li>• Drive : 1 HP motor .</li> <li>• Speed Control: Thyristor controlled</li> <li>• Sump Tank</li> <li>• Measuring Tank : With Piezometer.</li> <li>• Stop Watch : Electronic.</li> <li>• Pressure Gauge : Bourdon type.</li> <li>• Control Panel Comprises of : Energy measurement : Electronic Energy meter, RPM measurement : Digital RPM Indicator, Standard make On/Off Switch, Mains Indicator, etc.</li> <li>• Tanks must be made of Stainless Steel.</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. must be provided along with the Apparatus.</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	
7.	<p><b>RECIPROCATING PUMP</b></p> <p><b>DESCRIPTION:</b></p> <p>The set-up is to be designed to study characteristics of a given reciprocating pump. A speed control arrangement facilitating the end user to operate the reciprocating pump at different speeds. To calculate the input power to the motor, an energy meter is to be provided. The set-up is to be self-contained water re-circulating unit, provided with a sump tank, reciprocating pump etc. Flow rate of water is measured with the help of measuring tank with piezometer and stopwatch. The supplied set-up is to be complete in all respect.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>• Pump : Double acting, Single Cylinder, Capacity 1 HP, Speed 250 RPM (max.), Head 5 kg/cm<sup>2</sup> (max.)</li> <li>• Drive : 1 HP DC motor.</li> <li>• Speed Control</li> <li>• Sump Tank</li> <li>• Measuring Tank : With Piezometer.</li> <li>• Stop Watch : Electronic.</li> <li>• Pressure Gauge : Bourdon type.</li> <li>• Control Panel Comprises of : Energy measurement : Electronic Energy meter, RPM measurement : Digital RPM Indicator, Standard make On/Off Switch, Mains Indicator, etc.</li> <li>• Tanks must be made of Stainless Steel.</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. must be provided along with the Apparatus.</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	1

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8.	<p><b>BALL MILL</b></p> <p><b>DESCRIPTION:</b> Ball Mill having a horizontal rotating cylindrical steel chamber of half filled with steel balls. The size reduction to be accomplished by the impact of balls as they fall back after being lifted by the baffles fitted in the rotating chamber. Ball Mill to be fitted on a sturdy MS frame. Charging of balls and material to be done by the means of opening provided the chamber. The chamber is to be turned about the horizontal and a drive to be provided to vary the RPM. An RPM indicator and a revolution counter to be provided with the set-up.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>• Ball Mill : Material MS,</li> <li>• Discharge Chute : Suitable size.</li> <li>• Feed Size : 6 mm (approx.)</li> <li>• Product Size : 200 mesh (approx.)</li> <li>• Drive : 1 HP motor, variable speed coupled to Reduction Gearbox.</li> <li>• Product receiver : Material Stainless Steel of suitable size.</li> <li>• Balls : 15 kg</li> <li>• Control Panel Comprises of : RPM measurement with Digital indicator, Energy measurement -Electronic Energy meter, RPM Measurement - Digital RPM Indicator.</li> <li>• The set-up to be fitted with required guards.</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. to be provided along with the Apparatus.</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	1
9.	<p><b>SIEVE SHAKER WITH TEST SIEVES</b></p> <p><b>DESCRIPTION:</b> Sieve shaker must reproduce the required motion to be given to the test sieves as that of hand sieving for separation of material. It should have a simple and durable construction and to be run by a motor. The machine must have easy installation. No special foundation is required. A time switch from 0 to 60 minutes is to be provided.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>• Sieve assembly : Compatible to sieves of 20-cm dia.(for 6-7 sieves)</li> <li>• Drive : ½ HP motor</li> <li>• Control Panel comprises of: On-off switch, Indicator etc.</li> <li>• Special arrangement for setting time for shaking.</li> <li>• Sieves of various mesh sizes (Tyler standard screen scale) : Mesh No. (22, 25, 35, 44, 52, 60, 72, 85, 100,115,150) With set of Lid and Pan</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. will be provided along with the Apparatus.</li> <li>• The whole set-up is well designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	1
10.	<p><b>FROTH FLOATATION CELL</b></p> <p><b>DESCRIPTION:</b> The floatation process to be operated by preparing a water suspension of a mixture of relatively finely sized solids. This is usually done in an agitated chamber open at the top. Fine bubbles of air are to be dispersed through the agitated suspension to form a froth that rises to the top of the</p>	1

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	<p>chamber. The setup is to consists of an agitated chamber open at the top. In the chamber, an impeller coupled to a shaft is to be fixed in a stationary diffuser. Low-pressure air is allowed to enter in the stationary diffuser through the air passage provided with the agitator. The collector coated mineral particles adhere to the rising bubbles and are carried to the top of the cell to be removed in the froth product.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>• Flootation Chamber : Material Stainless Steel, Compatible capacity.</li> <li>• Agitator : Stainless Steel Impeller with Stainless Steel shaft coupled to FHP motor.</li> <li>• Diffuser : Material Stainless Steel holding the impeller.</li> <li>• Froth Collecting Tank : Material Stainless Steel,</li> <li>• Air Supply : By Air pump, Compatible capacity.</li> <li>• Control Panel comprises of : Standard make On off switch, Mains Indicator etc.</li> <li>• Screw Jack arrangement for tightening and removing of frames easily.</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. to be provided along with the Apparatus.</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	
11.	<p><b>PLATE &amp; FRAME FILTER PRESS</b></p> <p><b>DESCRIPTION:</b> A filter press designed as a pressure filter applying a large pressure difference across the septum to give economically rapid filtration with viscous liquids or fine solids. It must contain a set of plates designed to provide a series of chambers or compartments in which solids may collect. The plates to be covered with a filter medium such as canvas cloth. Slurry that is to be filtered is admitted to each compartment under pressure; liquor passes through the canvas cloth and out a discharge pipe, leaving a wet cake of solids behind. Plates and frames to be stacked horizontally in a metal rack, with cloth covering the face of each plate. A set up consisting of 7 plates and 6 frames. Frames to be covered with filter cloth. Inlet &amp; outlet pressures are measured by pressure gauges. Rate of filtrate removals is measured by calibrated tank provided.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>• No. of frame : 6</li> <li>• No. of Plates : 7</li> <li>• Size : 200 mm x 200 mm.</li> <li>• Material : Acrylic</li> <li>• Filter Medium : Filter Cloth</li> <li>• Filtrate collection tray : Material Stainless Steel, Suitable size.</li> <li>• Filtration rate measurement : Using measuring tank. Material Stainless Steel</li> <li>• Slurry Feed tank : Material Stainless Steel,</li> <li>• Slurry Tank Agitator : Stainless Steel Impeller with SS Shaft coupled to FHP Motor and Reduction Gear Box</li> <li>• Slurry Feed Pump : Gear Pump with FHP motor.</li> <li>• Piping system : GI and PVC.</li> <li>• Pressure Measurement : By Bourdon type</li> <li>• Overhead water tank : Material Stainless Steel</li> <li>• Control Panel comprises of : Standard make On off switch, Mains Indicator etc.</li> <li>• Screw Jack arrangement for tightening and removing of frames easily.</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. to be provided along with the Apparatus.</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	1

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## 2. UNIT OPERATIONS LAB – II

SL No	Description	Quantity
1.	<p><b>HEAT CONDUCTION APPARATUS</b></p> <p><b>DESCRIPTION :</b> The set-up is to be designed to study basic experiments on the topic of heat conduction through various metals. The experimental unit must include a linear heat conduction experimental setup, each equipped with a heating and cooling element and heat transfer through composite wall. Setup to incorporate various measuring objects with different heat transfer characteristics for linear heat conduction and slab assembly for heat conduction through composite wall. The experimental unit to be supplied together with a display and control unit.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>● Linear heat conduction having measuring objects.</li> <li>● Slab assembly arranged symmetrically on both sides of heater.</li> <li>● Cooling water jacket with insulating shell</li> <li>● Flow Measurement : By Rotameter</li> <li>● Heater : Nichrome Wire Heater</li> <li>● Temperature Sensors : RTD Type</li> <li>● Digital Temp. Controller</li> <li>● Energy meter : Digital Type for power measurement.</li> <li>● Digital Temperature Indicator with Standard make on/off switch, Mains Indicator etc.</li> <li>● The test section to be thermally insulated to minimize errors due to heat loss. Manual flow control valve to control the cooling flow rate to be provided</li> <li>● An ENGLISH instruction manual consisting of experimental procedures, block diagram etc. must be provided along with the Apparatus.</li> <li>● The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	1
2.	<p><b>THERMAL CONDUCTIVITY APPARATUS</b></p> <p><b>DESCRIPTION :</b> The set-up is to be designed to determine the thermal conductivity of metal rod. It is to consist of a metal bar with one end heated by an electric heater while the other end projects inside the cooling water jacket. A cylindrical shell filled with insulating material surrounds the middle portion of the bar. The temperature of the bar is to be measured at different points. Water at constant rate to be circulated through the jacket and its flow rate and temperature rise to be indicated. A Digital Temperature Controller is to be provided to have an automatic smooth control on required heat input to the heater as per user requirements. Electronic energy meter to be provided to measure the heat input.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>● Metal Bar: Material - Copper</li> <li>● Insulating shell</li> <li>● Cooling Water Jacket</li> <li>● Heater : Nichrome Wire Heater</li> <li>● Water Flow measurement</li> <li>● Control panel comprising of : Digital Temperature Controller, Energy meter : Digital Type for power measurement, Digital Temp. Indicator, Temperature Sensors, Standard make On/off switch, Mains Indicator etc.</li> <li>● An English instruction manual consisting of experimental procedures, block</li> </ul>	1

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	<p>diagram etc. must be provided along with the Apparatus</p> <ul style="list-style-type: none"> <li>The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint</li> </ul>	
<b>3.</b>	<p><b>SHELL AND TUBE HEAT EXCHANGER</b></p> <p><b>DESCRIPTION :</b> Shell and Tube Heat Exchanger apparatus to consists of fabricated shell, inside which tubes with baffles on outer side are fitted. The setup of 1-2 heat exchangers, with cold water flowing through shell and hot water inside the tubes. For hot water, a recirculation type water tank is to be provided, fitted with heaters and Digital temperature controller. Cold water at constant head condition provision to be kept. Flow rates of hot and cold water are to be measured using Rotameters. A magnetic drive pump to be used for circulating the hot water from the re-circulation type water tank. Digital temperature indicator with multichannel switch is to be fitted in control panel to observe the temperature of hot and cold fluids at inlet and outlet of heat exchanger.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>System : Water to Water. (1 – 2 shell &amp; tube type)</li> <li>Shell : Material Stainless steel with Insulation with ceramic wool and having 25% cut baffles</li> <li>Tube : Material Stainless steel</li> <li>Water Flow Measurement : Rotameters (2Nos.) one each for cold &amp; hot fluid.</li> <li>Hot Water Tank : Made of Stainless steel (Insulation)</li> <li>Hot Water Circulation : Magnetic Pump</li> <li>Heater : Nichrome Wire Heater</li> <li>Control panel comprising of : Digital Temp., Digital Temp. Indicator, Temperature Sensors with Standard make On/Off switch, Mains Indicator etc.</li> <li>An English instruction manual consisting of experimental procedures, block Diagram etc. must be provided along with the Apparatus.</li> <li>The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint</li> </ul>	<b>1</b>
<b>4.</b>	<p><b>BOILING HEAT TRANSFER UNIT</b></p> <p><b>DESCRIPTION:</b> The experimental setup is to be designed to study the modes of pool boiling and to make both qualitative and quantitative assessments of convective, nucleate and film boiling. The processes to take place in a transparent vessel. A condenser in the form of a water-cooled tube coil to be present. Evaporation of water takes place with heating element and condensation with tube coil. Instruments to be included to record the flow rate of the heating power, cooling water, pressure and temperature at desired points.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>Pressure vessel: Transparent</li> <li>Safety Features: Pressure Relief Valve, diaphragm type pressure switch, low water heater protection.</li> <li>Heater : Nichrome Wire Heater</li> <li>Evaporator: Containing Heating element with adjustable heating.</li> <li>Condenser: With Stainless Steel 304 Tube Coil.</li> <li>Tank pressure Measurement: Bourdon Type pressure gauge.</li> <li>Flow Rate Measurement: By Rotameter.</li> <li>Temperature Measurement: RTD. Digital Temperature Controller. Digital Temperature Indicator, Standard make On-off switch, Mains indicator etc.</li> </ul>	<b>1</b>

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	<ul style="list-style-type: none"> <li>• An English instruction manual consisting of experimental procedures, block Diagram etc. must be provided along with the Apparatus</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	
<b>5.</b>	<p><b>WETTED WALL COLUMN APPARATUS</b></p> <p><b>DESCRIPTION:</b> The set up to consists of a glass column. Water is to be fed at the top of the column along the walls to make the column a wetted wall column. Hot air from heating chamber with known humidity when passed through the column vertically upward and evaporation in the liquid film around the wall to take place. To simulate different condition, flow rates of water and air to be varied. Instrumentation is to be provided to measure the dry and wet bulb temperatures at air inlet and outlet.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>• Column : Borosilicate Glass</li> <li>• Water Circulation : FHP Pump.</li> <li>• Air compressor</li> <li>• Water Tank : Material Stainless Steel,</li> <li>• Heating Chamber : Compatible capacity.</li> <li>• Heater : Nichrome Wire Heater</li> <li>• Rotameter : For water flow rate measurement.</li> <li>• Dry &amp; wet Bulb Temp. : With Digital Temperature Indicator.</li> <li>• Temperature Sensors : RTD.</li> <li>• Control panel comprises of : Digital Temp. Indicator, Standard make on/off switch, Mains Indicator etc.</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. will be provided along with the Apparatus.</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	<b>1</b>
<b>6.</b>	<p><b>VAPOUR IN AIR DIFFUSION APPARATUS</b></p> <p><b>DESCRIPTION:</b> The set-up is to consists of a glass tube placed in a water bath. A horizontal glass tube to be fixed to the upper end of the tube where air is to be drawn through by a small air pump included within the unit. Air flowing over the tube maintaining a partial pressure difference. A traveling microscope with sliding vernier scale is provided to measure the rate of fall of solvent within capillary. A stirrer is to be fitted to maintain constant temperature inside the bath.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>• Tube : Material Borosilicate Glass.</li> <li>• Water Bath : Material Stainless Steel with two sides made of glass, Fitted with heater and stirrer.</li> <li>• Heater : Nichrome Wire Heater</li> <li>• Stirrer : Stainless Steel</li> <li>• Air Circulation : By Air Pump.</li> <li>• Traveling Microscope : 0-150 x 0.1 mm resolution.</li> <li>• Temp. Sensor : RTD type</li> <li>• Control panel comprising of : Digital Temp. Controller cum-Indicator (For Water Bath), Standard make On/off switch, Mains Indicator etc.</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. must be provided along with the Apparatus.</li> </ul>	<b>1</b>

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	<ul style="list-style-type: none"> <li>The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	
7.	<p><b>PACKED COLUMN APPARATUS</b></p> <p><b>DESCRIPTION:</b> The set-up is to consists of a glass column packed with Raschig rings. Liquid to be fed at the top of the column through distributor. The solute gas and air are measured separately, mixed in a mixing chamber and then passed through the packed column vertically upward and absorbed in liquid. All the flow rates to be independently varied to simulate different conditions. Provision for liquid sampling can be at the bottom of the column for analysis must be there.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>Column : Borosilicate Glass</li> <li>Packing : Borosilicate Glass Raschig Ring</li> <li>Feed Circulation : By compressed air. (Air compressor)</li> <li>Pressure Regulator : (0-2) kg/cm<sup>2</sup>.</li> <li>Pressure Gauge : Bourdon type</li> <li>Flow measurement : Rotameters (One each for feed, air &amp; CO<sub>2</sub>).</li> <li>Feed Tank : Material Stainless Steel</li> <li>Collecting Tank : Material-Stainless Steel</li> <li>An English instruction manual consisting of experimental procedures, block diagram etc. must be provided along with the Apparatus.</li> <li>The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	1
8.	<p><b>TRAY DRIER</b></p> <p><b>DESCRIPTION:</b> The tray dryer setup is to consist of forced draft action created by hot air for removal of moisture. It should consist of an insulated double wall chamber. Material for drying is placed in the tray and regular loss of weight is monitored by an electronic weighing balance. Air from a blower passing through a heating chamber is to be used as drying agent. Provisions to be provided for varying the airflow rate.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>Drying Chamber : Insulated double wall chamber</li> <li>Weighing Balance : Digital (0-1000gm) of <math>\pm 1</math> gm resolution.</li> <li>Hot Air Circulation : By forced draft fan, Arrangement is done to vary the air flow rate.</li> <li>Heating Chamber : Compatible capacity.</li> <li>Heater : Nichrome Wire Heater</li> <li>Temperature Sensors : RTD Type</li> <li>Control panel comprises of : Digital Temp. Controller, Digital Temp. Indicator With Standard make on/off switch, Mains Indicator etc.</li> <li>An English instruction manual consisting of experimental procedures, block diagram etc. to be provided along with the Apparatus.</li> <li>The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	1
9.	<b>BATCH DISTILLATION COLUMN</b>	1

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	<p><b>DESCRIPTION:</b>  The equipment consists of a distillation still made of stainless steel. Feed in the still is heated externally by heater. The vapours form at the top of the vessel, are condensed in condenser by circulating cooling water. Temperature of the feed mixture is controlled by means of a digital temp. controller. The condensate is collected in a receiver made of stainless steel.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>• Flow measurement : Rotameter for cold water for condenser</li> <li>• Distillation still : Material Stainless Steel, With Insulation</li> <li>• Condenser :Material- Stainless Steel</li> <li>• Distillate tank : Material- Stainless Steel</li> <li>• Heater : Nichrome Wire Heater</li> <li>• Refractometer</li> <li>• Control panel comprises of : Digital Temp. Controller (For Steam Generator)</li> <li>• Digital Temp. Indicator, Temp. Sensors : RTD type, Standard make on/off switch, Mains Indicator</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. will be provided along with the Apparatus.</li> <li>• The whole set-up is well designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	
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### 3. CHEMICAL REACTION ENGINEERING LAB

SL No	Description	Quantity
1.	<p><b>BATCH REACTOR</b></p> <p><b>DESCRIPTION :</b>            A set-up should be a closed system reactor with no input and output streams. It is to operate under conditions like Isothermal (Temperature of Reaction Mass remains constant), perfectly mixed (composition of reaction mixture is uniform throughout), and constant volume (volume of the reaction mixture within the reactor remains constant, no appreciable change in the density of reaction mass). This set-up would be used to study a noncatalytic homogeneous reaction under isothermal condition. The set up should consists of a reactor fitted in a constant temperature water bath. One stirrer is fitted for mixing the reactants in reactor and other is fitted in water bath to keep the uniform temperature throughout in the bath. Provisions for samples to be taken out with the help of a sampling pipette must be provided.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>● Reactor : Material Stainless Steel</li> <li>● Capacity: 1 Ltr. (approx.)</li> <li>● Agitator : Variable speed with speed control facility</li> <li>● Impeller : Material Stainless Steel, 4 Square bladed</li> <li>● Baffles : 4 Nos., Detachable.</li> <li>● Heater : Nichrome Wire Heater</li> <li>● Temp. Sensor: RTD type</li> <li>● Control panel comprises of : Digital temp. comptroller Cum Indicator, Standard make on/off switch, Mains Indicator etc.</li> <li>● Pressure Gauge : Bourdon type 0-2 Kg/cm<sup>2</sup></li> <li>● Piping : Stainless Steel and PU pipe</li> <li>● An ENGLISH instruction manual consisting of experimental procedures, block diagram etc. must be provided along with the Apparatus.</li> <li>● The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	1
2.	<p><b>COMBINED FLOW REACTOR</b></p> <p><b>DESCRIPTION :</b>            This set-up is to study a non-catalytic homogeneous second order liquid phase reaction under ambient condition in a combined reactor. It is to consists of two reactors connected in series; one is plug flow reactor and another is CSTR. The set up to consists of two feed tanks through which two reactants are fed to the reactors fitted in series. Rotameters are to be provided to measure and adjust the individual flow of Chemicals. Compressed air to be used for circulation of feed. Pressure Regulator, Pressure Gauge and Safety Valve are fitted in the compressed air-line.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>● Reactor 1 : Helical Coil Tube Type</li> <li>● Material: Stainless Steel 304 grade</li> <li>● Capacity: 1 Liter approx</li> <li>● Reactor 2 : CSTR</li> <li>● Material: Stainless Steel 304 grade</li> <li>● Capacity: 1 Liter (approx).</li> </ul>	1

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	<ul style="list-style-type: none"> <li>• Stirrer for CSTR : Stainless Steel Impeller and shaft coupled with FHP motor</li> <li>• Feed Tank (2Nos.) : Material Stainless Steel</li> <li>• Feed circulation : By compressed air.</li> <li>• Flow Measurement : Rotameter 2 Nos. (One each for Reactor).</li> <li>• Piping : Stainless Steel and PU pipe</li> <li>• Pressure Regulator : 0-2 Kg/cm<sup>2</sup></li> <li>• Pressure Gauge : Bourdon type 0-2 Kg/cm<sup>2</sup>.</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. must be provided along with the Apparatus</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	
3.	<p><b>CONTINUOUS STIRRED TANK REACTOR (CSTR)</b></p> <p><b>DESCRIPTION :</b> The CSTR setup is to study a non-catalytic homogeneous second order liquid phase reaction under ambient condition. The set-up is to consists of two feed tanks through which two reactants are to be fed to the reactor. Rotameters are to be provided to measure and adjust the individual flow of Chemicals. The compressed air can be used for circulation of feed. The CSTR is fitted with stirrer for proper mixing. Provisions for sample collection for analysis to be provided. Pressure Regulator, Pressure Gauge and Safety Valve are to be fitted in the compressed air line.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>• Reactor : Material Stainless Steel,</li> <li>• Capacity: 2 Ltrs (Approx).</li> <li>• Stirrer : Stainless Steel Impeller and shaft coupled with FHP Motor.</li> <li>• Feed Tank : Material Stainless Steel,</li> <li>• Capacity: 20 Ltrs. (Approx).</li> <li>• Feed Circulation : By compressed air (Air compressor).</li> <li>• Flow Measurement : Rotameter</li> <li>• Piping : Stainless Steel and PU pipe.</li> <li>• Pressure Regulator : 0-2 Kg/cm<sup>2</sup></li> <li>• Pressure Gauge : Bourdon type</li> <li>• Control Panel comprises of : Standard make On off switch, Mains Indicator etc.</li> <li>• An English instruction manual consisting of experimental procedures, block Diagram etc. must be provided along with the Apparatus.</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint</li> </ul>	1
4.	<p><b>PLUG FLOW TUBULAR REACTOR</b></p> <p><b>DESCRIPTION:</b> The Plug Flow Reactor (PFTR) set-up is to study a non-catalytic homogeneous reaction under ambient condition. The set-up is to consists of two feed tanks through which two reactants are fed to the reactor. It is to be a helical coil tube type reactor. Rotameters are to be provided to measure and vary the individual flow of Chemicals. The compressed air can be used for circulation of feed. Provision for sample collection for analysis from the outlet of reactor to be provided. Pressure Regulator, Pressure Gauge and Safety Valve are to be fitted in the compressed air line.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>• Reactor : Material Stainless Steel</li> <li>• Feed Tank : Material Stainless Steel, Capacity – 20Ltrs. (approx.)</li> </ul>	1

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	<ul style="list-style-type: none"> <li>• Feed Circulation : By compressed air (Air compressor).</li> <li>• Flow Measurement : Rotameter</li> <li>• Piping : Stainless Steel and PU pipe</li> <li>• Pressure Regulator : 0-2 Kg/cm<sup>2</sup>.</li> <li>• Pressure Gauge : Bourdon type</li> <li>• An English instruction manual consisting of experimental procedures, block Diagram etc. must be provided along with the Apparatus</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	
5.	<p><b>PACKED BED REACTOR APPARATUS</b></p> <p><b>DESCRIPTION:</b> The setup is to consist of a glass column packed with Raschig Rings and two feed tanks. Reactants are to be fed to the reactor through liquid distributor, fitted at the bottom of the column. Rotameters to be provided to measure and vary the individual flow of Chemicals. The compressed air to be used for circulation of feed. Samples to be taken periodically from the top outlet of reactor. Pressure Regulator &amp; Pressure Gauge to be fitted in the compressed air line.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>• Reactor Column : Material Borosilicate Glass</li> <li>• Packing : Raschig Rings, Material Borosilicate Glass.</li> <li>• Feed Tank : Material Stainless Steel, Capacity 20 Ltrs.</li> <li>• Feed Circulation : By compressed air (Air compressor).</li> <li>• Flow Measurement : Rotameter</li> <li>• Piping : Stainless Steel and PU Pipe.</li> <li>• Pressure Regulator : 0-2 Kg/cm<sup>2</sup></li> <li>• Pressure Gauge : Bourdon type</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. will be provided along with the Apparatus.</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	1

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#### 4. PROCESS INSTRUMENTATION AND CONTROL LAB

SL No	Description	Quantity
1.	<p><b>CONTROL VALVE SETUP</b></p> <p><b>DESCRIPTION :</b> The setup is to consist of Pneumatic control valves of Linear, Equal and quick % type. Stainless Steel water tanks with pump to be provided for continuous water circulation. Rotameter is used for the flow measurement and variation. Manometer to be provided for measuring of valve inlet pressure. The air regulator and pressure gauge are to be provided for regulating air supply.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>● Control Valve : 2Nos.</li> <li>● Characteristics : Quick, Linear &amp; Equal %</li> <li>● Type : Pneumatic</li> <li>● Air compressor</li> <li>● Water Tank : Material Stainless Steel,</li> <li>● Water Circulation : FHP Pump Champion/Standard make.</li> <li>● Overhead Tank : Material Stainless Steel,</li> <li>● Flow Measurement : By Rotameter.</li> <li>● Pressure Head measurement : By Single column manometer.</li> <li>● Pressure Regulator : 0-2 kg/cm<sup>2</sup></li> <li>● Pressure Gauge : Bourdon type</li> <li>● The whole set-up is well designed and arranged on a rigid structure painted with industrial PU Paint.</li> <li>● An ENGLISH instruction manual consisting of experimental procedures, block diagram etc. must be provided along with the Apparatus.</li> </ul>	1
2.	<p><b>LEVEL CONTROL TRAINER</b></p> <p><b>DESCRIPTION :</b> The Level Process Trainer is to be designed to understand the elements of a level process and its control. It is to consists of a process tank fitted with a level transmitter and necessary drain valve arrangements. The inlet flow to the tank is controlled by a control valve which operates on a 3 to 15 psi pressure signal. A current to pressure (I/P) converter to be used to convert the output of the controller (4-20mA) to the signal pressure. The process parameter is to be controlled by a digital indicating controller. These units along with necessary piping are fitted on the support frame. The setup is to be designed for tabletop placement and access. The controller is connected to computer through USB for monitoring and controlling the process. User friendly software to be supplied along with the hardware to perform different set of experiments.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>● Level Transmitter : Range 0-300 mm, Capacitance Type, Output 4-20 mA</li> <li>● Process tank : Material SS with Scale.</li> <li>● Water Tank : Material Stainless Steel</li> <li>● Water Circulation : FHP Pump, Champion/Standard make.</li> <li>● Flow Measurement : By Rotameter.</li> <li>● Control valve : Compatible capacity with pneumatic actuator.</li> <li>● I/P converter : Input 4-20mA, Output 3-15 PSIG.</li> <li>● Pressure Regulator : 0-2 kg/cm<sup>2</sup>.</li> <li>● Pressure Gauge : Bourdon type</li> </ul>	1

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	<ul style="list-style-type: none"> <li>• Interfacing unit : For input-output communication with auto/manual facility</li> <li>• Micro-processor Controller : PID Setting, auto tuning</li> <li>• Software : For experimentation, PID control, Data logging, trend plot, offline analysis and printing.</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. must be provided along with the Apparatus</li> <li>• The whole unit is to be assembled rigidly on a base plate and mounted on a stand.</li> </ul>	
	<p><b>FLOW CONTROL TRAINER</b></p> <p><b>DESCRIPTION :</b>  The Flow Process Trainer is to be designed to understand the elements of a flow process and its control. It is to consists of a pipeline fitted with orifice as flow device and a differential pressure transmitter calibrated to measure flow. One end of the pipeline to be connected with a pump and rotameter. The flow of the pipeline is to be controlled by a control valve which operates on a 3 to 15 psi pressure signal. A current to pressure (I/P) converter is used to convert the output of the controller (4-20mA) to the signal pressure. The process parameter is to be controlled by a digital indicating controller. These units along with necessary piping are fitted on the support frame. The setup is to be designed for tabletop placement and access. The controller is to be connected to computer through USB for monitoring and controlling the process. User friendly software will be supplied along with the hardware to perform different set of experiments.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>• Differential Pressure : Output 4-20 mA.</li> <li>• Flow Transmitter</li> <li>• Orifice-meter : Material Stainless Steel.</li> <li>• Water Circulation : FHP Pump, Standard/Champion make.</li> <li>• Water Tank : Material Stainless Steel</li> <li>• Flow Measurement : By Rotameter.</li> <li>• Control Valve : Compatible capacity with Pneumatic Actuator.</li> <li>• I/P converter : Input 4-20mA, Output 3-15 PSIG</li> <li>• Pressure Regulator : 0-2 kg/cm<sup>2</sup>.</li> <li>• Pressure Gauge : Bourdon type, 0-2 kg/cm<sup>2</sup></li> <li>• Interfacing unit : For input-output communication with auto/manual facility</li> <li>• Micro-processor Controller : PID Setting, auto tuning</li> <li>• Software : For experimentation, PID control, Data logging, trend plot, offline analysis and printing.</li> <li>• An English instruction manual consisting of experimental procedures, block Diagram etc. must be provided along with the Apparatus.</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint</li> </ul>	<b>1</b>
	<p><b>TEMPERATURE CONTROL TRAINER</b></p> <p><b>DESCRIPTION:</b>  The Temperature Process Trainer is to be designed to understand the elements of a temperature process and its control. It consists of a process tank fitted with a heater to heat the water. The tank having inflow and outflow pipelines for continuous water supply should have provisions of viewing and controlling the flowrate by a rotameter. The temperature of the outflow to be measured by a RTD temperature transmitter. The heater supply to be controlled by a digital indicating controller by means of a solid state relay (SSR). All the units along with necessary piping are fitted on the support frame. The setup to be designed for tabletop placement and access. The controller is connected to computer through USB for monitoring and controlling the process. User friendly software must be supplied along with the hardware to perform different</p>	<b>1</b>

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	<p>set of experiments.</p> <p><b>TECHNICAL DETAILS :</b></p> <ul style="list-style-type: none"> <li>• Temperature Transmitter : RTD type</li> <li>• Process tank : Material Stainless Steel</li> <li>• Heater : Nichrome Wire Heater</li> <li>• Flow Measurement : By Rotameter</li> <li>• Interfacing unit : For input-output communication with auto/manual facility</li> <li>• Micro-processor Controller : PID Setting, auto tuning, fully programmable with serial communication</li> <li>• Software : For experimentation, PID control, Data logging, trend plot, offline analysis and printing.</li> <li>• An English instruction manual consisting of experimental procedures, block Diagram etc. must be provided along with the Apparatus</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	
3.	<p><b>THERMOCOUPLE AND THERMOMETER SET</b></p> <p><b>DESCRIPTION:</b> The setup to be consisted of a Heat source controlled with the help of digital temperature controller at any preset value. A thermometer/thermocouple pocket is to be provided to insert the thermometer/thermocouple in it. The time constant of different thermometer/thermocouple to be calculated with the set-up. A stopwatch is also provided for measurement of time. A Heat sink is also to be fitted to cool down the thermometer/thermocouple. All components are to be assembled on a base plate to form table top set-up.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>• Heat Source : To be provided with insulation.</li> <li>• Heater : Nichrome Wire Heater.</li> <li>• Temp. Controller : Digital Temperature controller</li> <li>• Thermometer : Glass Thermometer</li> <li>• Thermocouple</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. will be provided along with the Apparatus.</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	1
4.	<p><b>INTERACTING AND NON-INTERACTING SYSTEM</b></p> <p><b>DESCRIPTION:</b> The setup to be designed to study the dynamic response of single and multi capacity processes when connected in interacting and non-interacting mode. It would be combined to study 1) Single capacity process, 2) Non-interacting process and 3) Interacting process. Provisions should be made to observe the step response of the tank level in different mode and further compare it with mathematically predicted response. The setup is to consists of supply tank, pump for water circulation, rotameter for flow measurement, transparent tanks with graduated scales, which can be connected, in interacting and non-interacting mode. The components to be assembled on frame to form tabletop mounting.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>• Process tank: Acrylic, Cylindrical with graduated scale</li> <li>• Supply tank : SS304</li> </ul>	1

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	<ul style="list-style-type: none"> <li>• Flowrate measurement: Rotameter</li> <li>• Pump : Fractional horse power</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. will be provided along with the Apparatus.</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	
5.	<p><b>THERMOMETER AND U-TUBE MANOMETER SYSTEM</b></p> <p><b>DESCRIPTION:</b> The set-up is to be designed to study the characteristics of a Thermometer and U Tube manometer. Setup must consist of ‘U’ tube manometer, heating bath, thermometer, thermo well, beeper for recording observations and timer for heater on-off operation. The components are to be mounted on base plate and must be tabletop mountable.</p> <p><b>TECHNICAL DETAILS:</b></p> <ul style="list-style-type: none"> <li>• Thermometer with Thermowell</li> <li>• ‘U’ Tube Manometer</li> <li>• Heating Bath : Stainless Steel 304.</li> <li>• Heater Type : Electrical</li> <li>• An English instruction manual consisting of experimental procedures, block diagram etc. will be provided along with the Apparatus.</li> <li>• The whole set-up to be designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>	1

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## 5. ENGINE LAB

SL No	Description	Quantity						
1.	<p><b>IC ENGINE TEST SETUP 1 CYLINDER, 4 STROKE, MULTIFUEL, VARIABLE COMPRESSION RATIO WITH ENGINE PERFORMANCE ANALYSIS SOFTWARE</b></p> <p><b>TECHNICAL DETAILS :</b> Required Features:</p> <ul style="list-style-type: none"> <li>• Fuel Control with fuel table</li> <li>• Barometric Pressure, Acceleration, Deceleration, Battery, Air Temp, Coolant Temp and Starting compensations Live Data measurement</li> <li>• Adjustable injection timing control</li> <li>• Adjustable ignition control</li> <li>• Built in igniters</li> <li>• Diagnostic features</li> <li>• Ethernet connection</li> </ul> <p>Engine : Single cylinder, 4 stroke, water cooled, stroke 110 mm, bore 87.5 mm, 661 cc.</p> <ul style="list-style-type: none"> <li>• Diesel mode : 3.5 KW, 1500 rpm, CR range 12-18, Injection variation :0-25° BTDC</li> <li>• Petrol mode : 3.5 KW@ 1800 rpm, Speed range 1200-1800 rpm, CR range 6-10</li> <li>• Dynamometer : Type eddy current, water cooled, with loading unit Propeller shaft with universal joints</li> <li>• Air box : MS fabricated with orifice meter &amp; manometer</li> <li>• Fuel tank : Capacity 15 lit, Type : Dual compartment, with fuel metering pipe of glass</li> <li>• Calorimeter : Type Pipe in pipe</li> <li>• Piezo sensor : Combustion: Range 5000 PSI, with low noise cable, Diesel line: Range 5000 PSI, with low noise cable</li> <li>• Temperature sensor : Type RTD, Thermocouple type K Programmable</li> <li>• Open ECU : For Petrol Mode, full build potted enclosure, Sensors for ECU :Air temp, coolant temp, Throttle position and trigger Engine Control hardware: Fuel injector, Fuel pump, ignition coil, idle air</li> <li>• Digital voltmeter Range 0-200mV, panel mounted</li> <li>• Crank angle sensor: Resolution 1 Deg, Speed 5500 RPM with TDC pulse.</li> <li>• Data acquisition device: USB-6210, 16-bit, 250ks/s</li> <li>• Load indicator: Digital, Range 0-50 Kg, Supply 230VAC, Load sensor: Load cell, type strain gauge, range 0-50 Kg, Fuel flow transmitter: DP transmitter, Range 0-500 mm WC Air flow transmitter :Pressure transmitter, Range (-) 250 mm WC</li> <li>• Software: "IC-Engine Soft" Engine performance analysis software</li> <li>• ECU software :Monitor &amp; Viewer software, Two year warranty for all defect including replacement parts if any</li> </ul>	1						
2.	<p><b>FLUE GAS ANALYZER</b></p> <table border="1"> <thead> <tr> <th>DESCRIPTION</th> <th>SPECIFICATIONS</th> </tr> </thead> <tbody> <tr> <td>The Portable Flue Gas Analyser shall be compact, easy to operate.</td> <td>The Instrument should be Microprocessor based, well-engineered to minimize Maintenance and Servicing.</td> </tr> <tr> <td>The analyser should have built-in Multi Output facilities</td> <td>like Data Logger, RS232 Interface and USB Interface.</td> </tr> </tbody> </table>	DESCRIPTION	SPECIFICATIONS	The Portable Flue Gas Analyser shall be compact, easy to operate.	The Instrument should be Microprocessor based, well-engineered to minimize Maintenance and Servicing.	The analyser should have built-in Multi Output facilities	like Data Logger, RS232 Interface and USB Interface.	1
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The analyser shall be operated	with Built-in Rechargeable Battery & Mains.
The analyser shall be Ideal for both	Combustion Efficiency Improvement and monitoring levels of Pollutant Gases.
Sensors specification: Parameter	Sensor Type/ Range /Repeatability/ Resolution
Oxygen	Electrochemical/ 0-25.0%/ ± 1%/ ± 0.01% v/v
CO	Electrochemical /0-10000ppm/ '±5% of reading for <200 to 2000 ppm ±10% of reading upto >2000 ppm,±10 ppm for 0 to 199ppm/ ± 1ppm
CO2	INFRARED /0-20% v/v/ ± 1%/ ± 0.1% v/v
NO	Electrochemical/ 0-4000ppm/ '±5% of reading upto <2000 ppm ±10% of reading upto >2000 ppm/ ± 1ppm
HC	Electrochemical /Methane: 100 to 40,000 ppm, Propane: 100 to 21,000 ppm, Butane: 100 to 18,000 ppm/ ±2%/ 10ppm
SO2	Electrochemical /0-5000ppm/±5% of reading upto <2000 ppm ±10% of reading upto >2000 ppm/ ± 1ppm
Analyser shall have standard SS Probe	(Appx. Length 300mm to 500 mm), Filter provided at the handle to avoid dust from entering the Probe tube.
The Analyser is modular, to enable expansion in future even though the initial configuration	is for 6 Gas Sensors.
Analyser shall have a built-in	diagnostics for effective fault finding and status of cell emf, cell zero and cell life, along with filter counts.
It is preferable to have	auto purging option of System on switching off.
Analyser shall have	backlit, high Resolution colour LCD, Interactive and user friendly Keypad for programming various values / Inputs, Highly reliable Electronic Circuitry with ease of push button operations.
It is preferable to have calculation options like	Efficiency Calculations, Loss and Excess Air.
Analyser shall allow user to	Manually calibrate for various Sensors using Standard Calibration Gases.
The Gas readings shall be displayed values in units	like ppm or mg/m <sup>3</sup> or lb/mBtu or ng/J. These Options should be user selectable from the system menu.

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## **TERMS & CONDITIONS**

### **1. Tender filling up and submission**

- a. Tender offer must refer to the letter/Notice inviting the Tender.
- b. The bid should mention “Tender for Supply, Installation & Operation of Laboratory Equipment at Common Laboratory Hall, Assam Energy Institute, Sivasagar” to Rajiv Gandhi Institute of Petroleum Technology, Jais, Amethi.
- c. Bids must be submitted only against above mentioned tender.
- d. The prices can be quoted in Indian Rupees, both in figures and in words and the same will be considered for price comparison. Where there is a difference between the two, the rates given in words will be taken as authentic. Should there be any discrepancy between unit rate and amount, the unit rate will be considered as the correct one.
- e. The rates quoted should include freight charges up to Assam Energy Institute, Sivasagar clearly mentioning the percentage/rate of GST and the rates quoted should be valid for at- least 180 days from the date of opening of the quotation. The rates must be quoted both in figures and words and overwriting should be avoided. However, all cuttings/corrections must be duly authenticated.
- f. The bid submitted must not contain any ambiguity. Any such ambiguity in the quote submitted shall make it liable for rejection.
- g. The tender document is not transferable.
- h. No amendment to the bid in any form by the bidder will be permitted after opening of the tender. No conditional offers shall be accepted.
- i. Submission of bid will bind the bidder to the acceptance of all conditions specified in the tender document.
- j. Canvassing in any form is for bidden and will be a criterion for disqualification.
- k. All interested eligible tenderers/bidders are invited to submit their best competitive bids as per the criteria given in this tender document. Kindly submit your bids in two parts as under:
  - a) Technical bid (Part-1) consisting of all technical details along with commercial terms and conditions and
  - b) Price bid (Part-2) indicating item-wise price for the items mentioned in the technical bid.The bidder should also submit an undertaking to abide by all the terms and conditions laid down in the tender document along with the technical bid.

### **Tender Cost**

- a. The bidder should pay the tender processing fee online.
- b. In addition, for MSME firms, the tenderers who are currently registered and, also, will continue to remain registered during the tender validity period body specified by Ministry of Micro, Small

&Medium Industry under MSME are exempted from payment of earnest money & Tender fees.  
In case the tenderer falls in these categories, it should furnish details.

2. **EMD (Earnest Money Deposit):**

The EMD should be paid online.

- a. The EMD of the unsuccessful bidders will be returned after final award of the Job to a successful bidder/ acceptance of the tender and within reasonable time not exceeding six months from the date of opening of Tender. The EMD will carry no interest.
- b. The EMD will be forfeited if the bidder withdraws his offer before finalization of the tender.
- c. The EMD of successful bidder will be returned after the submission of Performance Security.
- d. The firms registered with DGS&D, MSME & NSIC, if any, are exempted from payment of EMD provided such registration includes the item they are offering which are manufactured by them and not for selling products manufactured by other companies. **(Latest Copy must be submitted for claiming exemption).**

3. **Performance Security:**

The successful bidder will provide “Performance Security” for an amount of 10% of the contract value in the form of valid Account payee Demand Draft/ FDR from a scheduled bank favouring “Rajiv Gandhi Institute of Petroleum Technology” payable at RGIPT, Jais, Amethi Campus Branch. Performance security should remain valid at least for a period of 180 days beyond the date of completion of all contractual obligations of supplier **(Total Period of FDR/Demand Draft – Warranty Period plus 180 days)**. Thereafter the security will be returned, provided there is no defect in the equipment supplied.

4. **Evaluation Criteria:**

The order will be awarded to the vendor, who fulfils all the technical specifications, terms& conditions mentioned in the tender document for Technical Bid and whose rate is L1 in grand total for a particular laboratory in Price Bid. A vendor has the option to bid for one, some or all the laboratories. Evaluation of Lowest bid will be calculated on the total price of all items tendered for basic equipment along with accessories, packing & forwarding, Installation & Commissioning, GST and other charges etc. as mentioned in the tender (Bidder must submit the technical bid & price bid separately). The price bid will be opened only of those firms, who will be found technically qualified after evaluation of their technical bids.

5. **Bid Validity:**

The bid must be valid for at least 180 days from the date of opening of Technical Bid.

6. **Payment terms:**

100% payment will be released against successful supply of equipment at site i.e. Assam Energy Institute, Sivasagar, erection, installation, commissioning, testing, demonstration of supplied equipment and training

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of designated personnel and subject to submission of original Bill/ Invoice as certified by the Indenter.

**7. Clearance and delivery:**

On arrival of shipment/consignment, the supplier is required to arrange custom clearance and transportation of the consignment up to Assam Energy Institute, Sivasagar premises. The Tenderer/ bidder will do all types of clearance work and formalities to deliver/provide the equipment at the site of installation.

The expenses incurred will be reimbursed on actual basis not exceeding the quoted amount. Institute will provide all types of documentary support including Customs Duty exemption certificate. The custom duty, custom clearance charges, transportation charges etc. will be reimbursed in Indian Rupees on subject of submission of documentary proof. This may be included in your quotation as a separate item. Principals will themselves have to procure any requisite permission from the Govt. of country of origin of equipment.

**8. Part Shipment not allowed:**

Part Shipment will NOT be allowed.

**9. Insurance:**

For delivery of goods at the purchaser's premises, the insurance shall be obtained by the supplier in an amount equal to 110% of the value of the goods from "Warehouse to Institute" (final destination) on "All Risks" basis including War Risks and Strikes. The insurance shall be valid for a period of not less than 3 months after installation and commissioning. If orders placed on CIF/CIP basis, the insurance should be up to Assam Energy Institute, Sivasagar.

**10. Bank Charges:**

All the bank charges within India will be borne by the Institute and outside India will be borne by the Supplier.

**11. Site Preparation:**

The supplier shall inform to the Institute about the site preparation, if any, needed for the installation of equipment, immediately after the receipt of the purchase order. The supplier must provide complete details regarding space and all the other infrastructural requirements needed for the equipment, which the Institute may arrange before the arrival of the equipment to ensure its timely installation and smooth operation thereafter. The supplier shall visit the Institute and see the site where the equipment is to be installed and may offer his advice and render assistance to the Institute in the preparation of the site and other pre-installation requirements.

**12. Resolution of Disputes:**

The dispute resolution mechanism to be applied pursuant shall be as follows:

- a. In case of Dispute or difference arising between the Purchaser and a domestic supplier relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996, the rules there under

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and any statutory modifications or re-enactments thereof shall apply to the arbitration proceedings. The dispute shall be referred to the Director, Rajiv Gandhi Institute of Petroleum Technology, Jais, Amethi and if he is unable or unwilling to act, to the sole arbitration of some other person appointed by him willing to act as such Arbitrator. The award of the arbitrator so appointed shall be final, conclusive and binding on all parties to this order.

- b. In the case of a dispute between the purchaser and a Foreign Supplier, the dispute shall be settled by arbitration in accordance with provision of sub-clause (a) above. But if this is not acceptable to the supplier then the dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules.
13. Live working product Demo of the equipment (at the cost of bidder) for all the bidders, if asked for, within the ONE week of opening the technical bid.
14. **Printed Conditions of the Company – Not Acceptable to the Institute:**  
RGIPT does not accept the printed conditions of any Tenderer. It will be ignored without any reference; hence tenderers should withdraw such printed conditions if they have any. RGIPT shall accept only unconditional tender.
15. **Technical Deviations – Sole discretion of RGIPT for consideration:**  
If technical deviations furnished by the Tenderer are not agreeable to RGIPT, the offers may be ignored. However it will be solely at discretion of RGIPT to consider the technical deviations OR not for considering the Tenderer. No correspondences of the Tenderer will be entertained in this matter.
16. **Price Validity:**  
The price quoted by the bidder shall remain valid till the supply is completed. During the tenure of the supply period, no price increase will be considered, except for change in statutory levies imposed by Central Govt. / state Govt. or Local authorities.
17. **Warranty:** All equipment should have 2 years of warranty period from the date of successful installation
18. **Delivery:**  
The timely delivery of “Laboratory Equipment at Common Laboratory Hall, Assam Energy Institute, Sivasagar” is the essence of contract. The supply should be completed with the specified delivery. Delivery shall be completed within maximum 45 days from the placement of purchase order.
19. **Bid Acceptance and Rejection:**
  - a. RGIPT reserves the right to reject the bid without assigning any reason whatsoever.
  - b. RGIPT does not bind itself to accept the lowest or any quotation and reserves the right to reject any or all without assigning any reason.
20. **Late Receipt of Bids:**  
No bids will be accepted or considered after the due date and time.
21. **Liquidity Damage Clause:**

In case of any damages and delay in supply of material, liquidated damages at the rate of 0.5% of the order value per day of delay or part thereof, subject to a maximum of 5% of the order value shall be recovered from the vendor's bill/invoice.

**22. Withdrawal of Tender:**

The Institute reserves the right to withdraw the tender at any stage of tendering process with the approval of the Competent Authority.

**23. Replacements of Goods Broken, Damaged or Short:**

If whole or part of the goods/ equipment supplied against the order is found defective/ non-functional or without specification the supplier will have to replace the defective goods/equipment to make equipment operational within a reasonable time (not exceeding two months from the date of intimation to the supplier), failure to which the supplier will have to refund the full cost of the equipment including freight, Insurance etc.

24. A quotation submitted with false information will not only be rejected but the vendor may also be debarred for participation in future tendering processes.

25. Authorized representative may choose to be present at the time of opening of quotation at their own cost.

**26. Each bidder who will participate in the tender/bid for one, some or all the laboratories will make sure that each and every Equipment/instruments listed in the Technical Specification (Annexure A) for that particular laboratory(s) will have to be supplied otherwise their bid will be rejected without any intimation.**

**27. Each bidder should have at least 4 years performance of supplying the Laboratory Equipment mentioned in this tender in various IIT/NIT/Other National Level Institute in India. PO copy should be attached.**

**28. Each Bidder should have at least 3 years of performance of Services/Maintenance of Laboratory Equipment mentioned in this tender in various IIT/NIT/Other National Level Institute in India.**

**29. A bidder can submit bid for one, some or all the laboratories. But Only one PRICE BID should be submitted for each laboratory. A bidder, who submits more than one PRICE BID for a single laboratory, shall be disqualified and considered non-responsive.**

**Documents required for eligibility in the tender**

Sl. No.	Description	Uploaded//Not uploaded
	<b>The EMD of INR 1,48,780/- (Rupees One Lakh Forty Eight Thousand Seven Hundred Eighty and Zero Paisa Only)</b> is to be paid only through Demand Draft. If the EMD is not paid, then the bid will be automatically rejected.	
1	Technical Specification Compliance Statement <b>-(On the letter head of the Company) – Annexure -1</b>	
2	Manufacturer’s Authorization Form – In defined format OR Self Declaration of Manufacturing Unit – <b>Annexure – 2</b>	
3	Price Reasonability Certificate – In defined format <b>(On the letter head of the Company)- Annexure – 3</b>	
4	Declaration Certificate (Acceptance of terms & conditions of the tender) – In defined format (On the letter head of the Company) - <b>Annexure – 4</b> and Declaration Sheet as per <b>Annexure - 4A</b> .	
5	As on date of submission of the proposal, the Bidder is neither blacklisted by Central Government/ State Government or Instrumentalities thereof nor is any criminal case against the Bidder/ its Partners/ Directors/ Agents pending before any court of law. Non-Blacklisting Certificate on Rs. 100.00 non-Judicial Stamp Paper – In defined format - <b>Annexure - 5</b>	
6	Copy of Firm Registration	
7	Copy of PAN Card & GST No.	
8	Bidder should have at least 4 years’ experience in the selling and 3 years’ experience providing service (related Equipment) to reputed Central Government Institutes/Engineering Colleges/ Universities/ Oil Companies/PSUs/Research Institutes/ IITs/ NITs/ IISERs (Self Declaration) – List of Clients & Purchase Orders of “Laboratory Equipment mentioned in this tender” to be submitted.	
9	The Bidder or their OEM should possess any valid standard certification like ISO 9001:2008 & 14001:2004.	
10	Bidder should enclose the copies of last 3 years Audited Annual Accounts (Balance Sheet and Profit & Loss A/c) duly authenticated by Chartered Accountant	
11	Last three years CA certified turnover certificate ( <b><u>Average Turnover of last three years should be Rs.15 lakhs (Rupees Fifteen lakhs only)</u></b> )	
12	Last 3 year Income Tax Return (ITR)	
13	In case of exemption of EMD, the scanned copy of the document in support of exemption will have to be uploaded by the bidder during bid submission	
14	<b>MOST IMPORTANT:</b> Document related to prior installation and service – At least 3 Academic and R&D National Organizations, Central and State Government Departments/ Institutions/ PSU in the last 3 years. <b>Annexure – 6</b>	

Place:

Date:

Signature and seal of the Manufacturer/ Bidder

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**MANUFACTURERS' AUTHORIZATION FORM (MAF)  
(ON THE LETTER HEAD OF THE COMPANY)**

**[NOTE:** The Bidder shall require the Manufacturer to fill in this Form in accordance with the instructions indicated. This letter of authorization should be **on the letterhead of the Manufacturer** and should be signed by a person with the proper authority to sign documents that are binding on the Manufacturer. It should be included by the Bidder in its bid]

No. Dated

Date: **[insert date (as day, month and year) of Bid Submission]**

Tender No.: **[insert number from Invitation for Bids]**

To, Director  
Rajiv Gandhi Institute of Petroleum Technology  
Mubarakpur, Mukhtia, Bahadurpur  
POST: Harbanshganj, Jais, Amethi - 229304

WHEREAS

We **[insert complete name of Manufacturer]**, who are official manufacturers of **[insert type of goods manufactured]**, having factories at **[insert full address of Manufacturers factories]**, do hereby authorize **[insert complete name of Bidder]** to submit a bid the purpose of which is to provide the following Goods, manufactured by us **[insert name and or brief description of the Goods]**, and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with the General Conditions of Contract, with respect to the Goods offered by the above firm.

**Signed:** **[insert signature(s) of authorized representative(s) of the Manufacturer]**

**Name:** **[insert complete name(s) of authorized representative(s) of the Manufacturer]**

**Title/Designation:** **[insert title]**

**Duly authorized to sign this Authorization on behalf of:** **[insert complete name of Bidder]**

Dated on day of,,**[insert date of signing]** Yours faithfully,

(Name of manufacturers)

**OR**

**SELF DECLARATION OF MANUFACTURING UNIT**

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**PRICE REASONABILITY CERTIFICATE**  
(ON THE LETTER HEAD OF THE COMPANY)

It is certified that the rates quoted against Tender No. ....

Dated.....for the items vide our bid No.  
..... dated .....are exclusively for supply  
to ACADEMIC and RESEARCH Institutions and are not more than as charged to other Govt./PSU's for  
similar supplies made in recent past. If they have been approved by the Director, RGIPT and if at any  
stage it has been found that the quoted rates are higher than the rates applicable to supply to Government  
then in such condition RGIPT, Amethi, will have the right to cancel the approved rates and to take legal  
action against the tenderer.

Yours faithfully,

(Name of manufacturers)

(Signature with date)

(Name and designation)

Duly authorized to sign tender for and on behalf of

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**DECLARATION (ACCEPTANCE OF TERMS & CONDITIONS)**  
(ON THE LETTER HEAD OF THE COMPANY)

1. I,.....Son/Daughter of Shri  
.....Proprietor/ Partner/CEO/MD/Director/Authorized  
Signatory of M/s ..... am competent to sign this tender document.
2. I have carefully read and understood all the terms and conditions of the tender and hereby convey my acceptance of the same.
3. The information/ documents furnished along with the above application are true and authentic to the best of my knowledge and belief.
4. I/ we/ am are well aware of the fact that furnishing of any false information/ fabricated document would lead to rejection of my tender at any stage besides liabilities towards prosecution under appropriate law.
5. Each page of the tender document and papers submitted by my Company is authenticated, sealed and signed, and I take full responsibility for the entire documents submitted.

Date: .....

.....

-----

Place: .....  
Person

Signature of the Authorized

Full Name: .....

Company Seal: .....

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### DECLARATION SHEET

We, \_\_\_\_\_ hereby certify that all the information and data furnished by our organization with regard to this tender specification are true and complete to the best of our knowledge. I have gone through the specification, conditions and stipulations in details and agree to comply with the requirements and intent of specification.

This is certified that our organization has been authorized (Copy attached) by the OEM to participate in Tender. We further certified that our organization meets all the conditions of eligibility criteria laid down in this tender document. Moreover, OEM has agreed to support on regular basis with technology / product updates and extend support for the warranty.

The prices quoted in the price bids are subsidized due to academic discount given to RGIPT, Jais, Amethi.

We, further specifically certify that our organization has not been Black-Listed/ De Listed or put to any Holiday by any Institutional Agency/ Govt. Department/ Public Sector Undertaking in the last three years.	
1. Phone	
2. Fax	
3. E-mail	
4. Contact Person Name	
5. Mobile Number	
6. TIN Number	
7. PAN Number	

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8.. Kindly provide bank details of the bidder in the following format: a) Name of the Bank	
b) Account Number	
c) Kindly attach scanned copy of one Cheque book page to enable us to return the EMD to unsuccessful bidder	

(Signature of the Tenderer)

Name:

Seal of the Company

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**NON-BLACKLISTING DECLARATION**

It has been certified that all information provided in tender form is true and correct to the best of my knowledge and belief. No forged / tampered document(s) are produced with tender form for gaining unlawful advantage. We understand that RGIPT, Amethi is authorized to make enquiry to establish the facts claimed and obtain confidential reports from clients.

In case it is established that any information provided by us is false / misleading or in the circumstances where it is found that we have made any wrong claims, we are liable for forfeiture of EMD and or any penal action and other damages including withdrawal of all work/purchase orders being executed by us. **Further RGIPT, Amethi is also authorized to blacklist our firm/company/agency and debar us in participating in any tender/bid in future.**

I / We assure the Institute that neither I / We nor any of my / our workers will do any act/s which is improper / illegal during the execution in case the tender is awarded to us.

Neither I/We nor anybody on my/our behalf will indulge in any corrupt activities/practices in my/our dealing with the Institute.

**Our Firm/Company/Agency is not been blacklisted or banned by any Central Government Department/ State Government Department, PSU, University, Autonomous Institute or Any other Govt. Organization.**

Date

Signature of the Tenderer

Place

Stamp

**Note: This certificate should be executed on duly notarized INR 100/- Non Judicial StampPaper.**

Terms & conditions mentioned above are accepted

Signature of Contractor  
Official Seal

**List of Govt. Organization/Department/Institutes**

<b>List of Government Organization/Department/Institutes for whom the Bidder has undertaken such work during last three years (must be supported with work orders)</b>		
<b>Name of the Organization</b>	<b>Name of Contact Person</b>	<b>Contact No.</b>

(Signature of the Tenderer)

Name:

Seal of the Company

Terms & conditions mentioned above are accepted

Signature of Contractor  
Official Seal



## **CHECKLIST FOR SUBMISSION OF DOCUMENTS FOR PRICE BID**

### **For Exemptions:-**

1. For Customs duty exemption in terms of Govt. Notification No. 51/96- Customs dated 23.07.1996& 28/03 Customs dated 01.03.2003 and Central Excise duty Exemption in terms of govt. Notification No. 10/97- Central Excise dated 01.03.1997 & 28/13- Central Excise dated 01.10.2013.  
Institute DSIR Notification No. TU/V/RG-CDE(1083)/2016 dated:03.02.2017 Valid up to 31.08.2021
2. For GST Exemption Notification No. 47/2017- Integrated tax (Rate).

**The Company can bid only in Indian Currency in the given format**

**The bidder may add rows as per requirement to include the prices of all components/ parts, warranties, installation etc. whichever applicable.**

**PRICE BID**– Tender for Supply, Installation & Operation of Laboratory Equipment at Common Laboratory Hall, Assam Energy Institute, Sivasagar

### **Price Bid in Indian Currency:**

- I. **Name of the Bidder/Tenderer:**  
**Name & Model No of offered goods:**

**Tender No.:**

<b>Sl. No.</b>	<b>Details</b>	<b>Total Amount (In INR)</b>
1	Basic Cost of each Laboratory Equipment for each laboratory (name of the Laboratory to be specifically mentioned) at Common Laboratory Hall , AEI, Sivasagar with accessories defined in Technical Specifications Statement of the Tender	
2	<b>Add:</b> Cost of Warranty (2 Year)	
3	<b>Add:</b> Packing & Forwarding Charges, If any	
4	<b>Add:</b> Installation & Commissioning Charges, if any	
5	<b>Add:</b> Transportation Charges up to RGIPT, Jais, Amethi, if any	
6	<b>Add:</b> GST (Taxes)	
<b>Total Price (Sum of Sl. No 1 to 6) F.O.R AEI, SIVASAGAR</b>		

Terms & conditions mentioned above are accepted

Signature of Contractor  
Official Seal

**Note: The Institute will provide DSIR & GST Exemption Certificate.**

Total Bid price in Indian Currency (Equipment Cost with accessories)

In number:.....

In words.....

- a) Name & Address of Supplier
- b) The cost of optional items shall be indicated separately

Date

Signature of the Tenderer

Place

Stamp

Terms & conditions mentioned above are accepted

Signature of Contractor  
Official Seal