



Bid Number: GEM/2022/B/2445357  
Dated: 17-08-2022

*Handwritten signature and date: 17/08/2022*

### Bid Document

Bid Details	
Bid End Date/Time	01-09-2022 18:00:00
Bid Opening Date/Time	01-09-2022 18:30:00
Bid Offer Validity (From End Date)	65 (Days)
Ministry/State Name	Ministry Of Ports, Shipping And Waterways
Department Name	Na
Organisation Name	Indian Maritime University
Office Name	Kolkata Campus
Total Quantity	29
Item Category	Hydraulic Set up for measurement of flow Pressure and Temperature , Pressure transducers Module trainer , temperature transducers , Functioning of Mist Detector , Operation of an Automatic flow pressure level and temperature Controller , Linear valve Quick opening valve Equal percentage valve Plot of characteristics of all valves , Flapper Nozzle Characteristic trainer , I P converter Trainer and P I Converter , Valve positioner training unit with ATO ATC type diaphragm actuator , LVDT Trainer , Strain Gauge Trainer kit , Thermocouple based Temperature measurement , PID trainer kit , Microprocessor Microcontroller based DC motor control , Fuzzy logic trainer , Synchros Trainer Kit
BOQ Title	Process and Control Instruments
Years of Past Experience Required for same/similar service	1 Year (s)
MSE Exemption for Years Of Experience	Yes
Startup Exemption for Years Of Experience	Yes
Document required from seller	Experience Criteria *In case any bidder is seeking exemption from Experience / Turnover Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer
Bid to RA enabled	No
Primary product category	Hydraulic Set up for measurement of flow Pressure and Temperature
Time allowed for Technical Clarifications during technical evaluation	2 Days
Estimated Bid Value	1666000
Evaluation Method	Total value wise evaluation

#### EMD Detail



Advisory Bank	State Bank of India
EMD Percentage(%)	2.00
EMD Amount	33320

**ePBG Detail**

Advisory Bank	State Bank of India
ePBG Percentage(%)	3.00
Duration of ePBG required (Months).	14

(a). EMD EXEMPTION: The bidder seeking EMD exemption, must submit the valid supporting document for the relevant category as per GeM GTC with the bid. Under MSE category, only manufacturers for goods and Service Providers for Services are eligible for exemption from EMD. Traders are excluded from the purview of this Policy.

(b). EMD & Performance security should be in favour of Beneficiary, wherever it is applicable.

**Beneficiary:**

Indian Maritime University - Kolkata Campus  
(.)

**Splitting**

Splitting Applied	Yes
Maximum No. Of Bidders Amongst Which Order May Be Split	2

**MII Purchase Preference**

MII Purchase Preference	Yes
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**MSE Purchase Preference**

MSE Purchase Preference	Yes
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1. If the bidder is a Micro or Small Enterprise as per latest definitions under MSME rules, the bidder shall be exempted from the requirement of "Bidder Turnover" criteria and "Experience Criteria". If the bidder is OEM of the offered products, it would also be exempted from the "OEM Average Turnover" criteria. In case any bidder is seeking exemption from Turnover / Experience Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer.
2. If the bidder is a Startup, the bidder shall be exempted from the requirement of "Bidder Turnover" criteria and "Experience Criteria". If the bidder is OEM of the offered products, it would also be exempted from the "OEM Average Turnover" criteria. In case any bidder is seeking exemption from Turnover / Experience Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer.
3. Experience Criteria: In respect of the filter applied for experience criteria, the Bidder or its OEM {themselves or through reseller(s)} should have regularly, manufactured and supplied same or similar Category Products to any Central / State Govt Organization / PSU / Public Listed Company for number of Financial years as indicated above in the bid document before the bid opening date. Copies of relevant contracts to be submitted along with bid in



support of having supplied some quantity during each of the Financial year. In case of bunch bids, the category of primary product having highest value should meet this criterion.

4. Preference to Make In India products (For bids < 200 Crore): Preference shall be given to Class 1 local supplier as defined in public procurement (Preference to Make in India), Order 2017 as amended from time to time and its subsequent Orders/Notifications issued by concerned Nodal Ministry for specific Goods/Products. The minimum local content to qualify as a Class 1 local supplier is denoted in the bid document. If the bidder wants to avail the Purchase preference, the bidder must upload a certificate from the OEM regarding the percentage of the local content and the details of locations at which the local value addition is made along with their bid, failing which no purchase preference shall be granted. In case the bid value is more than Rs 10 Crore, the declaration relating to percentage of local content shall be certified by the statutory auditor or cost auditor, if the OEM is a company and by a practicing cost accountant or a chartered accountant for OEMs other than companies as per the Public Procurement (preference to Make-in -India) order 2017 dated 04.06.2020. Only Class-I and Class-II Local suppliers as per MII order dated 4.6.2020 will be eligible to bid. Non - Local suppliers as per MII order dated 04.06.2020 are not eligible to participate. However, eligible micro and small enterprises will be allowed to participate .In case Buyer has selected Purchase preference to Micro and Small Enterprises clause in the bid, the same will get precedence over this clause.

5. Purchase preference to Micro and Small Enterprises (MSEs): Purchase preference will be given to MSEs as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned Ministry. If the bidder wants to avail the Purchase preference, the bidder must be the manufacturer of the offered product in case of bid for supply of goods. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises. In respect of bid for Services, the bidder must be the Service provider of the offered Service. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product or service. If L-1 is not an MSE and MSE Seller (s) has/have quoted price within L-1+ 15% (Selected by Buyer) of margin of purchase preference /price band defined in relevant policy, such Seller shall be given opportunity to match L-1 price and contract will be awarded for 25%(selected by Buyer) percentage of total QUANTITY.

6. Estimated Bid Value indicated above is being declared solely for the purpose of guidance on EMD amount and for determining the Eligibility Criteria related to Turn Over, Past Performance and Project / Past Experience etc. This has no relevance or bearing on the price to be quoted by the bidders and is also not going to have any impact on bid participation. Also this is not going to be used as a criteria in determining reasonableness of quoted prices which would be determined by the buyer based on its own assessment of reasonableness and based on competitive prices received in Bid / RA process.

#### Pre Bid Detail(s)

Pre-Bid Date and Time	Pre-Bid Venue
26-08-2022 16:00:00	Indian Maritime University - Kolkata Campus

#### Hydraulic Set Up For Measurement Of Flow Pressure And Temperature

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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#### Technical Specifications

Specification Document	<a href="#">View File</a>
BOQ Detail Document	<a href="#">View File</a>

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.



**Consignees/Reporting Officer and Quantity**

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088,Indian Maritime University - Kolkata Campus P-19, Taratala Road	1	30

**Pressure Transducers Module Trainer**

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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**Technical Specifications**

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**Consignees/Reporting Officer and Quantity**

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088,Indian Maritime University - Kolkata Campus P-19, Taratala Road	2	30

**Temperature Transducers**

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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**Technical Specifications**

Specification Document	<a href="#">View File</a>
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**BOQ Detail Document**

[View File](#)

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

**Consignees/Reporting Officer and Quantity**

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088,Indian Maritime University - Kolkata Campus P-19, Taratala Road	2	30

**Functioning Of Mist Detector**

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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**Technical Specifications**

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**Consignees/Reporting Officer and Quantity**

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088,Indian Maritime University - Kolkata Campus P-19, Taratala Road	1	30

**Operation Of An Automatic Flow Pressure Level And Temperature Controller**

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier)



respectively)

Brand Type	Unbranded
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**Technical Specifications**

<b>Specification Document</b>	<a href="#">View File</a>
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**Consignees/Reporting Officer and Quantity**

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088, Indian Maritime University - Kolkata Campus P-19, Taratala Road	1	30

**Linear Valve Quick Opening Valve Equal Percentage Valve Plot Of Characteristics Of All Valves**

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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**Technical Specifications**

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**Consignees/Reporting Officer and Quantity**



S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088, Indian Maritime University - Kolkata Campus P-19, Taratala Road	1	30

### Flapper Nozzle Characteristic Trainer

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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#### Technical Specifications

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### Consignees/Reporting Officer and Quantity

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088, Indian Maritime University - Kolkata Campus P-19, Taratala Road	3	30

### I P Converter Trainer And P I Converter

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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#### Technical Specifications

Specification Document	<a href="#">View File</a>
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**Consignees/Reporting Officer and Quantity**

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088,Indian Maritime University - Kolkata Campus P-19, Taratala Road	1	30

**Valve Positioner Training Unit With ATO ATC Type Diaphragm Actuator**

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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**Technical Specifications**

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**Consignees/Reporting Officer and Quantity**

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088,Indian Maritime University - Kolkata Campus P-19, Taratala Road	1	30

**LVDT Trainer**

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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**Technical Specifications**



<b>Specification Document</b>	<a href="#">View File</a>
<b>BOQ Detail Document</b>	<a href="#">View File</a>

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**Consignees/Reporting Officer and Quantity**

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088, Indian Maritime University - Kolkata Campus P-19, Taratala Road	3	30

**Strain Gauge Trainer Kit**

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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**Technical Specifications**

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**Consignees/Reporting Officer and Quantity**

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088, Indian Maritime University - Kolkata Campus P-19, Taratala Road	3	30

**Thermocouple Based Temperature Measurement**



(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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**Technical Specifications**

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<b>BOQ Detail Document</b>	<a href="#">View File</a>

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**Consignees/Reporting Officer and Quantity**

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088, Indian Maritime University - Kolkata Campus P-19, Taratala Road	3	30

**PID Trainer Kit**

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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**Technical Specifications**

<b>Specification Document</b>	<a href="#">View File</a>
<b>BOQ Detail Document</b>	<a href="#">View File</a>

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**Consignees/Reporting Officer and Quantity**



S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088, Indian Maritime University - Kolkata Campus P-19, Taratala Road	2	30

### Microprocessor Microcontroller Based DC Motor Control

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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#### Technical Specifications

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#### Consignees/Reporting Officer and Quantity

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088, Indian Maritime University - Kolkata Campus P-19, Taratala Road	2	30

### Fuzzy Logic Trainer

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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#### Technical Specifications

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### Consignees/Reporting Officer and Quantity

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088, Indian Maritime University - Kolkata Campus P-19, Taratala Road	1	30

### Synchros Trainer Kit

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

Brand Type	Unbranded
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### Technical Specifications

Specification Document	<a href="#">View File</a>
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### Consignees/Reporting Officer and Quantity

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Md Sabir Ali	700088, Indian Maritime University - Kolkata Campus P-19, Taratala Road	2	30

### Buyer Added Bid Specific Terms and Conditions

#### 1. Generic

OPTION CLAUSE: The Purchaser reserves the right to increase or decrease the quantity to be ordered up to 25 percent of bid quantity at the time of placement of contract. The purchaser also reserves the right to increase the ordered quantity by up to 25% of the contracted quantity during the currency of the contract at the contracted rates. Bidders are bound to accept the orders accordingly.



## 2. Scope of Supply

Scope of supply (Bid price to include all cost components) : Supply Installation Testing Commissioning of Goods and Training of operators and providing Statutory Clearances required (if any)

## 3. Service & Support

Availability of Service Centres: Bidder/OEM must have a Functional Service Centre in the State of each Consignee's Location in case of carry-in warranty. (Not applicable in case of goods having on-site warranty). If service center is not already there at the time of bidding, successful bidder / OEM shall have to establish one within 30 days of award of contract. Payment shall be released only after submission of documentary evidence of having Functional Service Centre.

## 4. Sample Clause

After award of contract – Successful Bidder shall have to get advance sample approved from buyer before bulk manufacturing / starting bulk supplies. Successful Bidder shall submit 16 samples for Buyer's approval, within 5 days of award of contract. Buyer shall, as per contract specifications framework, either approve the advance sample or will provide complete list of modification required in the sample within 5 days of receipt of advance sample. Seller shall be required to ensure supply as per approved sample with modifications as communicated by Buyer. If there is delay from buyer side in approval of advance sample – the delivery period shall be refixed without LD for the period of delay in sample approval. In case, the sample is found to have major deviations / not conforming to the Contract specifications, the buyer at its discretion may call for fresh samples for approval before allowing bulk supplies or may terminate the contract after notifying the deviations to the seller.

Unless otherwise provided in the contract, all samples required for test shall be supplied by the contractor free of cost. Where under the contract, the contractor is required to submit an advance sample, any expenses incurred by the contractor on or in connection with the production of stores in bulk, before the sample has been approved unconditionally shall be borne by the Seller and he shall not claim any compensation in the event of such sample being found unacceptable by the Buyer / Consignee.

## 5. Warranty

Bidder / OEM has to give an undertaking that after expiry of warranty period, it will provide AMC Service for next 1 years for the offered products at the rate not more than 7 % of contract price per annum. Buyer reserves the right to enter into an AMC agreement ( covering preventive maintenance and servicing)with the Successful Bidder / OEM after expiry of the Warranty period at rate as mentioned above and the payment for the AMC charges would be made Quarterly after rendering of the AMC Services of the relevant AMC period. Performance Security of the successful bidder shall be forfeited if it fails to accept the AMC contract when called upon by the buyer. The original Performance Security of contract will be returned only after submission and verification of AMC Performance Security for 2% of total AMC value valid up to AMC period plus 2 months (if there is no other claim). (Undertaking of acceptance to be uploaded with bid).

## 6. Buyer Added Bid Specific ATC

Buyer Added text based ATC clauses

- 1. Pre-Bid Meeting: Pre-Bid Meeting is scheduled through Video Conference, Intended Bidders who are willing to participate in the Pre-Bid Meeting need to register through the following link: <https://docs.google.com/forms/d/1hIsPts03ax30uGwpCOqq58j9axjqz2blmI22KTHfOXw/edit#responses> The Link will also be available at IMU's Website i.e [www.merical.ac.in](http://www.merical.ac.in). The Link to join the Video Conference Meeting will be sent to registered mail ids One day before the Pre-Bid Meeting date.**



2. **Estimated Cost: Rs. 16,66,000.00**
3. **Warranty - one year from the date of SITC.**
4. **Successful bidder will have to submit 3% of contract value for performance security in form of Insurance Surety bond/ePBG/NEFT/Demand Draft/any government approved performance guarantee as per GFR 2017 in favour of Indian Maritime - Kolkata Campus.**
5. **RISK PURCHASE CLAUSE:** The Employer reserves the right to purchase the material / spares/ equipment /service & works from elsewhere at the sole risk and cost of the Contractor and recover all such extra cost incurred by the Employer in procuring the material, service and works. The procedure to be followed is given below: -
  - a) After the expiry of the specified date of delivery / completion period, if the Contractor fails to deliver the materials/ complete the work a notice will be given to the Contractor for delivering the material/ complete the work immediately.
  - b) If the Contractor fails to deliver the material/complete the work, a final risk and cost notice will be served to the Contractor by registered post with A/D, clearly indicating that if he fails to deliver the materials/ complete the work within 7 days of the receipt of the letter, the same shall be outsourced from other sources at the risk and cost of the Contractor.
  - c) The existing order has to be closed and action will be initiated by the Employer for procurement / completion of work & services of the balance items/ portion. While taking such action the defaulting Contractor may not be given an opportunity against fresh enquiry.
  - d) If it is found that price has come on the higher side then the difference between the original price and the new price will be recovered from the Contractor.
  - e) For the purpose of recovery of the amount, unpaid amount / security deposit by the way of BG as provided by the Contractor will be adjusted first. If there is any balance left to be recovered, the Contractor should be informed to deposit the money at the earliest.
  - f) If he fails to deposit the balance amount no further enquiry will be given as per banning procedure of Indian Maritime University - Kolkata Campus.
  - g) In case the amount is considerable, legal action may be considered by the Employer.
  - h) The Employer will have the right to re-purchase the stores or complete the work, to meet urgency in requirement caused by Contractor's failure to comply with the schedule of delivery or completion of the work or services irrespective of the fact whether the materials / equipment/ work/ services are similar or not.
6. **Cancellation of Tender:**

Notwithstanding anything specified in this bidding document, Purchaser / Indian Maritime University - Kolkata Campus at its sole discretion, unconditionally and without assigning any reason, reserves the right:

  - 6.1 To accept OR reject lowest bid or any other bid or all the bids.
  - 6.2 To accept any bid in full or in part.
  - 6.3 To reject the bid offer not confirming to the tender's terms.
  - 6.4 To give purchase preference to Public Sector undertakings when applicable as per



## Disclaimer

The additional terms and conditions have been incorporated by the Buyer after approval of the Competent Authority in Buyer Organization. Buyer organization is solely responsible for the impact of these clauses on the bidding process, its outcome, and consequences thereof including any eccentricity/restriction arising in the bidding process due to these ATCs and due to modification of technical specifications and/or terms and conditions governing the bid. Any clause incorporated by the Buyer such as demanding Tender Sample, incorporating any clause against the MSME policy and Preference to make in India Policy, mandating any Brand names or Foreign Certification, changing the default time period for Acceptance of material or payment timeline governed by OM of Department of Expenditure shall be null and void and would not be considered part of bid. Further any reference of conditions published on any external site or reference to external documents/clauses shall also be null and void. If any seller has any objection/grievance against these additional clauses or otherwise on any aspect of this bid, they can raise their representation against the same by using the Representation window provided in the bid details field in Seller dashboard after logging in as a seller within 4 days of bid publication on GeM. Buyer is duty bound to reply to all such representations and would not be allowed to open bids if he fails to reply to such representations. Also, GeM does not permit collection of Tender fee / Auction fee in case of Bids / Forward Auction as the case may be. Any stipulation by the Buyer seeking payment of Tender Fee / Auction fee through ATC clauses would be treated as null and void.

This Bid is also governed by the General Terms and Conditions

In terms of GeM GTC clause 26 regarding Restrictions on procurement from a bidder of a country which shares a land border with India, any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. While participating in bid, Bidder has to undertake compliance of this and any false declaration and non-compliance of this would be a ground for immediate termination of the contract and further legal action in accordance with the laws.

---Thank You---



SI	Laboratory name	Experimental Setup	Technical specification	Required Quantity (Number)
1	Control engineering laboratory	Hydraulic Set up for measurement of flow, Pressure, and Temperature with ON/OFF controller.  Using different transducers (at-least 2 nos.)	The setup consists of 1ph Induction motor 1HP with pump, Tank 100ltr, pressure Gauge and switch, orifice meter, Rota meter, flow meter, flow control valve, U tube manometer, inverted tube manometer, and temperature sensor (Thermostat) with Temperature control with ON/OFF controller	1
2	Control engineering laboratory	Pressure transducers (Module/trainer)  (Operational of Pressure transducers)	Pressure Vessel: shape-cylindrical, material-CRCC, diameter- 4inch, length-12 inch, capacity-10kg/cm <sup>2</sup> , with 1/2" BSP connection. A.F.R. / F.R.L.: 0-10kg/cm <sup>2</sup> , with pressure gauge. Bellows gauge / diaphragm gauge: 0-300 mm Hg / 0-2.5kg/cm <sup>2</sup> / 0-4kg/cm <sup>2</sup> . Bourdon tube pressure gauge: Dial size- 6", Range- 0-4kg/cm <sup>2</sup> Bottom connection- 1/2" BSP connection. Air Compressor: Tank Capacity: 25 liters, Discharge 2CFM, Motor- 2H. P 230-volt Ac Operated. Working Pressure: 5-6 kg/cm <sup>2</sup> .	2
3	Control engineering laboratory	temperature transducers  Module/Trainer	Transducer(4nos) : NTC Thermistor, Platinum RTD, Type K Thermocouple, IC Temperature Sensor .  Heating Element : Wire-Wound Resistance.  Signal Conditioning Circuitry : Instrumentation Amplifier, X 100 Amplifier, DC Amplifier, Comparator, Electronic Switch.  Inout Circuits : Rotary and Slide Potentiometers. Output Circuits : Relay, Buzzer.  Interconnections : 4mm Banana Sockets.  Power Supply : 230 V (+/-)10% 50 Hz  Accessories : Manual set of Patch Cords.	2



4	Control engineering laboratory	Functioning of Mist Detector.	<ul style="list-style-type: none"> <li>• Range (measurement &amp; indication) 0 - 30 ppm, Trend up to 50 ppm</li> <li>• Range (IMO specification) 0 - 15 ppm (according to IMO regulations) Accuracy better than IMO MEPC.107(49)</li> <li>• Electrical power supply 24V - 240V, AC or DC, automatic selection Electrical power consumption. &lt; 10 VA</li> <li>• Sample Oily water from the separator outlet, 0,1 - 4 l/min Sample temperature range. +1°C to +65°C Sample connections R 1/4" Female</li> <li>• Alarm 1 &amp; 2 Set Points 1 - 15 ppm (independently adjustable) Alarm 1 operating delay for annunciation 1 - 540 sec Alarm 2 operating delay for control 1 - 10 sec Alarm contacts 2 independently adjustable contacts Alarm contact operation mode De-energized in Alarm State Alarm ratings 3A, 240V each Alarm output 0 - 20 mA or 4 - 20 mA, for 30 ppm reversible, extolled</li> </ul>	1
5	Control engineering laboratory	Operation of an Automatic flow, pressure/level and temperature Controller.	<ul style="list-style-type: none"> <li>• PID Controller with closed loop control facility</li> <li>• Input supply: 230V/ 50 Hz AC mains</li> <li>• Sensor Input : 0-24V from Controller</li> <li>• PID Control output : 0-10V DC</li> <li>• Orifice assembly</li> <li>• Differential Pressure Transmitter (Honeywell)</li> <li>• Glove Valve</li> <li>• Electric Linear Valve Actuator (Honeywell)</li> <li>• Motor Pump-230V AC, 1/2HP 220V, operated for water circulation in line.</li> <li>• 3 pin electric socket is provided on unit with motor ON/OFF switch</li> <li>• Two Tanks</li> </ul>	1
6	Control engineering laboratory	Linear valve, Quick opening valve, Equal percentage valve, Plot of characteristics of all valves	<p>Control Valve : 3 nos, Characteristics - Linear, Equal (%) &amp; quick opening, Type - pneumatic, size - 1/2", Actuator - 15 square inch, Stroke - 14mm, input - 3-15 PSIG.</p> <p>Water Tank : Material - Stainless Steel, capacity 25 liters.</p> <p>Water Circulation : FHP pump champion/</p>	1



			<p>standard make.</p> <p>Overhead Tank: Material – Stainless Steel capacity: 10liters.</p> <p>Flow Measurement: Rotameter.</p> <p>Pressure Head Measurement: By Single Column Manometer.</p> <p>Pressure Regulator: 0-2kg/cm<sup>2</sup>.</p> <p>Pressure Gauge: Bourdon Type, 0-2kg/cm<sup>2</sup>.</p> <p>Piping: Size ½ ".</p> <p>An English instruction manual consisting of experimental procedures block diagram etc will be provided along with the apparatus.</p> <p>The hole setup is well designed and arranged on a rigid structure painted with industrial PU point.</p>	
7	Control engineering laboratory	Flapper Nozzle Characteristic trainer	<p>A.P.R. / A.F.R. Unit : 0-10kg/cm<sup>2</sup> with pressure gauge.</p> <p>Micrometer: Display Electro Mechanical for Displacement.</p> <p>Pressure Gauge: 0-2kg/cm<sup>2</sup>.</p> <p>Air Compressor : Tank Capacity - 25 liters , Discharge - 2CFM Motor - 2HP 230 V AC Operated, Working Pressure - 5-6kg/cm<sup>2</sup>.</p>	3
8	Control engineering laboratory	I/P converter Trainer And P/I converter	<p>I/P Converter : Input - 4-20mA Output - 3-15 PSI.</p> <p>P/I Converter : Input - 3-15 PSI Output - 4-20mA.</p> <p>Air Pressure Regulator : Range - 0-4.1kg/cm<sup>2</sup>, with pressure gauge.</p> <p>Digital Current Indicator : Supply - 1φ 230V AC Range - 0-20mA.</p> <p>Current Source : Supply - 1φ 230V AC Range - 0-20mA.</p>	1



			Pressure Vessel : Capacity - 2.1kg/cm <sup>2</sup> .	
			Pressure Gauge : Range - 2.1kg/cm <sup>2</sup> .	
9	Control engineering laboratory	<ul style="list-style-type: none"> <li>Valve positioner training unit with ATO/ATC type diaphragm actuator</li> </ul>	<ul style="list-style-type: none"> <li>Direct Acting/Reverse acting/ATO/ATC type diaphragm actuator</li> <li>Valve Positioner</li> <li>AFR</li> <li>Compressor unit</li> <li>Pressure gauges</li> <li>Mechanical linkage</li> <li><b>Spare:</b> Control Valve Positioner Cutaway</li> </ul>	1
10	Control engineering laboratory	LVDT Trainer Kit	DC Linear variable differential transformers, converts changes in physical position into an DC electrical output, complete set up	3
11	Control engineering laboratory	Strain Gauge Trainer kit (Bonded Type)	<ul style="list-style-type: none"> <li>kit Strain in terms of Kilograms on a cantilever beam</li> <li>Measurement System: Physical by Weights and Transducer with electronic instrumentation</li> <li>Transducer: Temperature compensated strain gauges mounted on a stainless steel cantilever beam</li> <li>Type: Cu-Ni foil with polyamide carrier base</li> <li>Gauge Resistance: 350 Ohms (Nominal)</li> <li>Gauge Length: 6 mm</li> <li>Gauge Width: 2.4 mm, Gauge Base: 12.5 mm x 4.3 mm, Gauge Factor: 2:1 (approx)</li> <li>Configuration: Bridge with two arms as strain gauges</li> </ul>	1
12	Control engineering laboratory	Thermocouple based Temperature measurement	Thermocouple and RTD based Temperature measurement with ON/OFF controller of a system	3
13	Control engineering laboratory	PID trainer kit	Closed loop temp control of an Oven With RTD sensor and PID Kit for measurement of P,I, PI & PID through oscilloscope.	2
14	Control engineering laboratory	Microprocessor / Microcontroller based DC motor control	DC motor 1/4HP, 220V, 1500rpm with mechanical loading arrangement, facility for measurement of SCR triggering in oscilloscope, zero crossing detector etc. :	2
15	Control engineering laboratory	Fuzzy logic trainer	<ul style="list-style-type: none"> <li>DC Power Supply</li> <li>Display Meters</li> <li>PC Labview Software Based</li> </ul>	1



			<ul style="list-style-type: none"> <li>• Fuzzy Logic Controller: - A.</li> <li>• Fuzzy Software Controller,</li> <li>• Process Monitoring Mode, Fuzzification Mode, Defuzzifier</li> <li>• B. Computer Interface Adaptor</li> <li>• Synchro transmitter</li> </ul>	
16	Control Lab	Synchros (Trainer Kit)		2