



भारतीय समुद्री विश्वविद्यालय INDIAN MARITIME UNIVERSITY

(जहाजरानी मंत्रालय के अधीन एक केंद्रीय विश्वविद्यालय)
(A Central University under the Union Ministry of Shipping)

कोच्चि परिसर/KOCHI CAMPUS

IMU-KoC/P/SEAMANSHIP/13/2018

12/11/2018

Sub: Notice inviting Sealed Quotation for purchase of Lab equipments – Reg.

The Indian Maritime University, Kochi Campus is inviting sealed quotations for various Lab equipments.

The list of items required along with specifications are enclosed herewith.

The cover should be super scribed as **Quotation for Lab equipments for IMU Kochi Campus** and addressed to

The Director,
Indian Maritime University, Kochi Campus,
South End Reclamation Area, NH-47A,
Near Alexander Parambithara Bridge,
Matsyapuri P O, W Island, Kochi - 682 029"
Tel-0484 2989404

The sealed quotation should reach the above address on or before 03/12/2018 before 5.00 PM.

Thanking You,

Yours faithfully,


Assistant Registrar

REQUIRED LAB EQUIPMENTS

Sl. No.	Description	No. of units required
1.	PNEUMATIC TRAINER KIT	1 No
2.	HYDRAULIC TRAINER KIT	1 No
3.	2 STAGES RECIPROCATING AIR COMPRESSOR	1 No
4.	CENTRIFUGAL PUMP	1 No
5.	MULTI CYLINDER I.C ENGINE TEST RIG	1 No

The detailed specifications are given below.

I PNEUMATIC TRAINER KIT

Supply, erection and commissioning of Pneumatic Trainer Kit as per specification below:

Purpose: For Pneumatic work shop - To conduct experiments on fundamental Pneumatics.

Specification:

1. The Pneumatic kit shall be of Sleek design and portable one with wheels.
2. Provided with standard Aluminium based mounting board (modular type) with all trainer kits so as to make the pick & place of components easier.
3. All the products to be provided with suitable "one touch fittings / Push-in fittings".
4. All the components used shall be of reputed make.
5. The following experiments should be possible to carry out using the kit:
 - a) To learn about the fundamentals of Pneumatics with components FRL Compressor, DC valves, Pressure control Valves, Pneumatic Cylinders, accessories etc. - functions, symbols, working principle & applications.
 - b) To build up a pneumatic circuit with applications like Pick & place, Clamping / de-clamping, Speed & load control in Double Acting cylinder, etc.
6. The Learning Resources - Basics of pneumatics, Different pneumatic Circuits (minimum 7 experiments) and components for it. Vendor to provide the list of experiments with components required.

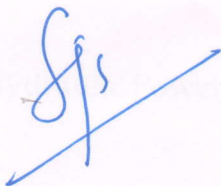


7. Operation & Maintenance manual to be supplied - 2 hard Copies and 1 soft copy with the equipments.

Scope of supply:

The following items (minimum):

1. Air compressors - Displacement 3 cfm, Working pressure - 7 kg/cm² (7 bar) with 0.5 HP 650 RPM electric motor 230V, 50Hz, 1 phase with 0-10 bar pressure gauge & shut off valve with suitable hose and end connector.
2. Filter Regulator and Lubricator (FRL) unit with Pressure gauge (10bar) - 1 No.
3. Direction control valves of different configuration (3/2 way, 5/2 way, 2/2 way & 5/3 way) and different actuations (manual / solenoid operated) of sufficient quantity to execute the experiments. The size of the valves shall be of 1/4" BSP.
4. Set of Pressure control Valves, One way valves, Flow control valves, shut off valves, OR gate & AND gate shuttle Valves, etc. of sufficient quantity to execute the experiments. The size of the valves shall be of 1/4" BSP. The vendor to list down the type, specification and quantity of valves offered.
5. Single acting cylinder - Bore 25mm, Stroke 100mm with suitable mounting arrangement - minimum 1 No. (If required quantity of cylinder is more to carry out the experiment, the same to be supplied).
6. Double acting cylinder - Bore 25mm, Stroke 100mm with suitable mounting arrangement - minimum 2 Nos.
7. Required length and quantity of pneumatic hoses with suitable end fittings of quick snap type, Straight & Tee fittings of required quantity to be provided. 50% extra spares of this hoses and fittings to be supplied.
8. Hand Tools required for carrying out the experiment - 2 sets to be supplied.
9. Required electrical controls with sockets for solenoids, etc.



II HYDRAULIC TRAINER KIT

Supply, erection and commissioning of Hydraulic Trainer kit as per specification below:

Purpose:- For hydraulic work shop to conduct experiments on fundamental Hydraulics.

Specification:

1. The Hydraulic kit shall be of sleek design and portable one with wheels.
2. Provided with standard steel / Aluminium based mounting board (modular type) with all trainer kits so as to make the mounting of components easier.
3. All the products to be provided with suitable quick disconnect couplings.
4. The following experiments should be possible to carry out using the kit:
 - a) To learn about the fundamentals of hydraulics with components (DC valves, pressure control valves, flow control valves, hydraulic Cylinders, accessories, etc.)
 - b) To build up a hydraulic circuit with applications like hydraulic press circuit, clamping / de-clamping, meter-in / meter-out speed control & load control in double acting cylinder, counter-balance circuit, deceleration circuit, sequencing function, etc.
5. The learning resources - basics of hydraulics, different hydraulic circuits (minimum 7 experiments) and components for it. Vendor to provide the list of experiments with components required along with offer.
6. Operation & maintenance manual to be supplied - 2 hard copies and 1 soft copy with the equipments.

Scope of supply:

Vendor to supply the following items (minimum):

- 1) Trolley with Frame:

No. of wheels - 4, Two fixed & two swivel type.
Load mounting capacity: 500 kg

- 2) Hydraulic Power pack with following capacity:



Operating pressure: around 40 bar. Flow rate: around 5 lpm.

The power pack includes the following components:

- a) Hydraulic Tank capacity around 50 litres.
- b) Suitable Pump & electric motor (single phase - 230V, 50 Hz, 1440 rpm induction motor) coupled with bell housing and mounted externally over the tank with vibro-mounts.
- c) Safety relief valve with variable pressure setting.
- d) Accessories like Drain plug, Suction Strainer, Return line Filter, electrical power source for solenoid valves, Valve mounting sub-plates, hydraulic fittings, etc.
- e) Required quantity (min. 8 Nos.) of hydraulic hoses of suitable length with end fittings and quick couplings, transparent hoses on return lines and leakage lines.

3) All types of valves to carry out the experiments proposed. The valves include

- a) Solenoid Operated DC valves - 2 Position and 3 Position types (Solenoid Voltage: 24V DC)
- b) Manual operated DC valves.
- c) Pilot operated DC valve.
- d) Pressure Relief valves.
- e) Pressure reducing valves.
- f) Pressure sequence valves.
- g) Flow control valves.
- h) Non-return Valves.

4) Hydraulic Cylinders:

- a) Single acting cylinder - spring return type (Size: Bore dia. around 20mm x rod dia. 12mm x stroke 200mm)
- b) Double acting cylinder (Size: Bore dia. around 20mm x rod dia. 12mm x stroke 200mm)

Seals: Bushak & Shamban / Merkel / Freudenberg or any other reputed make acceptable to NITT.

Max operating pressure : 100 bar

Normal operating pressure : 40 bar

Piston rod : Chrome plated and hardened.

5) Hydraulic motor:

Type	: Gear motor / Piston motor
Direction of rotation	: Bi-directional
Normal Operating pressure	: 40 bar



Max. Pressure : 100 bar

6) Flow meter

Type : Acrylic hone type flow meter with scale, Rotameter
Working Pressure : around 40 bar

7) Proximity sensor

Type : Contact less Proximity sensor PNP type
Operating voltage : 24 V DC

8) Equipment trays

The required no. of equipment trays to be supplied. The tray design is such that the supplied components can be kept in the tray. Also the trays have space for each individual component.

9) Pressure Gauges

Required quantity of pressure gauges (glycerin filled) of suitable range to measure the pressure at various points (Pressure line, return line, reduced pressure line, suction line, etc.)

10) Cut Models of the following items to demonstrate the functions of each items:

- a) 3-Position Solenoid Operated DC valve.
- b) 2- Position Solenoid Operated DC valve.
- c) Manual operated DC valve.
- d) Pilot operated DC valve
- e) Pressure Relief valves
- f) Pressure reducing valves
- g) Pressure sequence valves
- h) Flow control valves
- i) Non-return Valves
- j) Flow control Check valve
- k) Cartridge Valve (Logic valve)
- l) Double acting Hydraulic Cylinders
- m) Gear Pump
- n) Axial Piston Pump
- o) Bladder / Diaphragm Accumulator
- p) Types of Hose end fittings



q) Solenoid Coil.

III 2 STAGES RECIPROCATING AIR COMPRESSOR

Working pressure - 7kg/cm² (7 bar) 6.0 Kw

IV CENTRIFUGAL PUMP

10 M Head 10 Kw (Appx.) 30cum per hr Cast iron impeller.

V MULTI CYLINDER I.C ENGINE TEST RIG

4- stroke 4 cylinder Diesel engine, developing about 30 H.P. at 3000 R.P.M. Electrical Dynamometer: A suitable capacity generator with water rheostat, load bank & load measurement arrangement.

The unit shall have following accessories:- 1) an ignition switch, 2) a radiator, 3) a self starter, 4) a battery ammeter, 5) a throttle control. Special arrangements by switches for cutting off ignition of each cylinder, all mounted on a suitable panel board, a battery for starting the engine.

BILLS OF QUANTITY

Sl. No.	Description	No. of units required	Rate (Rs.)	GST (Rs.)	Total (Rs.)
1.	PNEUMATIC TRAINER KIT	1 No			
2.	HYDRAULIC TRAINER KIT	1 No			
3.	2 STAGES RECIPROCATING AIR COMPRESSOR	1 No			
4.	CENTRIFUGAL PUMP	1 No			
5.	MULTI CYLINDER I.C ENGINE TEST RIG	1 No			

Terms & Conditions

1. Quotation should have a validity of 30 days from the date of opening of the quotations.
2. L1 will be decided for each item separately.
3. Quotation can be submitted for a single item/multiple items. It is not necessary that bidder should quote for all the items.
4. Rates quoted should be inclusive of GST.



5. Delivery & installation of the items should be made within 30 days from the date of issue of Purchase Order.
6. Payment will be made after satisfactory delivery & installation of the items at Indian Maritime University, Kochi Campus, South End Reclamation Area, NH-47A, Near Alexander Parambithara Bridge, Matsyapuri P O, W Island, Kochi-682029.
7. 1 year site warranty for installation and supplied components should be provided.
8. The University reserves the right to accept in part or in full any quotation (s) or reject any or more quotation (s) without assigning any reason or to cancel the process and reject all quotation(s) at any time prior to award of purchase order, without incurring any liability, whatsoever to the affected bidder or bidder(s).

Thanking You,

Yours faithfully,

Assistant Registrar