COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Govt. of Maharashtra)

Department of Instrumentation and Control

Shivajinagar, Pune – 411005, INDIA.

Tel: +91-20-25507009/7171/7174 Fax: +91-20-25507299 Website:- www.coep.org.in.

Dear Sir,

Sealed Quotations are invited by the Department of Instrumentation and Control from reputed manufactures/ suppliers for the supply of the listed items in attached documents Annexure A.

Enquiry Number:-	COEP/Instru/Tranducerslab/Enq/2017-18/ 1079
Enquiry Date:-	29/07/2017
Instrument Name & Qty:-	**1. Sensors and equipment** **Qty-**As per List Detailed Technical Specification Annexure 'A' Attached
Location:-	Cabin of Head of Department
Quotation Submission Date@ Time:-	30/08/2017@ 4.00pm
Quotation Submission Place:-	Cabin of Head of Department , Instrumentation and Control, COEP
Quotation Opening Place:-	Cabin of Head of Department , Instrumentation and Control, COEP

Terms & Conditions:-

1. Fax and Email quotation are not acceptable.
2. **The taxes, insurance, freight, packing and forwarding charges if any be quoted in Indian Rupees separately**.
3. The rates shall be valid for 90days
4. **Validity**: Quotation Validity at least 90 days from the due date.
5. Quotations shall be sent in sealed envelopes clearly marked **Basic Sensors Laboratory Enquiry Number**, **Enquiry date** and **Enquiry due date** addressed to The Head, Department of Instrumentation and Control College of Engineering Pune-411005.
6. 100% payment will be paid after satisfactory installation and commissioning.
7. **Delivery Period and Terms Conditions** should be mentioned clearly.
8. **Delayed supplies:** The penalty conditions are applicable for the late delivery as per Institutional norms.
9. Optional items should be quoted in separate sheet otherwise your quote will be rejected

10. **Supply and Installation**:- Vendor shall be responsible for successful installation, commissioning and testing of the supplied items at Department of Instrumentation and Control College of Engineering Pune. Any defective component/device will be replaced by vendor at his cost.
11. **Training**: Suppliers need to provide adequate training at COE, Pune to the nominated person of COE, Pune at their cost. COE, Pune will not bear any training or leaving expenditure in this regard
12. The Director of College of Engineering, Pune reserves right to reject any one or all the quotation(s) without assigning any reasons there for.

Head
Department of Instrumentation and Control
College of Engineering Pune

Technical Specification
Annexure 'A'

1. **Thermocouple (J type) – 2Nos.**
   Type - J type
   Range 0- 750 Deg C
   Accuracy - +/- 0.75%
   Sheathed - SS304
   With head
   Length with head and sheath – 15 cm

2. **Thermocouple (K type) – 2Nos.**
   Type - Ktype
   Range 0- 1000 Deg C
   Accuracy - +/- 0.75%
   Sheathed - SS304
   With head
   Length with head and sheath – 15 cm

3. **Thermocouple (R & S type) – 2Nos.each (Total 4 Nos)**
   Type – R & S type
   Range 0- 1300 Deg C
   Accuracy - +/- 0.75%
   Sheathed - SS304
   With head
   Length with head and sheath – 15 cm

4. **Electric Furnace – (1No.)**
   Temp.- 1400 deg C
   Furnace area- 15cmx10cmx10cm
   Insertion hole from top of diameter – 1.5 cms

5. **RTD (Pt100) – (2Nos)**
   Type – Pt 100 type
   Accuracy - +/- 0.5%
   Sheathed - SS304
   With head
   Length with head and sheath – 15 cm
   With 3 wire compensation

6. **RTD (Pt1000) – (2 Nos)**
   Type – Pt 1000 type
   Accuracy - +/- 0.25%
   Sheathed - SS304
   With head
   Length with head and sheath – 15 cm
   With 3 wire compensation

7. **RTD (Cu) – (2 Nos)**
   Type – Cu-100 type
   Accuracy - +/- 0.25%
   Sheathed – SS304
   With head
   Length with head and sheath – 15 cm
   With 3 wire compensation

8. **Strain Gauges – Bare elements - (4 Nos)**
   Resistance - 120 ohm
   Gage Factor – 2

9. **Strain Gage accessory kit (1 No)**
   Adhesive Material – 1 bottle
   Release Film – 1 Roll
   Protective Coating

10. **A cantilever beam model (1 No)**
    Hight –45 cms with base
    Length of cantilever beam - 20cms

11. **LVDT – (3Nos)**
    Range –15 to +15cms
    Sensitivity for nominal measuring range - 270 mV/V (bridge output per 1 V supply voltage)
    Supply voltage - 5 Vrms
    Carrier frequency - 3 to 5 kHz
    Permissible environmental temperature - -20 to +120˚ C (-4 to 248˚ F)
    Capacitance - 250 pF (each winding)
    Serial data Interface RS232/ RS 485

12. **Load cell – Compression type (2 Nos)**
    Type – Compression
    Capacity- 500 kg
    Cable - 6 wire, 10m long PVC insulated cable along with voltage sensing and mating binder socket
    Accuracy class - 0.1 or better
    Nominal Sensitivity - 2mV/V
    Input Resistance - Ω / 700Ω350
    Operating excitation voltage - 0.5 to 12V
    C°Operating temperature range - -30 to +85
    Maximum operating force - 150%
    Protection class to EN 60529 - IP65

13. **Load cell – Shear Beam type (2Nos)**
    Type – Compression
    Capacity- 100 kg
    Cable - 6 wire, 10m long PVC insulated cable along with voltage sensing and mating binder socket
    Accuracy class - 0.2 or better

Nominal Sensitivity - 2mV/V
Input Resistance - Ω / 700Ω350
Operating excitation voltage - 0.5 to 12V
C°Operating temperature range - -30 to +85
Maximum operating force - 150%
Protection class to EN 60529 - IP65

14. Load cell – S Beam type (2Nos)

Type – Compression
Capacity- 100 kg
Cable - 6 wire, 10m long PVC insulated cable along with voltage sensing and mating binder socket
Accuracy class - 0.2 or better
Nominal Sensitivity - 2mV/V
Input Resistance - Ω / 700Ω350
Operating excitation voltage - 0.5 to 12V
C°Operating temperature range - -30 to +85
Maximum operating force - 150%
Protection class to EN 60529 - IP65

15. Amplifier and signal Conditioner for Loadcell (1No)

Suitable for all types of loadcell mentioned above
Display - LCD
Serial Data interface
Calibration facility

16. Piezo Electric Accelerometers - (2Nos)

Mounting: Custom aluminum block (25 x 25 x 25 mm)
Circuit Integral impedance converting electronics
Cable: Shielded,
standard length 900mm (for wired connection)
Sensitivity: Nominally 1.0 mV/g with 10 V.D.C. bias voltage
input Range: 50 g
Frequency Range: 0.25 to 7000 Hz (resonant freq: > 40 kHz)
Temperature Range: -50° to 120°C operating
Time Constant: Nominally 3s

17. Amplifier and analyzer for accelerometers (1No)

Instrument must be capable of carrying out the 'Vibration Analysis'
Must be capable of measuring 'Shaft & Bearing Housing Vibration'.
Instrument must be capable of recording data of Vibration, Velocity, and Displacement & Speed
It should have capability for analyzing data for time & frequency domain and real time data capture & display.
4. Instrument should be capable of analyzing Overall Vibration, Time signal & phase, FFT, Live Spectrum

18. Magnetic pick up tachometer (1No)

Power Input: 11-28VDC (70mA – 120mA except lamp load)
Backlight: 3.4W T-10 wedge base bulb
RPM Input Signal Voltage: 1.5Vrms minimum
Accuracy: Tachometer: +2% full scale
Hourmeter: +0.01% hours, +1 count
Dial (Face Plate): 270deg sweep with white numerals (over black background)
Bezel: 304 stainless steel for bright and IS 513 E.E.E. CRCA steel for black
Scale: 0-4000RPM
Case Material: Plastic
Hour meter Range: 99999.9 hours in 0.1 increments

19. Digital Tacho meter (1No)

Measuring Range - 0.5 to 19,999 RPM.
Resolution - 0.1 RPM (< 1,000 RPM) & 1 RPM (1,000 RPM)
Display 5 digits, 10 mm
Accuracy ± (0.05% + 1 digit)
Operating Temperature - 0 - 50 (32 - 122). ℃

20. Inductive Proximity sensors (2Nos)

Size - 18 mm
Load Current 5…200 mA
Inrush Current (one cycle) ≤2 A ≤4 A
Leakage Current ≤1.9 mA @ 120V AC
Operating Voltage 20…250V AC Voltage
Drop ≤10V @ 5…200 mA ≤10V @ 5…250 mA
Repeatability ≤10% at constant temperature
Hysteresis 10% typical
Protection Type False pulse, transient noise, short circuit, overload (trigger at 250 mA typical) Connection Type- Cable: 2 m (6.5 ft) length, 2-conductor PVC

21. Capacitive proximity sensors (2Nos)

Switching distance (Sn) – 25 mm
Continuous voltage - 10 V
Switching frequency – 10Hz
Repeatability (at constant temperature) -<1 mm
Max output current <300mA

22. Rotary Encoder (2Nos)

Power supply voltage – 5VDC
Current consumption - 80 mA max.
Resolution – 50 **(pulses/rotation)**
Output configuration - NPN open-collector output
Output capacity - Applied voltage:30 VDC max., Sink current: 35 mA max., Residual voltage: 0.4 V max. (at sink current of 35 mA)
Maximum response frequency *3 - 100 kHz

23. Linear Encoder (2Nos)

Measuring standard Expansion coefficient - approx. 10 x 10–6 K–1
Accuracy grade* ± 3 µm, ± 2 µm
Measuring length ML* in mm - 1040
Incremental signals - 1 VPP
Grating period Signal period 8 µm 4 µm
Cable length1- † 150 m
Traversing speed † 60 m/min
Required moving force - † 4 N

24. Amplifier for Encoder (1No)

Interface - Serial bidirectional
Data transfer - Position values, parameters and additional data
Data input - Differential line receiver according to EIA standard RS 485 for the signals CLOCK, CLOCK, DATA and DATA
Data output - Differential line driver according to EIA standard RS 485 for DATA and DATA signals
Position values - Ascending during traverse in direction of arrow

25. Leak Detectors kits (2Nos)

Operating Temperature - 0ºC to 38ºC (32ºF to 100ºF)
Storage Temperature -40ºC to 66ºC (-40ºF to 150ºF)
Frequency Response 35 kHz to 45 kHz + 6 db
Ultrasonic Transmitter
Operating Temperature 32ºF to 100ºF (0ºC to 38ºC)
Storage Temperature -40ºF to 150ºF (-40ºC to 66ºC)
Frequency 40kHz

26. Smoke detector kits (2Nos)

Input Power: 100-240VAC, 2-3mA (avg.), 50/60Hz
System Voltage: 12VDC
Operating Temperature Range: 41°F to 135°F
Operating Humidity Range: 0 to 95% RH non-condensing
Sensor: Photoelectric Smoke Detector

27. Flame detector kits (2Nos)

UV/IRS Flame Detector
Operating Voltage Range - 10 to 32 VDC
Power Consumption at 32 VDC *with Heater - Nom 35 mA/1.12 W
Temperature Range Certified -40 °C to +75 °C (-40 °F to +167 °F)
Spectral Range
UV Radiation 185 to 260 nm (1850 to 2600 angstroms) |
IR Radiation in the 4.4 µm range

28. Digital Multi meter (2Nos)

Display – 5 digit LCD Display
Counts - 4000 Counts
AC/DC Voltage Range - 400mV to 1000V
AC /DC Current Range – 400mA - 10 A
Measurement of frequency, capacitance, temperature

29. Digital Storage Oscilloscope (1No)

100MHz bandwidth •
500MS/s to 1GS/s real-time sample rate
50GS/s sample rate for repetitive waveforms
1M Memory
2mV/div to 50V/div Vertical Sensitivity
High resolution color LCD display
USB storage, RS232C , optional J45 interface
4000 point record length for each channel
Multi-waveforms math, FFT Function
Built-in delay sweep function
Automatic Multi-waveform Measurement
Cursor & Track measurement
Waveform Record & Recall
Trigger Mode for Edge, Video, Pulse Width, Slope & Alternate
Pass & Failure for ordinary setting and waveform setting
Calibration Signal with optional frequency of 1KHz,10KHz &100KHz

30. Multifunction Calibrator for Sensors (1No)

Voltage DC -	30.000 V	0.01%+ 2 mV (upper display)
	20.000 V	0.01%+ 2 mV (lower display)
	90.00 mV	0.01%+ 10µV
	-10.00 mV to 75.00 mV	0.025 % + 1 count (via TC connector)

Current DC - 24mA , 0.01% =/- 2mA

Resistance - 0 to 4000.0 Ω +/- 0.015%

Frequency – 2.0 to 1000.0 CPM 0.05% + 0.1cpm
1.0 to 1000.0 Hz 0.05% + 0.1Hz
1.00 to 15.00 kHz 0.05% + 0.1kHz

Measure and Source Accuracy -

PT-100 (385)	0.45 °C
RTD Resolution:	0.01 C (0.01 F)
Cu10.01 C	0.1 C (0.1 F)
J:	0.4 °C
K:	0.5 °C
R:	1.4 °C
S:	1.4 °C

Pressure– Modules available for differential, gauge, vacuum, absolute, dual and high pressure Modules available for differential, gauge, vacuum, absolute, dual and high pressure

Operating Temperature - -10 °C to +55 °C

31. pH sensor and Amplifier (1No)

Range - 0 to 14 units
Resolution - 0.01 unit
Accuracy - ±0.2 unit

Type - Combination electrode with ribbon junction and platinum button
Reference Electrode – Gel-filled
Operating Temp Range - - -5 to 70°C (23 to 158°F)
Storage Temp Range – - -5 to 50°C (23 to 122°F)
Operating Pressure Range - 0 to 100 psi
Response Time -- -5 to 50°C (23 to 122°F)
Pre-Amplifier Battery Life - ~2.5 years with proper use and storage

32. Conductivity Meter (1No)

MAX. PRESSURE/TEMP. RATINGS - 100 PSIG @ 95° C
WETTED MATERIALS:
Insulator – CPVC
O-rings - FDA APPROVED
Electrodes -316SS
PROBE CONSTANT: 10.0

33. Lux meter (1No)

Photoelectric element - Silicon photodiode
Display - Liquid crystal display (number of 7 digits); maximum effective display:999; (0 or 0's to indicate the number of digits)-
Measurement cycle - Twice per second
Measuring range - 0.0 to 99.9/999/9,990/ 99,900/999,000lx
Accuracy(*) - ±4% rdg ±1dgt
Response time - Automatic range : 5 sec; Manual range: 2 sec

34. Sound Meter (1No)

Standards - ANSI S1.4 IEC 60651:1979 Type 2
Measurement Range - "A" Weighted : 35dB(A) to 130dB(A)
"C" Weighted : 40dB(C) to 130dB(C)
Range Selection - L (Low) = 35dB(A) to 100dB(A)
H (High) = 65dB(A) to 130dB(A)
Frequency Weighting - "A" and "C" Weighting - dB(A) & dB(C)
Time Weighting - P14: Fast - "F" IP14S: Slow - "S"
Display Functions - Normal (Sound Level), Maximum Hold

35. Pressure gauges (4Nos)

Dial Size: 4-1/2"
Accuracy: ±0.5% FS - ANSI Grade 2A
Socket: 316SS or Monel 400
Bourdon Tube: 316SS or Monel
Movement: SS Rotary Geared with Overload/ Underload Stops
Lens: Laminated Safety Glass Pointer: Micrometer
Adjustable Dial: Heavy Gage Aluminum Connection: 1/4"or 1/2" NPT Lower Scales: 0-6kg/m2

36. Piezo electric pressure sensor (1No)

Dynamic Range - psi 0.01 to 50
Sensitivity - 10 mV/psi
Resolution - 0.003 psi
Range (for 5V output) - 50 psi
Resonant Frequency kHz ≥ 250 ≥ 200 ≥ 400
Rise Time µs ≤ 2 ≤ 2 ≤ 1
Discharge Time Constant (6) s ≥ 1 ≥ 50
Low Frequency (-5%) (6) Hz 0.5 0.01

37. DP pressure sensor and indicator (1No)

Measuring range 16 bar
Max. static working pressure bar 160
Smallest possible span mbar 0.3
Lowest static pressure - 0.1 mbar
Accuracy Measuring ranges bar >= 0.5

38. Rotameters (2Nos)

Specifications Scales Length: 65 mm
Graduations: Direct reading in GPM water or SCFM air Construction
Metering Tube: Borosilicate glass
Float: 316 stainless steel
Float Stops: Stainless steel End Fittings and Tube Retaining
Adaptor: Chrome-plated brass, 316 stainless steel
Side Plates: Chrome-plated brass
Packing Material: O-rings: Buna with Brass,
Pressure: 13.8 bar (200 psig) maximum

39. Orifice plate (2Nos)

Size for Integral Design : 25mm
Size for Flanged Design : 50mm
Material- Flanges & Carrier Ring : SS304
Orifice Plate : SS304, SS316
Gasket : CAF / SS Spiral Wound
Bore Calculation : ISO 5167 / BS 1042
Types : Square edge concentric,
Pressure Toppings : flange tap

40. Ventury tube (1No)

Line Size: 200 mm
Accuracy: +/-3.0%.
Flow coefficient value: 0.98 for all ratios of diameter
Beta ratios: 0.3.

41. Pitot Tube (1No)

Diameter 3 mm (Probe length : 48 mm)
Type: ellipsoidal head curved NPL
Coefficient : 1,0015.
Accuracy: more than 0.5 % for an alignment with to the fluid axis flow within 12°.

Quality: Hard stainless steel
Operating temperature: 650°C continuously

42. Acrylic Manometer with scale with accessories (2Nos)

Measuring Range - 0-300 MM WC
Height – Inches 15

43. Wind flow or anemometer (1No)

Sensor Type Wind Speed - Solid state magnetic sensor
Wind Direction - Wind vane and potentiometer Attached
Cable Length - 40' (12 m)
Cable Type – 4 conductor,
26 AWG Connector - Modular connector (RJ-11)
Recommended Maximum Cable Length - 140' (42 m)
Sensor to Console Material Wind Vane and Control Head- UV-resistant ABS Wind Cups Polycarbonate Anemometer Arm- Black-anodized aluminum
Dimensions - 18.5" long x 7.5" high x 4.75" wide (470 mm x 191 mm x 121 mm)

44. Portable Doppler Ultrasonic Flow meter (1No)

Works on plastic and metal pipes 0.5" to 100"
Measures bi-directional flow 0.1 FPS to 40 FPS
A/C and D/C powered models
Large backlit LCD display with keypad shows flow rate and totalizer
Rugged NEMA 4X enclosure
Standard outputs include 4-20 mA, Modbus RTU and pulse

45. Capacitance type level meter (1No)

Enclosure - Die cast Aluminium LM-6 alloy duly certified for flameproof by CMRS Dhanbad for Gas Group IIA & IIB of IS : 2148
Probe -
Cable - 3/4" NPT (F) / 1/2" ET
Transmitter Type - Two Wire
Input Power - 24 VDC (from the indicator)
Output - 4-20 mA @ constant current max. load of 500 ohms
Temperature Rating - -20 to 100^0 C
Pressure - 6 kg / cm^2
Measuring Range - 4000 mm

Indicator / Controller

Input Signal - 4-20 mA from transducer
Display - 4 digit LED
Accuracy - 1% of full scale.
Relay Contacts - 1 Changeover per set point @ 5A230 VAC. Max. four relays can be provided
Enclosure - 96 x 96 x180 mm (Standard)
Power - 230 VAC 50 Hz.

46. Noncontact type Displacement meter (1No)

Power Supply :+5V DC
Quiescent Current : <2mA
Working Current: 15mA
Effectual Angle: <15°
Ranging Distance : 2cm – 400 cm/1″ – 13ft
Resolution : 0.3 cm
Measuring Angle: 30 degree
Trigger Input Pulse width: 10uS
Dimension: 45mm x 20mm x 15mm

Head
Department of Instrumentation and Control
College of Engineering Pune

[To be submitted by Bidder - Letter Head]

Bidder Quotation Number & Date

Commercial Offer

To,
The Director,
College of Engineering, Pune

Subject:-Award of contract for Supply and Installation of Workstation at Department of Instrumentation and Control, COEP

Reference: - COEP/Instru/transducerslabs/Enq/2016-17/1029 Date:-28/04/2017

Dear Sir,

With above referenced subject, I am pleased to inform you that you have been awarded a contract for Supply and Installation of Workstation Department of Instrumentation and Control

Sr. no.	**Description**	**Make & Model**	**Units**	**Qty**	**Rate Per Unit in Rs. (Inclusive of all taxes)**	**Total Amount in Rs. (Inclusive of all taxes)**
1	**As per annexure A List all the items**					
Total Amount (inclusive of all taxes) in Rs.						
Total Amount (inclusive of all taxes) In word Rupees-						

PAN No:-……

VAT Registration No:-……

Service Tax Registration No:-…….

Signature:-……..

Name:-……

Address:-…….

Affix Rubber Stamp:-……