

22420

21819

3 Hours / 70 Marks

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. Attempt any FIVE of the following: **10****
- a) Define active and passive transducers.
 - b) List any four units of pressure.
 - c) Define laminar and turbulent flow.
 - d) List any two non-contact type level measurement methods.
 - e) State any two advantages of ultrasonic flow meters.
 - f) State seebeck and peltier effect.
 - g) What is Pt-100?

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) State the selection criteria for transducers (any eight points).
 - b) Draw constructional details of C-types Bourdon tube and explain its working
 - c) What is piezo electric effect? Name two piezo electric materials.
 - d) Explain the process of calibration of pressure gauge by Dead Weight Tester.
- 3. Attempt any THREE of the following:** **12**
- a) Compare orifice plate with venturi tube with reference to:
 - (i) Working principle
 - (ii) Construction
 - (iii) Cost
 - (iv) Pressure loss
 - b) Draw and explain block diagram of instrumentation system.
 - c) Write one example of each type:
 - (i) Active transducer
 - (ii) Primary transducer.
 - (iii) Electrical transducer.
 - (iv) Digital transducer.
 - d) Draw the following and write one application of each:
 - (i) Well type manometer
 - (ii) Bellows.

4. Attempt any THREE of the following:**12**

- a) Explain the principle of operation of Doppler type ultrasonic flow meter with a neat labeled sketch.
- b) A capacitive type level sensor is to be used for measuring the level of water in the tank. With a neat labeled diagram. Explain the construction of this transducer. Also state the reason for change in capacitance with change in level of water.
- c) Compare RTD and thermistor on the basis of:
 - (i) temperature coefficient
 - (ii) linearity
 - (iii) temperature
 - (iv) range and cost
- d) State any two advantages and disadvantages of electromagnetic flow meter.
- e) Suggest a suitable level transducer for following application:
 - (i) Level control of liquid, powders and fine grained solids within mining
 - (ii) Chemical processing and food industries
 - (iii) Tank level monitoring in chemical, water treatment
 - (iv) Oil level in transformer.

5. Attempt any TWO of the following:**12**

- a) Draw constructional diagram of LVDT. State its working principle. What is residual voltage, explain with neat diagram.
- b) Why Rotameter is called variable area flowmeter? Explain the working of rotameter with neat diagram. State its one advantage and one disadvantage.
- c) Explain the following troubles and related remedies in ultrasonic flow meter:
 - (i) Meter does not show reading
 - (ii) Meter show less value of flow measured.
 - (iii) Meter show high value of flow measured.

6. Attempt any TWO of the following:**12**

- a) What is pyrometry? Explain working of optical pyrometer with neat diagram. State its one application.
 - b) Convert 200°F into Celsius (°C) Kelvin (°K) and Rankine (°R).
 - c) Compare between:
 - (i) Ultrasonic and Radar type level measurement (any three points)
 - (ii) U-tube and well type manometer (any three points)
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