

22332

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) Compare transducers and sensors (any two points).
- (b) State Seebeck effect and Peltier effect.
- (c) Compare LED and LCD (any two points).
- (d) Convert 40 °C to °F and °K.
- (e) Define :
 - (i) Atmospheric pressure
 - (ii) Vacuum pressure
- (f) Define :
 - (i) Reynolds number
 - (ii) Vena contracta
- (g) A pressure gauge measures the P gauge reading as 30 psi. If the atmospheric pressure is 14.696 psi, calculate the corresponding absolute pressure.

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P.T.O.

- 2. Attempt any THREE of the following : 12**
- (a) Explain with neat sketches the construction and working principle of capsule used for pressure measurement.
 - (b) Explain with neat sketch, the working principle of capacitive transducer using the concept of variable area.
 - (c) Identify a suitable type of recorder used for plotting the Resistance – temperature characteristics of an RTD. Justify your selection.
 - (d) Explain with sketches the operating principle of LVDT.
- 3. Attempt any THREE of the following : 12**
- (a) List any two examples for the following :
 - (i) Non-elastic pressure transducers
 - (ii) Elastic pressure transducers
 - (b) Explain with sketches the principle of operation of capacitive type hygrometer.
 - (c) Identify the temperature transducer for an application where high sensitivity is required for measurement. Justify your selection.
 - (d) State any two advantages and disadvantages of voltage telemetry system.
- 4. Attempt any THREE of the following : 12**
- (a) Explain with sketches the construction and working of 'C' type Bourden tube.
 - (b) State any two advantages and disadvantages of Rotameter.
 - (c) Calculate the output resistance of PT100 RTD for following temperature values :
 - (i) 30 °C
 - (ii) 50 °C
 - (d) Explain with neat sketches the construction and principle of operation of strip chart recorder.
 - (e) Suggest a suitable transmission method to transmit temperature of process liquid measured in a plant to control room situated far away. Justify your selection.

- 5. Attempt any TWO of the following :** **12**
- (a) State Piezo electric effect. Give any two examples of (i) Natural piezo electric material (ii) Synthetic Piezo electric material.
 - (b) List various types of Data Acquisition System (any two). Draw the block diagram of a multichannel data acquisition system and explain the function of each block.
 - (c) Explain with sketches the principle of operation of orifice plate. State its advantages and disadvantages.
- 6. Attempt any TWO of the following :** **12**
- (a) Identify whether the following are active or passive transducer. Justify your answer.
 - (i) Potentiometer
 - (ii) Photovoltaic cell
 - (iii) Thermistor
 - (b) (i) Distinguish between laminar flow and turbulent flow (any two points). **2**
(ii) Calculate the Reynolds number if a fluid with viscosity 0.56 NS/m^2 and density 750 kg/m^3 is flowing with a velocity of 3 m/s through a pipe of diameter 30 mm . Based on Reynold's number identify the type of flow. Justify your answer. **4**
 - (c) (i) Define :
 - (1) Absolute humidity **2**
 - (2) Relative humidity **2**(ii) Explain with neat diagram, the working of Hair type Hygrometer for Humidity measurement. **4**
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