

22477

24225

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Illustrate your answers with neat sketches wherever necessary.
  - (3) Figures to the right indicate full marks.
  - (4) Assume suitable data, if necessary.

**Marks**

**1. Attempt any FIVE of the following :**

**10**

- (a) Classify transducers on any two factors.
- (b) Define temperature and state its units.
- (c) List different types of transducers used to measure the thickness.
- (d) Define speed and state its units.
- (e) State working principle of inductive pick-up for thickness measurement.
- (f) Write the specifications of photoelectric type proximity sensor required for measurement of position (any two).
- (g) List different types of speed measurement transducers.

**2. Attempt any THREE of the following :**

**12**

- (a) Explain the working of magnetic pick-up for speed measurement.
- (b) Describe working principle of C-type bourdon tube.
- (c) State piezoelectric effect. Name any two piezoelectric material.
- (d) Convert the 40°C temperature into Fahrenheit and Rankine scale.



- 3. Attempt any THREE of the following : 12**
- (a) Compare active and passive transducers (any 4 points).
  - (b) Explain working principle of bimetallic thermometer with neat labelled diagram.
  - (c) Suggest suitable method to measure thickness of newspaper with justification.
  - (d) Choose appropriate transducer for following applications :
    - (i) To measure speed of rotating shaft.
    - (ii) To determine nearby metallic object.
- 4. Attempt any THREE of the following : 12**
- (a) Name the material used and sensitivity of the following thermocouple :
    - (i) J (ii) K
    - (iii) R (iv) S
  - (b) Compare capacitive pick-up and inductive pick-up for thickness measurement.
  - (c) State selection criteria for transducers (any 8 points).
  - (d) Explain Hydraulic force meter with neat labelled diagram.
  - (e) Explain Seebeck & Peltier effect.
- 5. Attempt any TWO of the following : 12**
- (a) Compare U-tube manometer and well type manometer (any four points). Give limitations of U-tube manometer.
  - (b) Convert 200°F into Celsius (°C), Kelvin (°K) and Rankine (°R).
  - (c) Explain thickness measurement using capacitive type transducer. State its advantage and disadvantage (one point each).
- 6. Attempt any TWO of the following : 12**
- (a) Describe the construction and working of LVDT with diagram and response graph.
  - (b) State different types of proximity sensors. Explain working principle of ultrasonic sensor & state its two applications.
  - (c) Explain optical pyrometer with neat diagram. State the temperature range where pyrometers are used. Define thermopile.
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