

22348

12425

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 :**

**10**

- (a) Differentiate between active and passive transducer.
- (b) Define transducer and give example of it.
- (c) Write any two pressure transducers.
- (d) State any two applications of capacitive transducer.
- (e) State seebeck effect.
- (f) Write chemical equation for  $PO_2$  electrode.
- (g) What is motion artifact ?

**2. Attempt any THREE :**

**12**

- (a) Draw block diagram of MIS and describe it's working.
- (b) Describe linear potentiometer with neat diagram.
- (c) Describe RTD with neat diagram.
- (d) Draw electromagnetic flow transducer and describe it's working.



- 3. Attempt any THREE :** **12**
- (a) Write different sources of biomedical signals with neat diagram.
  - (b) Describe with neat sketch the piezoelectric transducer.
  - (c) Draw and describe Photomultiplier tube.
  - (d) Describe the working of  $\text{PCO}_2$  electrode with neat sketch.
- 4. Attempt any THREE :** **12**
- (a) Describe the concept of primary and secondary transducer with the help of suitable example and diagram.
  - (b) Draw and describe unbonded strain gauge.
  - (c) Compare RTD and Thermistor on the basis of (i) Material used (ii) Accuracy (iii) Temperature range (iv) sensitivity.
  - (d) Draw and describe ultrasonic flow transducer.
  - (e) Draw diagram of metal plate electrode and describe it.
- 5. Attempt any TWO :** **12**
- (a) An unbonded strain gauge has resistance of  $3000\ \Omega$  and gauge factor of 2.6, what will be the change in resistance due to 1000 micro strain ?
  - (b) Draw radiation thermometry diagram. Describe its working. Write two applications of it.
  - (c) Describe working of flow measurement by indicator dilution with diagram. Write two applications of it.
- 6. Attempt any TWO :** **12**
- (a) A platinum RTD has resistance of  $100\ \Omega$  at  $25\ ^\circ\text{C}$ . (i) Find its resistance at  $65\ ^\circ\text{C}$ . The resistance temperature co-efficient of platinum is 0.00392 per degree celsius (ii) If RTD has resistance of  $150\ \Omega$ , calculate the temperature.
  - (b) Describe the working of pH electrode with neat diagram.
  - (c) Define polarizable electrodes and non-polarizable electrodes. Describe working of suction and floating electrode with neat diagram.
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