

22348

23124

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) Define active transducer and give any two examples of it.
- (b) Enlist any two dynamic characteristics of instrument.
- (c) Draw a sketch of linear potentiometer.
- (d) Draw a sketch of C-shape Bourdon tube.
- (e) Enlist type of material used for making of RTD.
- (f) State any one flow measurement technique.
- (g) Define Polarizable electrode.

2. Attempt any THREE of the following :

12

- (a) Describe any two static characteristics of instrument.
- (b) Explain the working of bonded and unbonded strain gauge.
- (c) Describe the concept of radiation thermometry.
- (d) Describe the construction of electromagnetic transducer with neat sketch.



- 3. Attempt any THREE of the following : 12**
- (a) Classify transducers based on following points :
 - (i) Process used
 - (ii) Physical or chemical used
 - (iii) Application
 - (b) Explain piezoelectric transducer with its sketch.
 - (c) Describe photomultiplier tube in detail.
 - (d) Describe blood glucose sensor in detail.
- 4. Attempt any THREE of the following : 12**
- (a) Explain Man instrumentation system with neat sketch.
 - (b) Describe angular potentiometer in detail.
 - (c) Suggest different transducers used for body temperature measurement and explain any one.
 - (d) Describe the concept of plethysmography.
 - (e) Draw a sketch of supported microelectrode and explain it.
- 5. Attempt any TWO of the following : 12**
- (a) An unbonded strain gauge has a resistance of 4000Ω and gauge factor of 3. What will be the change in resistance due to 2000 micro strain ?
 - (b) Compare Thermistor, thermocouple and RTD on following basis :
 - (1) Working principle
 - (2) Temperature range
 - (3) Materials used
 - (c) Suggest an instrument used to measure blood flow in human body. Describe any one with its construction and working.

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

(a) A platinum RTD has a resistance of 100Ω at 25°C .

(i) Find its resistance at 60°C .

The resistance temperature co-efficient of platinum is 0.00392 per degree Celsius.

(ii) If the RTD has a resistance of 200Ω , calculate the temperature.

(b) Describe working of following electrodes with neat diagram :

(1) PO_2 electrode

(2) PCO_2 electrode

(c) Enlist different advanced biosensors and describe any one advanced biosensor in detail.
