

17414

15162

3 Hours / 100 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.
(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

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

10 × 2 = 20

- (a) Define : (i) Zero drift (ii) Hysteresis effect
- (b) State the principle of calibration.
- (c) Define the transducer. Give any one example.
- (d) List any two sources of error in thermister.
- (e) Draw neat labelled pin diagram for 741 IC.
- (f) State any two characteristics of an ideal Op-Amp.
- (g) Define pressure and write it's SI unit.
- (h) Define volumetric flow rate. List any one device used to measure volumetric flow.
- (i) Define the following terms related to Op-Amp :
 - (i) CMRR
 - (ii) SVRR
- (j) Draw the neat labelled diagram for measurement of force using load cell.
- (k) List any four applications of Op-Amp in signal conditioning circuits.
- (l) Draw the circuit diagram for measurement of temperature using thermocouple.

P.T.O.

2. Attempt any FOUR of the following : **4 × 4 = 16**

- (a) List and explain dynamic characteristics of instrument.
- (b) List the different types of thermocouple and write their temperature ranges and material used.
- (c) Explain the LVDT working principle with suitable construction diagram and output waveform.
- (d) Draw the basic block diagram of generalized instrumentation system and explain each blocks.
- (e) Describe the use of Op-Amp as integrator with circuit diagram. Draw its I/P and O/P waveform.
- (f) What is DAS ? Draw a neat labelled diagram of single channel DAS.

3. Attempt any FOUR of the following : **4 × 4 = 16**

- (a) Explain the following terms with suitable example :
 - (i) Precision
 - (ii) Repeatability
- (b) Draw the construction diagram of bonded metal foil strain gauge and give it's any two applications.
- (c) Explain the design of Schmitt trigger using Op-Amp with suitable circuit diagram and output waveform.
- (d) Explain the measurement of speed using non-contact type transducer.
- (e) Describe the measurement of ac current by hall effect transducer.
- (f) Describe with neat labelled diagram measurement of flow using turbine flow-meter.

4. Attempt any FOUR of the following : **4 × 4 = 16**

- (a) Describe the ramp response of first order system in brief.
- (b) Draw and explain the temperature compensation circuit in strain-gauge.
- (c) Explain in brief the concept of active and passive filter.
- (d) State the concept of ratio metric conversion and logarithmic conversion in DAS.

- (e) List the points to be considered while selecting a transducer for its applications.
- (f) Describe the measurement of pressure using C-type burdon tube with neat labelled diagram.

5. Attempt any FOUR :**4 × 4 = 16**

- (a) Draw the response of second order instruments for step, Define dynamic error.
- (b) Describe the ultrasonic level measurement with neat label diagram and give it's any two advantages.
- (c) State working principle of analog to digital and digital-to-analog conversion.
- (d) Describe rotary motion measurement using optical encoder.
- (e) Which types of flow is measured by hot wire anemometer and describe it's working principle with suitable diagram.
- (f) Describe the instrumentation system used for temperature measurement using thermistor.

6. Attempt any FOUR :**4 × 4 = 16**

- (a) Describe the importance of three wire and four wire configuration for RTD with suitable circuit diagram.
 - (b) Draw the pin diagram of IC LF 398. List the function of each pin.
 - (c) Draw the generalized block diagram of Data Acquisition System (DAS) and explain the role of each block.
 - (d) Describe liquid level measurement by resistive sensor with suitable diagram.
 - (e) Compare between RTD and thermistor (any four points)
 - (f) Explain pressure measurement using diaphragm with neat diagram.
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