11718

3 Hours / 100 Marks   Seat No.

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 :**   **5 × 4 = 20**

(a)   Explain hysteresis and dead zone effect on a measuring instrument.

(b)   State and explain working principle of potentiometer.

(c)   What are the laws of thermocouple ? State & explain any two laws.

(d)   Explain working of Rotameter with neat sketch.

(e)   State the different materials used for strain gauge. Define gauge factor.

(f)   Compare hydraulic and electronic control systems.

(g)   What is transducer ? Classify the transducer.

2. **Attempt any FOUR :** 4 × 4 = 16

   (a) Differentiate between accuracy and precision.

   (b) State and explain observation errors and operational errors in measurement.

   (c) Explain construction and working principle of Mcleod Gauge.

   (d) State and explain with neat sketch working of LVDT.

   (e) Explain working of bimetallic thermometer and state its two applications.

   (f) Explain working principle of temperature measuring instrument for temperature upto 2200 °C.

3. **Attempt any FOUR :** 4 × 4 = 16

   (a) State and explain significance of overshoot and Fidelity for measuring instrument.

   (b) Explain capacitive transducer with one application.

   (c) Explain pressure measurement using thermal conductivity gauge with neat sketch.

   (d) Explain construction and working of photo-electric pressure transducer.

   (e) Explain working principle of pressure thermometer with neat sketch.

   (f) Explain construction and working of RTD.

4. **Attempt any FOUR :** **4 × 4 = 16**

   (a) Explain with neat sketch pressure measurement using Bourdan tube.

   (b) Explain temperature measurement using thermistor.

   (c) Explain flow measurement using electromagnetic flow meter with neat sketch.

   (d) State and explain construction and working of hot wire anemometer.

   (e) Explain the instrument used for the measurement of humidity.

   (f) Explain float and resistance type instrument used for liquid level measurement.

5. **Attempt any FOUR :** **4 × 4 = 16**

   (a) State and explain working of turbine meter.

   (b) Explain working of ultrasonic flow meter.

   (c) Explain with neat sketch eddy current dynamometer.

   (d) Explain bonded type of strain gauge with neat sketch.

   (e) Explain feed back control system and state its two examples.

   (f) Explain control system used for motor speed control.

6. **Attempt any FOUR :** **4 × 4 = 16**

   (a) Explain servo motor mechanism with neat sketch. State its application.

   (b) Explain with suitable example and with block diagram feed forward control system.

   (c) What are the different control actions ? State its significance.

(d) Differentiate between open loop and close loop control system.

(e) Explain with necessary sketch inductive type pick up tachometer used for speed measurement.

(f) A pressure gauge having a range of 500 kN/m^2 has a guaranteed accuracy of 1.5% of full scale deflection. What would be the possible readings for a true value of 95 kN/m^2 ?

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