16172

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) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. **Attempt any TEN :** **(10 × 2 = 20)**

(a) Define the term threshold and resolution.

(b) Explain overshoot in a measuring instrument.

(c) Define the term range and span.

(d) State the function of transducer & major difference between active and passive transducer.

(e) Explain the thermoelectric effect in brief.

(f) State the name of instrument used for measuring temperature of 1400 °C in furnace and exhaust values of engines.

(g) State applications of potentiometer and write its working principle.

(h) List any four low pressure measuring instrument. State its range.

    (i)   Describe working of hair hygrometer.

    (j)   Define strain gauge and enlist the materials used for strain gauge.

    (k)   State working principle of electromagnetic flow meter.

    (l)   Compare pneumatic and electronic control system. (any two points)

    (m)   Draw the block diagram of automatic control system.

    (n)   State the significance of hysteresis in a measuring instrument.

2.   **Attempt any FOUR :**   **(4 × 4 = 16)**

    (a)   State the different types of errors in measurement system. Give classification.

    (b)   Explain the working principle and state one application of resistive type and inductive type transducer each.

    (c)   Differentiate between accuracy and precision with suitable example.

    (d)   Explain with neat sketch working principle of LVDT.

    (e)   Explain with neat sketch working of McLeod gauge.

    (f)   Explain pressure measurement using electrical resistance type gauge.

3. **Attempt any FOUR :** (4 × 4 = 16)

    (a) State the specifications of a typical displacement transducer.

    (b) Explain with neat sketch photoelectric pressure transducer.

    (c) Explain construction and working of bimetallic thermometer.

    (d) State the working principle of RTD. Explain its working with neat sketch.

    (e) Draw a neat sketch of radiation pyrometer. Explain working principle and state its applications.

    (f) Explain working principle of thermistor. State its types.

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

    (a) Draw neat sketch of Rotameter and explain its working.

    (b) Explain construction and working of hot wire anemometer.

    (c) Explain working of turbine meter with necessary sketch and state its use.

    (d) Explain sound measurement using electro-dynamic microphone.

    (e) Describe working of stroboscope. State its working principle.

    (f) Explain construction and working of inductive pick-up tachometer.

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

   (a)   Explain working and application of bonded strain gauge.

   (b)   Explain feedback control system with block diagram and state its application.

   (c)   Explain control system for boiler setup.

   (d)   Explain Proportional and Derivative type (PD) control action.

   (e)   With a suitable example, explain servo motor mechanism.

   (f)   Define feed forward control system. Explain with suitable application.

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

   (a)   Explain integral control action.

   (b)   Explain working of pressure thermometer.

   (c)   State one application of ultrasonic flow meter. Explain its working principle with necessary figure.

   (d)   Explain working principle of eddy-current dynamometer.

   (e)   Explain control system for speed control of motor.

   (f)   Explain any one method of measuring shaft power.

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