23124

3 Hours / 70 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 questions out of the following :   **10**

(a)   Define Sensitivity and Reproducibility.

(b)   State the difference between sensor and transducer with one example of each.

(c)   State the function of RVDT.

(d)   State the function of Tachometer.

(e)   Draw the constructional diagram of RVDT.

(f)   State the balance equation of Wheatstone bridge.

(g)   Draw the block diagram of Instrumentation system.

2. **Attempt any THREE questions out of the following :** 12

   (a) Justify the working of LVDT as name given to it "Linear variable differential Transformer" with neat diagrams.

   (b) Explain construction of Bourdon tube gauge with neat diagram.

   (c) State the types of flow and give its unit of measurement.

   (d) Describe the working of hair hygrometer with neat labelled diagram.

3. **Attempt any THREE out of the following :** 12

   (a) "Piezoelectric transducer is an active transducer." Justify the statement.

   (b) List the type of microphone and explain one of it.

   (c) Explain the working of Electromagnetic flow meter with neat diagram.

   (d) Explain the functional block diagram of Data Acquisition system.

   (e) In a Wheatstone bridge as shown in fig., the value of $P = 100\ \Omega$, $Q = 1000\ \Omega$ and $R = 40\ \Omega$. If the galvanometer shows zero deflection, determine the value of S.
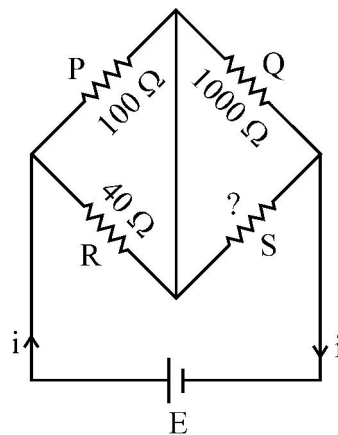
4. **Attempt any THREE of the following :** 12

   (a) Explain Optical Pyrometer with neat diagram.

   (b) Explain construction and working of thermocouple.

   (c) Write application of following transducer :

      (i) Venturimeter

      (ii) Orifice plate

      (iii) Ultrasonic flow meter

      (iv) Electromagnetic flow meter

   (d) Explain concept of amplitude modulation.

   (e) Explain instrumentation amplifier with neat diagram.

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

   (a) Explain Strain gauge load cell with neat diagram.

   (b) State different types of thermistor & compare PTC and NTC w.r.t. thermistor.

   (c) State classification of level measurement technique. Explain capacitive type level measurement.

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

   (a) Give selection criteria of transducer for any application.

   (b) (i) Explain the meaning of PT 100 &

      (ii) Calculate the resistance of PT100 at 500 ºC when temperature coefficient $\alpha = 0.003851$ /ºC.

   (c) Explain the working of Eddy current generation tachometer with neat diagram.

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