53 (IE 701) ININ

2021

INDUSTRIAL INSTRUMENTATION

Paper : IE 701

Full Marks : 100

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

*Answer **any ten** questions.*

1. *(a)* J,K, S types of thermocouples with their
compositions and temperature range.

4

   (b) What is cold junction compensation ?
What are its types ? 6

2. *(a)* Explain temperature measurement
using 4-wire RTD using Wheatstone
bridge. 4

   (b) How is pressure gauge calibrated using
Dead weight tester ? 6

3. (a) Explain pressure head type densitometer. 4

   (b) A strain gauge has a gauge factor of 2. If it is stretched from $10 cm$ to $10.5 cm$, what is the percentage change in resistance? 6

4. (a) Write a short note on Stroboscope. 4

   (b) Write a short note on Revolution Counter. 6

5. (a) Draw complete LVDT circuit with phase sensitive demodulation. 4

   (b) Write a short note on Seismic instrument as an accelerometer. 6

6. (a) What are the different types of manometers? Which type is sensitive? 4

   (b) For a thermistor $\beta = 3140 K$ and resistance at $40°C$ is 1050Ω. At what temperature its value is $2k\Omega$? 6

7. (a) Write a short note on IC temperature sensor. 4

   (b) Explain the working principle of Ionization gauge. 6

8. *(a)* How Piezoelectric accelerometer works ?

    4

   (b) Draw a Bourdon tube.   6

9. *(a)* How AC tachogenerators works ?   4

   (b) If *Pt* 100 is used for measurement of temperature then at what temperature its resistance is 120 ohm ? Alpha=0.0038 ohm/ohm/°C.   6

10. *(a)* How Bimetallic thermometer works ?

    4

   (b) Write a short note on optical radiation pyrometer.   6

11. *(a)* Write the equation of gauge factor.

    4

   (b) Write a short note on McLeod Gauge.

    6

12. A *Hg* manometer has one arm in the shape of a well and the other as a tube inclined at an angle 30° with the horizontal. The well is 4 *cm* in diameter and the tube is 5*mm* in diameter. Find the percentage at error, if no area correction factor is used.   10

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