

2018

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 out of twelve.

1. (a) Write the equation of Gauge factor and explain. 4

- (b) 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 4cm in diameter and the tube is 5mm in diameter. Find the percentage of error if no area correction factor is used. 6

2. (a) If Pt 100 is used for measurement of temperature than at what temperature its resistance is 1200Ω , $\alpha = 0.00390\Omega/\Omega/^\circ\text{C}$. 4

(b) Explain temperature measurement using 4 wires RTD using Wheatstone Bridge Circuit. 6

3. (a) Explain all the laws of thermocouple. 4

(b) A Strain Gauge has gauge factor of 2.8. If it stretches from 20cm to 20.5cm, what is the percentage change in resistance? 6

4. (a) What is Cold-junction Compensation? What are the types? 4

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

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

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

6. (a) Write a short note on IC Temperature Sensor. 4

(b) A Thermistor has $\beta = 3140\text{K}$ and the resistance at 37°C is 1050Ω . At what temperature its resistance will be 2330Ω ? 6

7. (a) What are the different types of Manometer? Which types of manometer is used for better sensitivity and describe it? 4

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

8. (a) How Piezoelectric accelerometers works? 4

(b) Draw and explain Bourdon tube (C type) pressure gauge. 6

9. (a) How AC tachogenerators work? Explain. 4

(b) Explain pressure head type densitometer. 6

10. (a) How Bimetallic thermometer works ? 4

(b) Write a short note on Optical Radiation Pyrometer. 6

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

(b) Write a short note on Revolution-counter. 6

12. Define gauge pressure and vacuum pressure. Explain the operating principle of McLeod gauge with a schematic diagram. What is its measurement range ?