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2019

**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 **thirteen**.

1. (a) If Pt100 is used for measurement of temperature then at what temperature its resistance is  $130\Omega$ , where Alpha is  $0.0039 \text{ ohm}/^\circ\text{C}$ ? 6
- (b) Explain temperature measure using 4-wires RTD using current transmission. 4
2. (a) Write the laws of thermocouple with explanation. 6

Contd.

(b) Define Seeback effect and Peltier effect. 4

3. (a) A strain gauge has a gauge factor 4. If it is stretched from 2cm to 2.3cm, what will be the percentage change in resistance? 6

(b) Explain cold junction compensation using ice bath method. 4

4. (a) How pressure gauge calibrates using dead weight tester. 6

(b) How a Biometalic thermometer works? 4

5. (a) Draw complete LVDT circuit with phase sensitive demodulation. 6

(b) Write a short note on seismic instrument as an accelerometer. 4

6. (a) What are the different types of manometers? Which type of manometer is used for better sensitivity and describe it? 6

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(b) Write a note on Elastic type pressure sensor. 4

7. (a) Write a short note on IC temperature sensor. 6

(b) Explain the working principle of Ionization gauge. 4

8. (a) How piezo-electric accelerometer works? 6

(b) Draw a sketch to show the essential parts of a Bourdon tube pressure gauge and describe the purpose of each part. 4

9. (a) How A.C. tachogenerator works? 6

(b) Explain Pressure head type densitometer. 4

10. (a) How PLL works? Explain with diagram. 6

(b) Write a short note on Total radiation pyrometer. 4

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Contd.

11. (a) Write a note on stroboscope. 6  
(b) What is the use of Revolution Counter ?  
How it works ? 4
12. (a) An *Hg* manometer has an arm in the shape of a well and the other as a tube inclined at an angle  $45^\circ$  with the horizontal. The well is 4cm in diameter and the tube is 1mm in diameter. Find the percentage of error, if no area correction factor is used. 6  
(b) Write the equation of gauge factor and explain. 4
13. Define gauge pressure and vacuum pressure. Explain the operating principle of Pirani gauge with a schematic diagram. What is the measuring range and accuracy ? 10

