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53 (IE 701) ININ

2021

( Held in 2022 )

**INDUSTRIAL INSTRUMENTATION**

Paper : IE 701

Full Marks : 100

Time : Three hours

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

Answer **any five** questions.

1. (a) Write the equation of gauge factor and explain. 4
- (b) Draw the setup of total radiation pyrometer. 6
- (c) If Pt100 is used for measurement of temperature, then at what temperature its resistance is  $125\text{ ohm}$  ?  $\text{Alpha} = .0039\text{ ohm/ohm/C}$ . 4
- (d) Explain temperature measurement using 3 wires RTD using Wheatstone bridge circuit. 6

Contd.

2. (a) Write on J, K, S types of thermocouples with their compositions and temperature range. 4
- (b) A strain gauge has a gauge factor of 3. If it is stretched from 2 cm to 2.2 cm, what is the percentage change in resistance? 6
- (c) What is cold junction compensation? What are the types? 4
- (d) How is pressure gauge calibrated using deadweight tester? 6
3. (a) Draw a complete LVDT circuit with phase-1 sensitive demodulation. 4
- (b) How does a DC tachogenerator work? 6
- (c) What are different types of manometers? 4
- (d) Explain cold junction compensation using ice bath method. 6
4. (a) Write a short note on IC temperature sensor. 4
- (b) Explain the working principle of Ionization gauge. 6
- (c) Define Seebeck effect. 4



- (d) Draw a neat sketch to show the essential parts of a Bourdon tube pressure gauge and describe the purpose of each part. 6
5. (a) How do A.C tachogenerators work ? 4  
(b) Write a note on Elastic-type pressure sensor. 6  
(c) How does a Bimetallic thermometer work ? 4  
(d) Write a short note on Optical radiation pyrometer. 6
6. (a) Write a short note on Stroboscope. 4  
(b) Write a short note on Revolution counter. 6  
(c) Define gauge pressure and vacuum pressure. What is the measuring range and accuracy of McLeod gauge ? 4  
(d) Explain the operating principle of McLeod gauge with a schematic diagram. 6

