

P. Pages : 2

Time : Three Hours

**GUG/S/25/14256**

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. Illustrate your answers wherever necessary with the help of neat sketches.

- 1.** a) Discuss with neat diagram need of cold junction compensation for temperature measurement in thermocouples. Elaborate any one method in detail. 8
- b) The temperature of a process tank was measured using a Pt 100 RTD. It was found that the final temperature measured was 99°C. Calculate the unknown resistance. (Temp. coefficient  $\alpha = 0.00392$ ). 8

**OR**

- 2.** a) Draw block diagram of generalized instrumentation system. Explain role of sensors in brief. What are typical characteristics of any sensor. 8
- b) Compare with neat sketch two, three, and four wire configurations in RTD. List one application of each. 8
- 3.** a) Discuss ‘Evolution of transmitter’ in short. 8
- b) Justify the need of a square root extractor. Draw and discuss in detail the design of square root extractor. 8

**OR**

- 4.** a) Draw and explain the working of Orifice meter. Enlist its advantages, limitations, and typical applications. 8
- b) In the water flow measurement application, an orifice plate is designed with the following parameters: the coefficient of discharge ( $C_d$ ) is set as 0.619, the beta ratio ( $\beta$ ) is 0.5 and orifice plate diameter is designed as 50mm. It is found that the volumetric flow measured with the set up is 3000lph. Calculate the input differential pressure ( $\Delta P$ ). (Assume the expansibility coefficient as 1). 8
- 5.** a) Write a short note on classification of Level sensors. 8
- b) A pressure gauge located at the base of an open tank containing a liquid with a specific weight of 57.7 lb./ft<sup>3</sup> registers 12.4 psi. What is the depth of the fluid in the tank? 8

**OR**

- 6.** a) With the help of a suitable diagram, explain the pressure measurement using strain gauge. Draw the appropriate signal conditioning circuit. **8**
- b) List and explain factors affecting sensitivity of pressure measurement. **8**
- 7.** a) Write a short note on valve positioner? **8**
- b) What is an actuator? Justify its need. Explain pneumatic actuator with neat diagram. **8**

**OR**

- 8.** a) Explain following valve terminology: **8**
- |                   |           |
|-------------------|-----------|
| 1) Galling        | 2) Bonnet |
| 3) Valve capacity | 4) Trim   |
| 5) Yoke           |           |
- b) Illustrate the concept of cavitation and Flashing. Explain the remedies to reduce the cavitation. **8**
- 9.** a) Explain Multi-layer and SMD boards in details. **8**
- b) Enlist soldering techniques. List the different materials used in soldering. Explain any one technique in short. **8**

**OR**

- 10.** a) Differentiate between Quality and reliability. Explain in short. **8**
- b) Elaborate with neat diagram the Bathtub curve. **8**

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