

B.E. Instrumentation Engineering (Model Curriculum) Semester-VII
IN701M - Instrumentation System Design

P. Pages : 2

Time : Three Hours



GUG/W/24/14256

Max. Marks : 80

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- 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.

1. a) Illustrate the design considerations of temperature transducers in general. 8
- b) Explain the calibration procedure for the thermocouple in detail. 8

OR

2. a) The temperature of a process tank was measured using a Pt 100 RTD. It was found that the final temperature measured was 84°C. Calculate the unknown resistance. (Temp. coefficient $\alpha = 0.00392$). 8
 - b) Distinguish the temperature sensors with the help of- 8
 - i) Range
 - ii) Accuracy
 - iii) Sensitivity
 - iv) Input-output characteristics
3. a) Illustrate the concept of span and zero with respect to transmitters in detail. 8
 - b) In the water flow measurement application, an orifice plate is designed with the following parameters: the coefficient of discharge (Cd) is set as 0.619, the beta ratio (β) is 0.25 and orifice plate diameter is designed as 50mm. It is found that the volumetric flow measured with the setup is 2000lph. Calculate the input differential pressure (ΔP). (Assume the expansibility coefficient as 1). 8

OR

4. a) Why current transmission is preferred in automation industry? List its advantages, disadvantages and applications. 8
- b) Discuss in short installation, and calibration of any flow sensor. 8

5. a) What are convertors. Elaborate P/I converter in detail. List its applications. 8
- b) What are the different types of pressure and their ranges. Draw a neat diagram distinguishing different types of pressures. 8

OR

6. a) Design capacitive level sensor. List and explain various components in its signal conditioning circuit. List the steps to build the circuit. 8
- b) A pressure gauge located at the base of an open tank containing a liquid with a specific weight of 44.5 lb/ft³ registers 10.7 psi. What is the depth of the fluid in the tank? 8
7. a) Draw and describe ideal and installed control valve characteristics. 8
- b) What is the need of valve positioner for the operation of control valve? 8

OR

8. a) Justify the need for an actuator? Explain pneumatic actuator with neat diagram. 8
- b) Illustrate the concept of cavitation and Flashing. Explain the remedies to reduce the cavitation. 8
9. a) Enlist various Soldering materials and techniques. Explain any one technique in short. 8
- b) Draw and discuss Bathtub curve. 8

OR

10. a) Write a short note on Single, Double, Multi-layer and SMD boards. 8
- b) Discuss in brief reliability concepts and causes of failure. 8
