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

IN701M - Instrumentation System Design

P. Pages : 2 **GUG/S/23/14256**

Time : Three Hours * 2 9 7 2 * 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.

1. a) List various static and dynamic characteristics of instruments and also explain in details. **8**

b) List various temperature sensor used in process automation. Draw and explain the temperature measurement using RTD with appropriate signal conditioning system. **8**

OR

2. a) Discuss selection criteria for temperature transducers. **8**

b) Describe in details the design consideration for thermocouple. **8**

3. a) Why current transmission is preferred in automation industry? Discuss the components of 4-20 mA, 2-wire type transmitter. **8**

b) Illustrate the concept of zero and span adjustments in transmitters. **8**

OR

4. a) Develop closed loop flow measurement system using orifice plate. Draw the different types of orifice plate and give applications of each. **8**

b) Propose a flow measurement system using rotameter. **8**

5. a) With the help of suitable diagram, explain the pressure measurement using strain gauge. Draw the appropriate signal conditioning circuit. **8**

b) What is converter? Explain I to P converter in detail. **8**

OR

6. a) List and explain factors affecting sensitivity of pressure transducers. **8**

b) Design a level sensor with its signal conditioning circuit. **8**

7. a) What is the need of actuator? Explain pneumatic actuator with neat diagram. **8**

b) Find the CV and valve size that must allow 150 gal of ethyl alcohol/min with a specific gravity of 0.8 at its maximum pressure of 50 Psi. **8**

(Given : valve size (inches) CV

1/2	3
1	14
1½	35

OR

8. a) Explain the following terms w.r.t control valve in details. **8**

i) Rangeability ii) Turndown

iii) Valve capacity iv) Throttling valve

b) Illustrate the concept of cavitation and Flashing. Explain the remedies to reduce the cavitation. **8**

9. a) Write a short notes on following terms, w.r.t. reliability. **8**

i) Redundancy and redundant system.

ii) Bath tub curve

iii) MTTF, MTBF.

iv) Quality and reliability.

b) Develop and discuss logic circuits for alarm annunciator system. **8**

OR

10. a) Explain in brief reliability concepts and causes of failure. **8**

b) Draw and explain PCB design techniques. **8**

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