B.E. Instrumentation Engineering Sem-V

IN501 - Process Automation

P. Pages : 2 **GUG/S/19/1641**

Time : Three Hours * 1 2 7 5 * Max. Marks : 80

Notes : 1. Same Answer book must be used for all question.
2. All questions carry marks as indicated.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.
5. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Define process time constant ? Explain the steps to calculate it. **8**

b) Describe in brief the concept of Mathematical Modeling. **8**

OR

2. a) Elaborate Evolution and benefits of Automation in Industry. **8**

b) List different process variables. Write guidelines for selection of manipulated variables. **8**

3. a) Describe two position control mode in detail. **8**

b) Illustrate the concept of tunning ? Explain in detail Ziegler - Nichols method. **8**

OR

4. a) Discuss the concept of Integral wind-up and its prevention. **8**

b) A liquid level control system linearly converts a displacement of 2-3 meters in to 4-20 mA control signal. A relay serves as a two position controller to open or close and inlet valve. The relay closes at 16 mA and open at 13 mA. Find : **8**
i) Relationship between level and current
ii) Neutral zone in meters.

5. a) Elaborate override control with any one typical industrial application. **8**

b) Distinguish between feedback and feedforward control. **8**

OR

6. a) Discuss the concept of Robust control. **8**

b) Identify the need of Ratio control ? Discuss Ratio control with suitable diagram. **8**

7. a) Describe HMI in detail. Also list it's applications. **8**

b) Enlist various programming methods of PLC. Explain any one in details. **8**

OR

8. a) Design control action program for bottle filling plant using ladder language. Use standard symbols. **8**

b) Elaborate the concept of Interlocks and alarms in PLC. **8**

9. a) List typical applications and specifications of distributed control systems. **8**

b) Define protocol ? Describe HART protocol in detail. **8**

OR

10. a) Distinguish in details PLC & DCS. **8**

b) Describe how DCS can support enterprise resource planning as a automation tool. **8**

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