B.E. Instrumentation Engineering Fifth Semester

IN501 - Process Automation

P. Pages : 2 **GUG/W/18/1641**

Time : Three Hours * 1 2 9 0 * Max. Marks : 80

Notes : 1. Same Answer book must be used for each 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) State and discuss degree of freedom. Calculate DOF if number of variables are 6 and number of equations are 2. **6**

b) Elaborate the concept of 'Evolution of Automation' in industry. **6**

c) Define process time constant state its significance. **4**

OR

2. a) Discuss mathematical modelling in detail. **8**

b) Enlist different process variables. State the guidelines for selection of controlled variable. **8**

3. a) Illustrate PID controller in detail. **8**

b) Elaborate two position mode in short. List its advantages and applications. **8**

OR

4. a) Elaborate the concept of 'Integral wind up and its prevention'. **8**

b) Define controller tuning. List different methods of PID tuning. Discuss any one in short. **8**

5. a) Describe split range control with neat sketch. **8**

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

OR

6. a) Discuss in short 'Adaptive Control'. **8**

b) Elaborate cascade control in detail with neat diagram. **8**

7. a) List typical specifications of PLC. Also list the Vendors for PLC. **8**

b) Elaborate the typical working of SCADA. List its applications. **8**

OR

8.	a)	Discuss 'Human Machine Interface' in detail. State its significance in process industry.	**8**
	b)	Describe various techniques for PLC programming. Discuss any one with suitable example. Use standard symbols.	**8**
9.	a)	Distinguish in between PLC and DCS.	**8**
	b)	Define protocol. Describe HART protocol. List its advantages.	**8**

OR

10.	a)	Discuss how DCS can support Enterprise Resource Planning as automation tool.	**8**
	b)	Elaborate architecture of 'Distributed control System' Justify application of DCS in process industries.	**8**

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