IN603M / PROCESS - Process Automation

P. Pages : 2

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2370

GUG/S/25/14030

Time : Three Hours

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.
4. Diagrams and Chemical equation should be given wherever necessary.

1. a) Discuss the history of automation in detail. **8**

b) State and illustrate the use of robotics in automation industry. **8**

OR

2. a) Obtain mathematical model of a blending process. **8**

b) A controller output is 4-20 mA signal to control motor speed from 140 to 600 rpm with linear dependence. Calculate
a) Current corresponding to 310 rpm
b) the value of
c) expressed as the percentage of control output. **8**

3. a) List the types of discontinuous controller mode. Explain two position controller mode with neutral zone. **8**

b) An integral controller is used for speed control with a set point of 12 rpm within a range of 10 to 15 rpm. The controller's output is initially 22%. The constant K_i = - 0.15% controller's output per second per percentage error. If the speed jumps to 13.5 rpm, Calculate the controller output after 2 seconds, assuming the error remains constant during this period. **8**

OR

4. a) List the types of composite controller mode and explain PI controller in brief. **8**

b) Write a short note on two position control mode. List its advantages and disadvantages. **8**

5. a) When are selective control systems used? Explain with suitable examples. **8**

b) Illustrate cascade control system. What are the main advantages and disadvantages of cascade control? **8**

OR

6. a) Illustrate the examples of control system with multiple loops and explain split range control. **8**

b) Write a note about the ratio control system. **8**

7. a) Develop a PLC ladder logic for AND, OR, NOT, NAND & NOR gates. **8**

b) Explain in detail the timer and counters in PLC. **8**

OR

8. a) Draw ladder logic and powerline diagram to control direction of 3 phase induction motor. **8**

b) Write a note on SCADA. **8**

9. a) Write a short note on Local Control Unit (LCU) in distributed control system. **8**

b) Explain concept of data redundancy in detail. **8**

OR

10. a) Write note on field bus standard. **8**

b) Explain communication protocols in DCS. **8**

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