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Question Paper Code: 31603

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Sixth Semester

Instrumentation and Control Engineering

01UIC603 - PROCESS CONTROL

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. What are the different mathematical models used in process control?
2. Distinguish between servo and regulator operation of control system.
3. Define windup of the controller.
4. Design an electronic p-controller with a proportional gain 5.
5. Point out the effects of reset time on the controlled process.
6. Give the difference between split-range control and selective control.
7. State control valve sizing.
8. Differentiate flashing and cavitations in a control valve.
9. List the components of heat exchanger.
10. Identify the input and output variables of distillation column.

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Explain with suitable examples, the difference between the interacting and non-interacting processes. (8)
- (ii) Briefly explain about the self-regulation process with an example. (8)

Or

- (b) Deduce the mathematical model of thermal system. (16)
12. (a) (i) With neat schematic diagram, briefly explain about the single speed floating control. (8)
- (ii) When an on-off controller is recommended? How its performance affected by process dead time. (8)

Or

- (b) (i) Compare the features of ON and OFF, P, I, D control modes and draw their characteristics. (8)
- (ii) Design an electronic PI controller with proportional gain = 10 and integral gain = 0.18S^{-1} . (8)
13. (a) Write short notes on
- (i) ratio control (ii) inferential control (16)

Or

- (b) Explain the process reaction curve method and Ziegler Nichol's method of tuning a controller. (16)
14. (a) (i) With a neat diagram, explain the functioning of a valve positioner. What are the advantages of using the same. (10)
- (ii) Explain the working of a simple current to pressure converter, with a neat diagram. (6)

Or

- (b) Explain about cavitation and flashing. Discuss about the methods to overcome. (16)
15. (a) (i) Explain about control of a heat exchanger, using feed forward control. (8)
- (ii) Explain feed forward control with an example from distillation column. (8)

Or

- (b) With necessary sketch, explain in detail about CSTR. (16)