53 (IE 601) PRCN

2016

PROCESS CONTROL

Paper : IE 601

Full Marks : 100

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

*Answer **any five** questions out of **seven**.*

1. *(a)* Describe a simple thermal system in which incoming liquid is heated by the heater in the tank and going out with higher temperature. Develop first order transfer function of the thermal process. 10

    (b) Illustrate servo and regulatory operation with an example for each. 10

2. (a) Describe the characteristics of P, PI and PIP modes. 10

   (b) With a neat block diagram, explain the functioning of a pneumatic PID controller. 10

3. (a) Explain the method of process reaction curve and damped oscillations for tuning the controllers. 10

   (b) What is the use of evaluation criteria ? Explain IAE, ISE, ITAE and $\frac{1}{4}$ decay ratio criteria. 10

4. (a) What is meant for split range control ? Explain with an example. 10

   (b) Explain the concept of ratio control with an example ? 10

5. (a) Explain the principle of working and construction of I/P converter. 10

   (b) Describe the construction and working of a solenoid. Give a suitable application. 10

6. (a) What are the characteristics and sizing of control valves ? 10

(b) Explain Cavitation and Flashing in Control Valves. 10

7. (a) Briefly explain the Control Schemes in the distillation column. 10

(b) Draw a neat sketch of pneumatic actuated control valve with positioned and explain its working. 10

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