

EI-702**B. E. (Seventh Semester) EXAMINATION, Dec., 2009**
(Electronics & Instrumentation Engg. Branch)**PROCESS CONTROL**

(EI-702)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt *one* question from each Unit. Total number of questions to be attempted is five. Internal choice is given in each Unit.

Unit-I

- (a) Draw and explain in brief, the block diagram of a process control system. 10
- (b) A liquid level ranging from 5.5 m to 8.6 m is linearly converted to pneumatic pressure range from 3 – 15 psi. What pressure will result from a level of 7.2 m ? What level does a pressure of 4.7 psi represent ? 10

Or

- (a) Discuss the following terms in context of a process control system : 10
- (i) Stability
- (ii) Steady state regulation

- (iii) Transient regulation
- (iv) Evaluation criteria
- (b) Define time constant of a sensor. A sensor measures temperature linearly with static transfer function of 33 mV/°C and has a 1.5 sec time constant. Find the output 0.75 sec after the input changes from 20°C to 41°C. Find the error in temperature this represents. 10

Unit-II

3. (a) Explain control value characteristics. Also discuss various types of control values. 10
- (b) Explain the role of value positioners in process control system. 10

Or

4. (a) Explain tuning of controllers by Zeigler-Nichol's technique. 12
- (b) Explain the working principle of current to pressure converter using a nozzle/flapper. 8

Unit-III

5. (a) Demonstrate feedforward control scheme with the help of suitable example and proper diagrams. 12
- (b) Explain in brief over-ride control scheme. 8

Or

6. (a) How is cascading implemented in process control systems ? Explain cascade control with suitable diagrams. 10
- (b) In what conditions will you prefer to use ratio control ? Explain how ratio control is implemented with proper example. 10

Unit-IV

7. What is the purpose of heat exchangers ? Explain the operation and control scheme implemented in heat exchangers. Discuss different types of heat exchangers. 20

Or

8. Write brief notes on the following : 20
- (i) distillation columns
- (ii) absorbers

Unit-V

9. (a) Draw the diagram of a data logging system for use in process control. Explain it in brief. 12
- (b) Differentiate between supervisory control and direct digital control (DDC). 8

Or

10. What are Programmable Logic Controllers (PLC) ? Explain in brief the programmable logic control (PLC) design, PLC operation and PLC programming. 20