

Seat  
No.

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DEI1349

**Process Instrumentation (New)**  
**(1300)**

**P. Pages : 2**

**Time : Three Hours**

**Max. Marks : 100**

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Solve **any two** questions from each unit.
5. Draw diagrams wherever necessary.
6. Use of non-programmable calculators is allowed.
7. Figures to the right indicate full marks.

**UNIT - I**

1. Discuss the following : 10
  - a) Process
  - b) Human aided control
  - c) Automatic control.
2. Derive & prove a circuit works as V to I converter. 10
3. Draw & Discuss the working of electro-hydraulic piston actuator. Also define actuators. 10

**UNIT - II**

4. a) Describe in detail the control valve sizing. 6  
b) A fully open 2 inch size valve passes 100gpm of water at a pressure differential of 7.0 psi. Calculate the  $C_v$  coefficient. 4
5. Define controller modes. Also describe the following : 10
  - a) Two position mode
  - b) Multiposition mode
  - c) Floating mode.

6. Draw & explain fluid flow through control valves. 10

### UNIT - III

7. Define proportional control mode. Describe direct & reverse action. Draw diagrams to show : 10  
i) PB & gain  
ii) offset error.
8. a) An integral controller is used for speed control with a set point of 12rpm within a range of 10 to 15 rpm. The controller O/P is 22% initially. The constant  $K_I = -0.15\%$ . Controller output per second per percentage error. If the speed jumps to 13.5rpm. Calculate the controller output after 2sec. for a constant  $e_p$ . 6  
b) Summarize the characteristics of the integral mode. 4
9. State the mathematical expression of proportional & reset action composite control mode. Summarize the characteristics of the same and draw the diagrams to support your statements. 10

### UNIT - IV

10. Describe working of split range control system in detail. Give example of the same. 10
11. Draw the various control schemes used for heat exchangers. 10
12. Draw & explain the control of stirred reactors. 10

### UNIT - V

13. Enlist & describe the basic functions of the computer system. 10
14. Draw & explain a direct digital control to control the set point of a boiler. 10
15. Draw & explain the types of Data acquisition systems. 10

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