Reg. No. :

Question Paper Code: 31554

B.E. / B.Tech. DEGREE EXAMINATION, NOVEMBER 2015

Fifth Semester

Electronics and Instrumentation Engineering

01UEI504 – PROCESS CONTROL INSTRUMENTATION

(Regulation 2013)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. List any four objectives of process control.

2. Quote self regulation.

3. Define proportional band.

4. Tell any two limitations of single speed floating control.

5. Discuss Integral Square Errors (ISE).

6. List the parameters required to design a best controller.

7. Differentiate inherent characteristics and installed characteristics.

8. Define control valve sizing.

9. Quote ratio control.

10. When is inferential control used?

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Summarize continuous and batch processes.   (4)

    (ii) Develop the transfer function for interactive capacities of two tank system.   (12)

(b) (i) Summarize servo and regulator operations. (4)

(ii) Develop the transfer function for non-interactive capacities of two tank system. (12)

12. (a) (i) Illustrate the characteristic of composite control mode (PI mode) in detail and mention any two advantages and disadvantages. (8)

(ii) Illustrate the operation of electronic PID controller. (8)

Or

(b) (i) What is cycling? (4)

(ii) A temperature control system inputs the controlled variable as a range from 0 to 4V. The output is a heater requiring 0 to 8V. A PID is to be used with $K_P = 2.4\%/\%$, $K_I = 9\%/(\% - \min)$ and $K_D = 0.7\%/(\%/\min)$. The period of the fastest expected change is estimated to be 8 Sec. Show the PID circuit. (12)

13. (a) Discuss the operation of process reaction curve method for P, PI and PID controllers. (16)

Or

(b) (i) Describe the Ziegler- Nichols method of tuning PID Controllers. (10)

(ii) Discuss about damped oscillation method. (6)

14. (a) (i) Draw the diagram for current to pressure converter and discuss its operation. (8)

(ii) Describe the principle of pneumatic actuators. (8)

Or

(b) (i) Summarize cavitation and flashing. (10)

(ii) List the factors involved in the selection of a control valve. (6)

15. (a) With suitable example explain the concept of cascade control. (16)

Or

(b) Explain the working of a split range control scheme for a chemical reactor. (16)

————————————

31554