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Question Paper Code: 31554

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

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. Compare servo and regulatory operation with level control process application.
3. Define proportional band.
4. Draw the pneumatic PID controller structure.
5. Discuss Integral Square Errors (ISE).
6. Define tuning of controllers.
7. Differentiate inherent characteristics and installed characteristics.
8. Differentiate flashing and cavitation in a control valve.
9. Quote ratio control.
10. Compare Feed forward and feedback controllers.

PART - B (5 x 16 = 80 Marks)

11. (a) Compare continuous process and batch process. Explain with an example. (16)

Or

(b) Develop the transfer function for non-interactive capacities of two tank system. (16)

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) Design a proportional-integral controller with a proportional band of 30% and an integration gain of $0.1\%/(\% \cdot S)$. The 4 to 20 mA input converts to a 0.4 to 2V signal, and the output is to be 0-10V. (16)

13. (a) Describe in about the procedure involved in PID tuning from the open loop and closed loop tuning methods. (16)

Or

(b) Describe the Ziegler- Nichols method of tuning PID Controllers. (16)

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) Briefly explain the inherent and installed characteristics of the control valves. (16)

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)
