

B.TECH. DEGREE EXAMINATION, MAY 2014

Sixth Semester

Branch : Applied Electronics and Instrumentation/Electronics and Instrumentation/
Instrumentation and Control Engineering

AI 010601/EI 010601/IC 010601—PROCESS CONTROL INSTRUMENTATION
(AI, EI and IC)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer all questions briefly.
Each question carries 3 marks.*

1. What do you mean by process equation and process lag ?
2. What do you mean by Bumpless transfer ?
3. Enlist any *five* simple performance criteria used for the selection and tuning of a controller.
4. Draw a neat sketch of Ball valve.
5. Comment on multivariable process control.

(5 × 3 = 15 marks)

Part B

*Answer all questions.
Each question carries 5 marks.*

6. Differentiate between Regular control and Servo control.
7. Define and describe the derivative control mode. Derivative controller alone is seldom used in a process. Why ?
8. Explain clearly the damped oscillation method.
9. Explain valve sizing with an example to find the valve size.
10. Differentiate between Cascade and Inferential control schemes.

(5 × 5 = 25 marks)



Turn over

Part C

Answer all questions.

Each question carries 12 marks.

11. Develop a mathematical model of an interacting type liquid level process.

Or

12. Explain (i) self regulation ; and (ii) servo regulation operation with the help of examples.

13. Draw and describe the electronic PID controllers. Draw the output waveform for an error and compare the composite mode with individual modes ?

Or

14. Sketch the response of various types of controllers for step and ramp inputs.

15. Describe how Ziegler-Nichols method is used for tuning.

Or

16. Explain the (a) tuning of controllers by process reaction curve method ; and (b) optimum controller settings.

17. What is a pneumatic control valve ? With suitable examples, explain its classifications.

Or

18. (a) What is meant by cavitation ? Explain.

- (b) Draw the valve characteristics and explain.

19. Stating a practical case study, explain split range and averaging control schemes.

Or

20. Explain how a microcontroller can be used to control either a boiler operation or a distillation column.

(5 × 12 = 60 marks)

