

G 1130

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Seventh Semester

Branch : Applied Electronics and Instrumentation Engineering

PROCESS DYNAMICS AND CONTROL (A)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 4 marks.

1. Differentiate continuous and Batch process with example.
2. Derive the transfer function for a 2-tank non-interacting system.
3. Explain the functioning of pneumatic PID controllers.
4. Briefly discuss the comparisons of electrical, hydraulic and pneumatic system.
5. What is tuning ? What are methods used for this purpose ?
6. What is $1/4^{\text{th}}$ decay ratio ?
7. With a neat sketch explain the working of a I/P converter.
8. What is meant by cavitation ?
9. Explain the uses of process identification exercise.
10. Explain the procedure for determination of cloud loop transfer function of a multivariable system.

(10 × 4 = 40 marks)

Part B

Answer all questions.

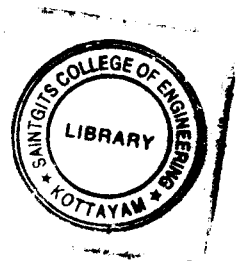
Each full question carries 12 marks.

11. (a) A thermocouple of time constant 2 min is placed in a bath of 150°C. The bath temperature increases linearly at the rate of 1.5° C/min. Sketch the response of the system.
(6 marks)
- (b) Derive the response equation of an RC circuit to a unit step input and sketch the response.
(6 marks)

Or

12. Explain self-regulation and servo regulation with suitable examples.

Turn over



13. Explain in detail about the effect of P, I, D and composite control modes on the response of controlled process.

Or

14. Explain the block diagram of a process control system and the final control operations.
15. Explain the block diagram representation of self-tuning controllers. How can the parameter estimation and control law be implemented in self-tuning controller.

Or

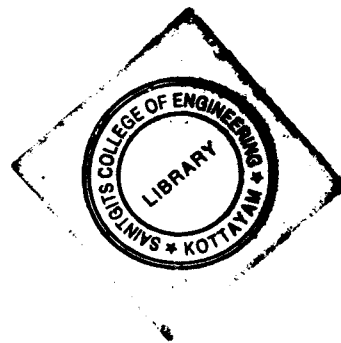
16. Explain the process reaction curve method and continuous cycling method of controller tuning.
17. With the help of a suitable diagram, explain the principle of operation of a valve positioner.

Or

18. Draw schematics and explain the working of hydraulic actuator. Compare it with other types of actuators.
19. (a) Explain the state space description method and list its advantages. (6 marks)
(b) If $\dot{X} = Ax + Bu$, explain how this can be transformed in to transfer function matrix. (6 marks)

Or

20. Write notes on :
(i) Ratio control.
(ii) Feed forward control.



(6 + 6 = 12 marks)
[5 × 12 = 60 marks]