

Fifth Semester B.E. Degree Examination, Jan./Feb. 2021

Process Control System

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Draw the block diagram of General Purpose control system. Explain the function of each block. (10 Marks)
- b. With a neat block diagram, describe the working of Automatic control system. (10 Marks)

OR

- 2 a. Use necessary sketches to illustrate the degree of baking of trackers showing final control operation. (10 Marks)
- b. Show the necessary graph to illustrate the operation of different types of control valve operation. (10 Marks)

Module-2

- 3 a. Discuss the working of Integral controller mode with necessary diagram and equation. (10 Marks)
- b. Design a system for controlling variable in a motor speed varies from 800 to 1750 rpm. If the speed is controlled by 25 to 50 Vdc signal. Calculate
 - (i) Speed produced by an input of 38 V.
 - (ii) Speed calculated as a percent of span. (10 Marks)

OR

- 4 a. Illustrate the working of proportional integral mode controller with necessary graph and equation. (10 Marks)
- b. PD controller has $K_p = 5.0$, and $K_D = 0.55$ and $P(0) = 20\%$. Plot the controller output for the error input shown in Fig. Q4 (b). (10 Marks)

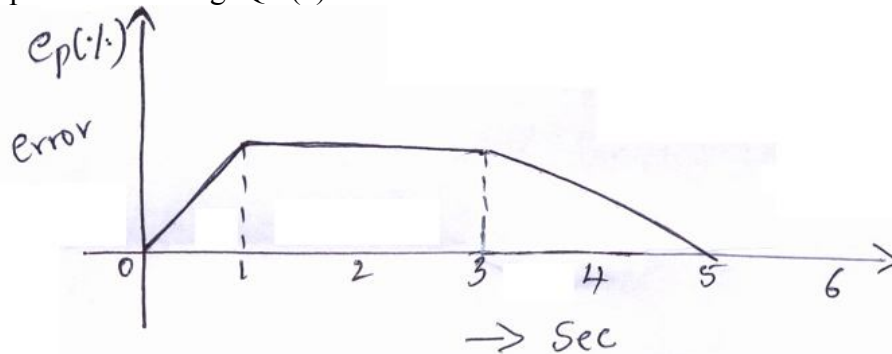


Fig. Q4 (b)

Module-3

- 5 a. Describe the working of supervisory computer control system with a neat diagram. (10 Marks)
- b. Explain the digital steps of derivative mode and PID control mode software. (10 Marks)

OR

- 6 a. With necessary diagram, explain the working of PI and PD controller mode in pneumatic type. (10 Marks)
- b. Explain the supervisory control/sample data system with an example. (10 Marks)

Module-4

- 7 a. Illustrate with a neat diagram, the interaction of two variable process control loop. (10 Marks)
- b. Describe open loop transient response method of process loop tuning for proportional controller with necessary equation. (10 Marks)

OR

- 8 a. Discuss about single variable control system configuration with its types. (10 Marks)
- b. Illustrate the process and instrumentation drawings (PI and D) symbols for various instrument and values. (10 Marks)

Module-5

- 9 a. With block diagram, briefly explain the following :
 (i) Model reference adaptive control.
 (ii) Model identification adaptive control. (10 Marks)
- b. Illustrate the operation of optimal control system. (10 Marks)

OR

- 10 a. Define Artificial Intelligence (AI) and illustrate the difference in working of conventional system and AI system. (10 Marks)
- b. With the flow chart, illustrate the steps to build mathematical model of a plant. (10 Marks)

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