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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)

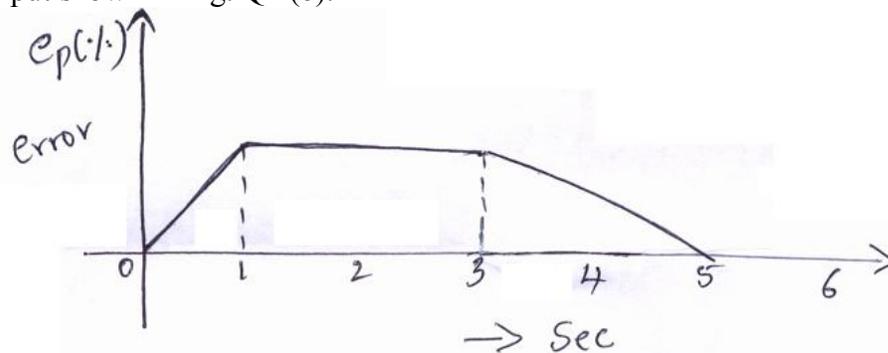


Fig. Q4 (b)

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)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

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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