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15ME73

Seventh Semester B.E. Degree Examination, Dec.2019//an.2020
Control Engineering

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. With a block diagram differentiate open loop and closed loop system. (08 Marks)
- b. Discuss the main requirements of an ideal control system. (08 Marks)

OR

- 2 Explain following types of controller with block diagram and state its characteristics.
 - (i) Proportional
 - (ii) Proportional plus derivative
 - (iii) Integral
 - (iv) Proportional plus integral
 (16 Marks)

Module-2

- 3 a. Obtain the transfer function for an armature controlled D.C. motor, which relates output angular displacement (Q) with input voltage (e). (08 Marks)
- b. A thermometer is dipped in a vessel containing liquid at a constant temperature of 01° . thermometer has a thermal capacitance for storing heat as C and thermal resistance to limit heat flow as R . If the temperature indicated by thermometer is θ , obtain the transfer function of the system. (08 Marks)

OR

- 4 a. Obtain the overall transfer function of the block diagram shown in Fig.Q4(a) by reduction technique. (10 Marks)

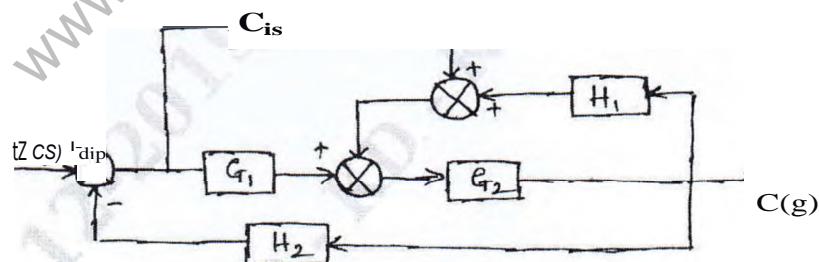


Fig.Q4(a)

- b. Discuss Mason's gain formula and define the following terms used in signal flow graphs.
 - (i) Node (ii) Branch gain (iii) Forward path (iv) Path gain (v) Feedback loop
 - (vi) Self loop
 (06 Marks)

Module-3

- 5 Obtain the expressions for Peak time, Rise time, Maximum overshoot and settling time for a second order control system in terms of damping factor and nature frequency. (16 Marks)