

CBCS SCHEME

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15MR82

Eighth Semester B.E. Degree Examination, July/August 2021 Control Engineering and Automation

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions.

- 1 a. Determine the transfer function $\frac{C(s)}{R(s)}$ of a system shown in Fig Q1(a)

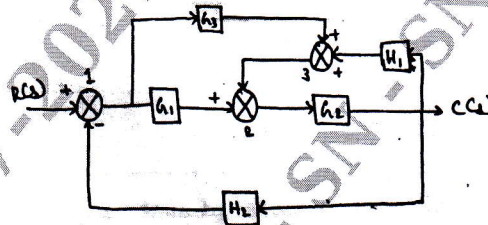


Fig Q1(a)

(08 Marks)

- b. For a mechanical translational system as shown in Fig Q1(b). Draw the electrical network based on torque current analogy. Write its performance equation.

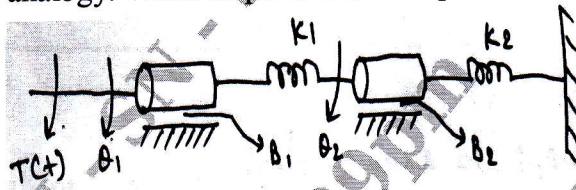


Fig Q1(b)

(08 Marks)

- 2 a. With a help of neat diagram, Define open loop and closed loop control system. Mention any four differences between open loop and closed loop control system. (08 Marks)
- b. For the system shown in Fig Q2(b). Determine $\frac{C(s)}{R(s)}$ using Mason's gain formula.

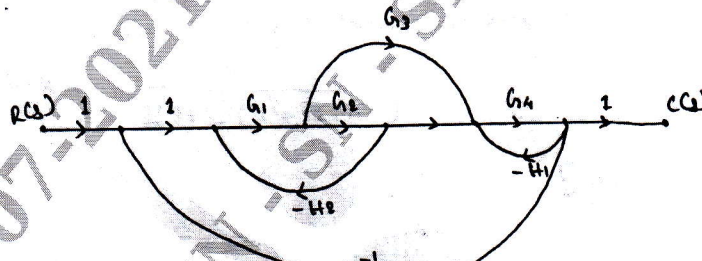


Fig Q2(b)

(08 Marks)

- 3 a. Derive steady state error and error constant. (08 Marks)
- b. Define controller and Derive proportional Integral controller with advantages and disadvantages. (08 Marks)
- 4 a. Define the various types of system compensation with block diagram. (08 Marks)
- b. Mention the types of compensators and derive lead compensator. (08 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.

- 5 a. Sketch the root locus plot of a unity feed back with an open loop transfer function. (10 Marks)
- $$G(s) = \frac{K}{s(s+3)(s^2+3s+4.5)}$$
- b. Determine : i) Gain Crossover Frequency and phase margin
ii) Phase crossover Frequency and gain margin. (06 Marks)
- 6 a. Sketch the Bode plot for $G(s)H(s) = \frac{80}{s(s+2)(s+20)}$ (10 Marks)
- b. For the system with $G(s)H(s) = \frac{K}{s(s+2)}$. Find whether $s = -0.5$ lies on the root locus or not using angle conditions. (06 Marks)
- 7 a. With the help of neat diagram, explain working of piston cooling water system. (08 Marks)
- b. How does the micro controller operates? Explain. (08 Marks)
- 8 a. With a neat sketch, explain marine Boiler combustion control system. (08 Marks)
- b. Explain integrated automation control and monitoring (IC and MS) (08 Marks)
- 9 a. With a neat sketch, explain variable inductance transducer. (08 Marks)
- b. With a neat sketch, explain pneumatic amplifier (Relay) system. (08 Marks)
- 10 a. Write a note on stack type controller. (08 Marks)
- b. Illustrate with neat diagram and explain, Flapper Nozzle. (08 Marks)
