CBCS SCHEME

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15MR82

Eighth Semester B.E. Degree Examination, November 2020
Control Engineering & Automation

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions irrespective of modules.

Module-1

1 a. With the 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. Draw an equivalent mechanical network using force voltage analogy as shown in Fig. Q1 (b). **(08 Marks)**

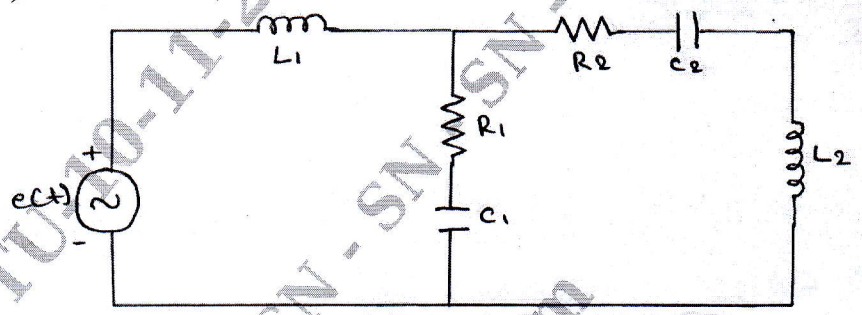

Fig. Q1 (b)

2 a. For a mechanical translation system as shown in Fig. Q2 (a). Draw the electrical network based on torque current analogy. Write its performance equation. **(08 Marks)**

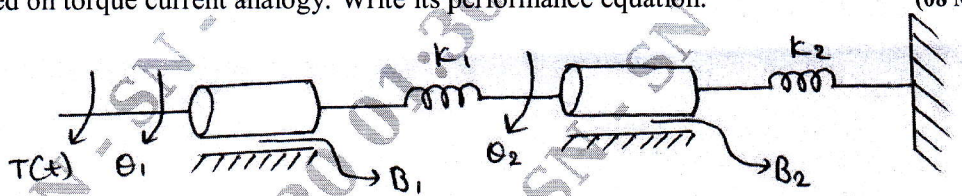

Fig. Q2 (a)

b. Determine the transfer function $\frac{C(s)}{R(s)}$ of a system shown in Fig. Q2 (b). **(08 Marks)**

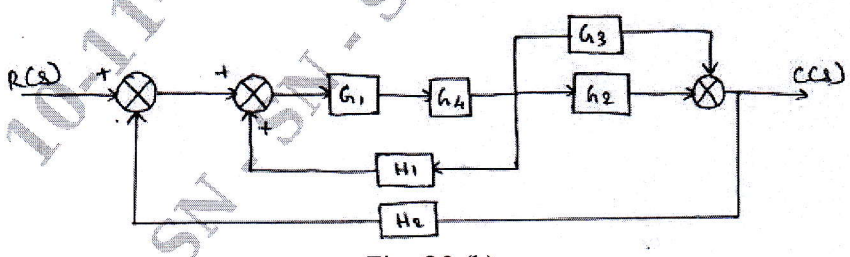

Fig. Q2 (b)

Module-2

3 a. Define the various types of system compensation with block diagrams. **(08 Marks)**

b. Define controller and derive proportional controller with advantages and disadvantages. **(08 Marks)**

4 a. Mention the types of compensators and derive lag compensator. (08 Marks)
b. Derive steady state error and error constant. (08 Marks)

Module-3

5 a. Sketch the Bode plot for $G(s)H(s) = \frac{2}{s(1+s)(1+0.2s)}$. (10 Marks)
b. Determine : (i) Gain crossover frequency and phase margin.
(ii) Phase cross over frequency and gain margin. (06 Marks)

6 a. Sketch the root locus plot of a unity feedback with an open loop transfer function, $G(s) = \frac{K}{s(s+2)(s+4)}$. Find the value of K for stable. (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 condition. (06 Marks)

Module-4

7 a. With a neat sketch explain marine boiler combustion control system. (08 Marks)
b. With the help of neat diagram, explain working of piston cooling water system. (08 Marks)

8 a. Explain integrated automation control and monitoring (IC and MS). (08 Marks)
b. How does the micro-controller operates? Explain. (08 Marks)

Module-5

9 a. With a neat sketch, explain variable inductance transducer any one. (08 Marks)
b. Illustrate with neat diagram and explain Flapper Nozzle. (08 Marks)

10 a. Write a note on stact type controller. (08 Marks)
b. With a neat sketch explain pneumatic amplifier (relay) system. (08 Marks)

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