



Reg. No. :

Name :

Seventh Semester B.Tech. Degree Examination, May 2013
(2008 Scheme)
08.701 : CONTROL SYSTEMS (E)

Time : 3 Hours

Max. Marks : 100

PART - A



Answer all questions.

1. Explain the advantages of a closed loop control systems.
2. Explain force voltage analogy with example.
3. Explain the principle and operation of stepper motor.
4. What is the effect of adding poles and zeroes on Root Locus ?
5. Explain the operation of DC servomotor.
6. Distinguish between static and dynamic error coefficients.
7. Explain the term stability with suitable example.
8. Define Nyquist stability criterion.
9. Distinguish between relative stability and absolute stability.
10. Briefly explain Compensation.



PART - B

(Answer any one full question from each Module)

Module - 1

11. a) Show that the system shown in Fig. (1) and Fig (2) are analogous.

10

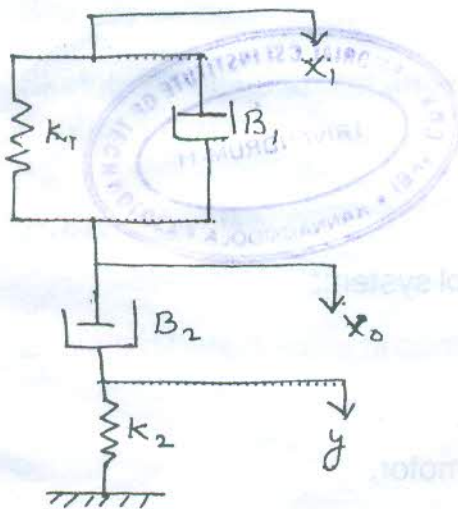


Fig. (1)

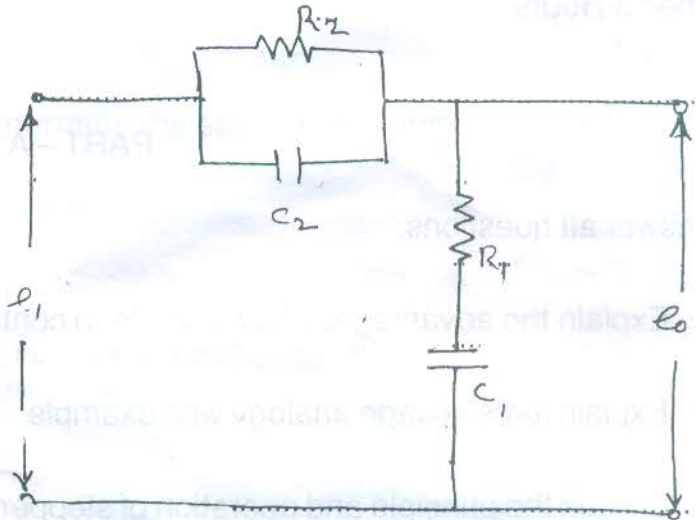
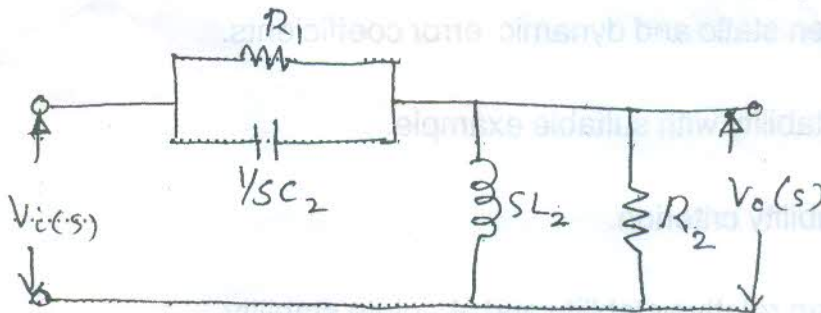


Fig. (2)

b) Determine the transfer function of the given circuit.

10



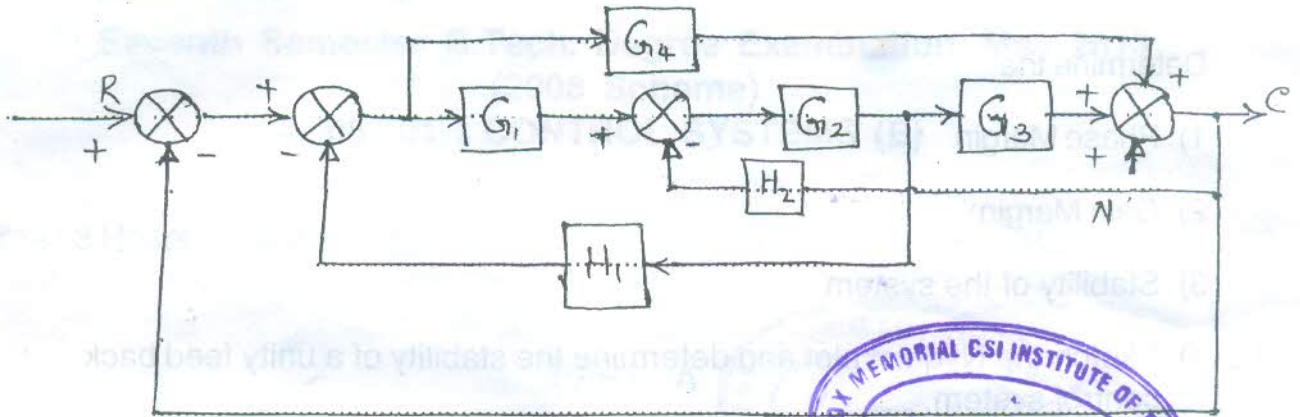
12. Construct an equivalent signal flow graph for the block diagram shown in Fig.

a) Evaluate the transfer function C/R when $N = 0$.

8



- b) Determine the relation among the transfer functions G_1, G_2, G_3, G_4, H_1 and H_2 so that the output C is not affected by the disturbance signal N . 12



Module – 2

13. a) The characteristic equation of a system is given by

$$S^4 + 20S^3 + 15S^2 + 2S + K = 0$$

- 1) Determine the range of k , for system to stable.
- 2) Can system be marginally stable? If so, find the required value of K and the frequency of sustained oscillation.

10

- b) The forward path transfer function of a unity feedback control system is given

$$\text{by } G(S) = \frac{5(S^2 + 2S + 100)}{S^2(S + 5)(S^2 + 3S + 10)}$$

Determine the step, ramp and parabolic error coefficients. Also determine the type of the system.

10

14. a) The open-loop transfer function of a control system with positive feed back is

$$\text{given by } G(S) = \frac{K}{S(S^2 + 4S + 4)}$$

Sketch the root locus diagram of the system as a function of $K (0 < k < \infty)$.

12

- b) Explain the relation between time domain and frequency domain specifications.

8



Module – 3

15. Sketch the Bode Plot for the transfer function $G(S) = \frac{1000}{(1 + 0.1S)(1 + 0.001S)}$.

Determine the

- 1) Phase Margin
- 2) Gain Margin
- 3) Stability of the system.

20

16. a) Sketch the Nyquist plot and determine the stability of a unity feed back control system.

$$G(S) = \frac{K}{(1 + 2S)(1 + S)}$$

12

- b) Explain different types of compensators.

8