[06 – 3216]

III/IV B.E. DEGREE EXAMINATION

Second Semester

Electrical and Electronics Engineering

CONTROL SYSTEMS

(Common with ECE and Dual Degree in ECE, EEE)

(Effective from the admitted batch of 2006–2007)

Time : Three hours Maximum : 70 marks

Question No. 1 is compulsory.

Answer any FOUR from the remaining.

All questions carry equal marks.

1. (a) Give a practical example for an open loop system.

   (b) Define summing point in Block diagram and give an example.

   (c) Write the analogy between translation and Rotational systems.

   (d) What is the effect of a dominant pole on rise time of a system?

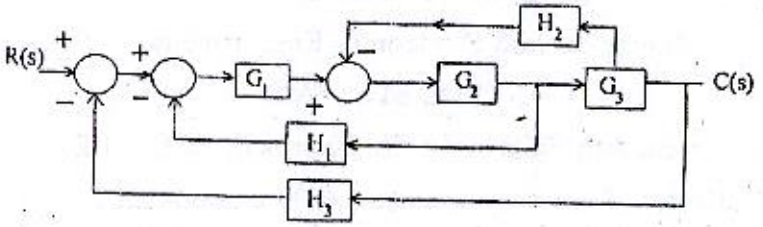
   (e) Explain the function of integral controller.

   (f) Show the effect of adding a pole to the root location.

   (g) What is the significance of M and N circles?

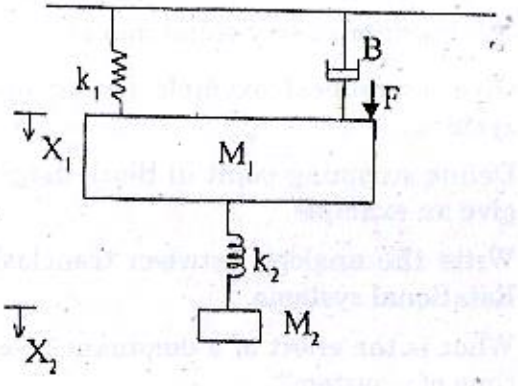
2. (a) Explain Mason's gain formula

(b) Find the overall transfer function.



3. (a) Write the properties of transfer functions.

(b) Obtain the nodal equations and draw its analogous electrical network.



4. (a) Explain the effect of type number of a system on steady state error constants.

(b) Find the transfer function of a second order system with peak time : $t_p = \pi/12$ seconds and a maxim overshort, $M_p = 0.095$.

5. (a) What are the limitations of RH criterion?

(b) The characteristic equation is $p(s)$,

$$p(s) = s^4 + 20k s^3 + 5s^2 + 10s + 15 = 0 .$$

Find the range of 'k' for which the system is stable.

6. Show that a part of the root locus of the system with $G(s) = \frac{k(s+3)}{s(s+2)}; H(s) = 1$ is circular.

7. For a unity feedback system

$G(s) = \frac{800(s+2)}{s^2(s+10)(s+40)}$, sketch the Bode plots and comment on stability.

8. Write notes on the following :

(a) Polar plots

(b) Relative stability of a system.
