B. Tech Degree VI Semester Examination, April 2009

CS/EC/EB/EI 605 CONTROL SYSTEMS ENGINEERING

(2006 Scheme)

Time : 3 Hours Maximum Marks : 100

PART – A

(Answer ***ALL*** questions)

(8 x 5 = 40)

I. (a) State any five theorems of Laplace transform.

(b) What is analogous systems? Compare the parameters in force – voltage analogous system.

(c) Plot the step response of a second order system and mark the different time domain specification.

(d) What is derivative control? What are its advantages?

(e) What do you mean by a stable system? How will you investigate the stability of a system using Nyquist criterion ?

(f) What is bode plot? What are its advantages over other plots?

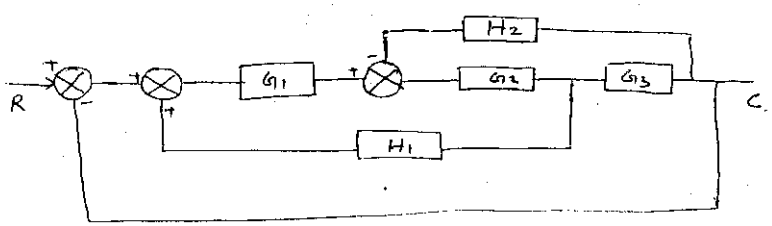
(g) What is root locus method?

(h) What is the use of compensators in control system? Comment on series compensation and parallel compensation.

PART – B

(15 x 4 = 60)

II. Determine the transfer function C/R of a system shown in figure using block diagram reduction method. Verify the results using Mason's gain formula.



OR

III. Derive the transfer function of armature controlled d.c. motors.

IV. Define and derive transient response specification of a second order control system.

OR

V. What is steady state error. Explain different steady state error constants.

VI. Determine the gain margin and phase margin of a unity feed back system having.

$$G(s)=\frac{10}{s(1+.1s)(1+0.05s)}$$ by using bode plot. Also find the open loop gain for a gain margin of G M = 20dB.

OR

VII. Explain frequent domain performance characteristics.

VIII. Sketch the root – locus plot for the positive feedback system with

$$G(s)H(s)=\frac{K(s+1)}{s(s-1)(s^2+4s+16)}.$$

OR

XI. Explain compensation technique. Derive transfer function of lead compensator. Lag Compensator and lag-lead compensator using electrical networks.

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