EIC-May'17

Y.M.C.A. UNIVERSITY OF SCIENCE AND TECHNOLOGY, FARIDABAD

B.TECH. (EIC)-IV SMESTEREXAMINATION (UNDER CBS),

CONTROL SYSTEM -1 (EIC-210)

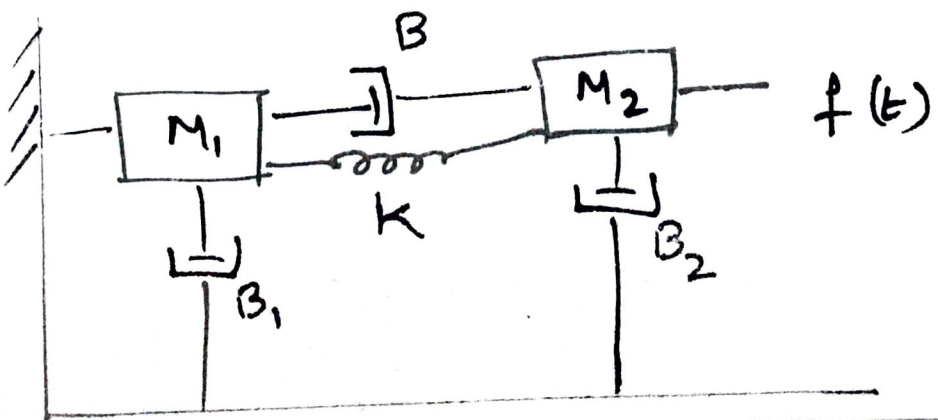
Time: 3hrs

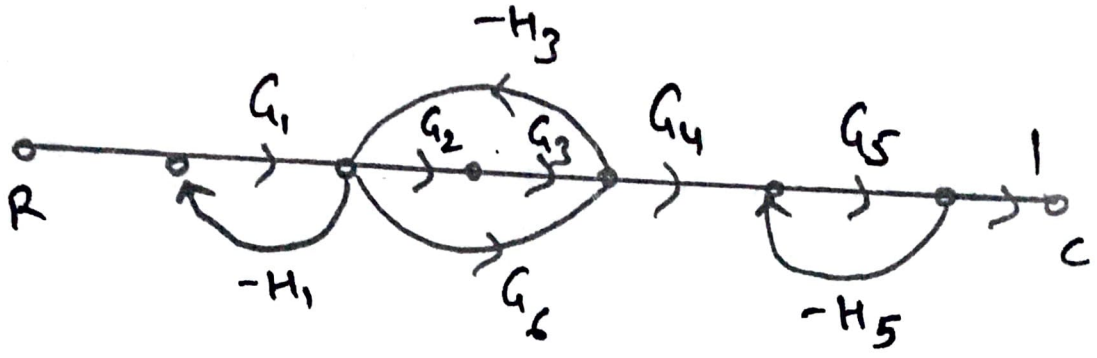
Max Marks:-60

Note:- 1. Part-A is compulsory and attempt 4 Questions from Part-B.

2. Assume relevant data/figure if found missing.

	PART-A	
Q.1.a	Explain the term servomechanism.	(02)
Q.1.b	What is the physical meaning of overdamped, underdamped and critically damped control system?	(02)
Q.1.c	What is the final value theorem of transfer function? What is the condition under which this theorem is valid?	(02)
Q.1.d	What is the most noticeable effect of zeros in the Right half s plane on the step response of II order system?	(02)
Q.1.e	Give physical significance of i) poor phase margin and infinity gain margin, ii) poor Gain margin and infinity phase margin.	(02)
Q.1.f	What is the principal effect of lead compensator on the steady state error to a polynomial reference input	(02)
Q.1.g	Explain relative advantages and disadvantages of positive and negative feedback in control system	(02)
Q.1.h	Define state transition matrix. What is its significance	(02)
Q.1.i	Draw the approximate polar plot for the function $G(s)H(s)=\frac{1}{(1+T_1S)(1+T_2S)}$	(02)
Q.1.j	What is the physical meaning of Absolute and relative stability of the system	(02)
	PART B	
Q.2.a	Explain the effect of negative feedback on the parameters variation of the control system?	(4)
Q.2.b	Write short note on Stepper motor and its application.	(4)
Q.3.a	Find the transfer function of the system shown in figure given below	(4)



3.b	Using Mason's gain formula, determine the ratio of C/R for the system represented by block diagram given below 	(6)
Q.4.a	A unity feedback system is characterized by an open loop transfer function $G(s)=\frac{k}{s(s+10)}$ Determine the gain k so that the system will have a Damping ration of 0.5. For this value of k, determine settling time, peak overshoot and time to peak overshoot for a unit step input	(10)
Q.5. a	A system is represented by the state and the output equations given below. Find (i) Characteristic equation (ii) the poles of the system.	(5)
Q.5.b	Sketch the plot showing the magnitude in decibels and phase angle in degrees as a function of frequency in logarithmic scale for the transfer function given by $G(s)=\frac{10}{s(1+0.5s)(1+0.1s)}$ Determine the gain margin and phase margin of the system.	(5)
Q.6.a.	For a system with $F(s)=s^4+22s^3+10s^2+s+k=0$ .Obtain the marginal value of k and the frequency of oscillations of that value of k	(5)
Q.6.b.	Sketch the root locus of the unity feedback system whose open loop transfer function is $G(s)=\frac{1}{s(s+2)(s^2+2s+10)}$	(5)
Q.7.a.	Explain the Relationship between frequency response and time-response for 2nd order system.	(5)
Q.7.b.	Write design procedure for phase lag compensator	(5)