Hall Ticket Number :										

R-15

Code: 5G244

II B.Tech. II Semester Supplementary Examinations April 2023

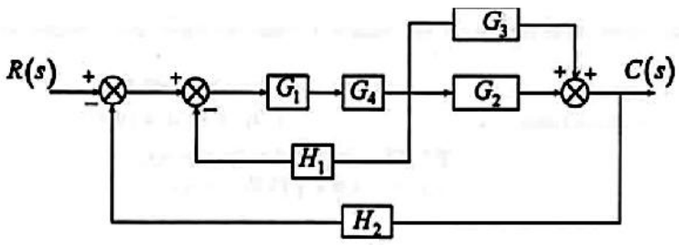
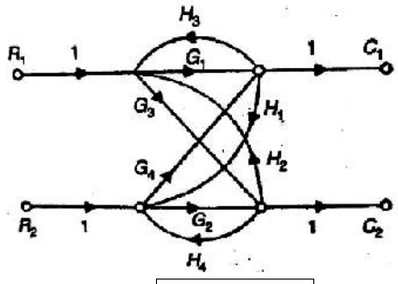
Linear Control Systems

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

****

			Marks	CO	BL
		UNIT–I			
1.		Find the closed loop transfer function of the given system using block reduction technique. 	14M	1	2
		OR			
2.		Deduce the output C1 in the given signal flow graph using Mason's gain formula 	14M	1	2
		UNIT–II			
3.		A unity feedback system is characterized by the open loop transfer function G(s) = 10/s*(0.1s+1). Determine the static error constants for the system. Obtain the steady state error when the system is subjected to an input given by the polynomial $r(t) = a_0 + a_1*t + a_2*t^2/2$	14M	2	1
		OR			
4.		Derive the time domain specifications of a second order system	14M	2	1
		UNIT–III			
5.		A unity feedback control system has an open loop transfer function of $G(s) = K/s(s^2+4s+3)$. Sketch the root locus	14M	3	2
		OR			
6.	a)	By Routh stability criterion determine the stability of the system represented by characteristics equation $9S^5-20S^4+10S^3-S^2-9S-10=0$. Comment on the location of characteristic equation.	10M	3	2
	b)	Define stability of a control system	4M	3	1
		UNIT–IV			
7.		Sketch the polar plot for the given transfer function and determine the frequency at which the plot crosses real axis and the corresponding magnitude. $G(S) = 1/[S^2*(1+S)(1+2S)]$.	14M	3	2
		OR			
8.		Sketch the Bode plot and find the Phase margin and gain margin for the system $G(S)H(S) = 10S(3+S)/S(S+2)(S^2+S+2)$.	14M	3	2
		UNIT–V			
9.		A continuous time system has a transfer function T(s)=10(s+4) / s*(s+1) *(s+3). Construct three different state models for the system and give block diagram representation for each state model.	14M	4	2
		OR			
10.	a)	What is state transition matrix? State and prove its properties	7M	4	1
	b)	Derive the expression for transfer function of State Model.	7M	4	1

***