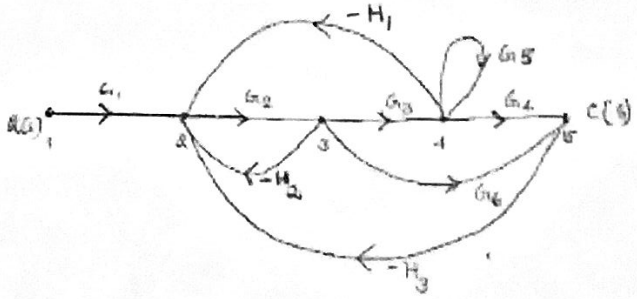
CONTINUOUS INTERNAL EVALUATION- 2

Dept:EC	Sem / Div:IV	Sub:Control Systems	S Code:18EC43
Date:04-08-2022	Time: 9:30-11:00 am	Max Marks: 50	Elective:N

Note: Answer any 2 full questions, choosing one full question from each part.

QN		Questions	Marks	RBT	COs
		PART A			
1	a	The closed loop transfer function of second order system is $\frac{C(s)}{R(s)} = \frac{10}{s^2+6s+10}$ What is the type of damping in the system.	7	L2	CO3
	b	Obtain the steady state error ess of Type-0, Type-1 and Type-2 systems for Step input and Ramp input.	9	L3	CO3
	c	With a neat sketch explain all the time domain specifications.	9	L2	CO3
		OR			
2	a	For unity feedback control system the open loop transfer function, $G(s) = \frac{10(s+2)}{s^2(s+1)}$ find i) the positional, velocity and acceleration error constant. ii) steady state error when the input is $R(s) = \frac{3}{s} + \frac{2}{s^2} + \frac{1}{3s^3}$	9	L3	CO3
	b	Find the C(s)/ R(s) for the signal flow graph below in Fig. 	9	L3	CO2
	c	Define rise time and derive the expressions for the same.	7	L3	CO3
		PART B			
3	a	Derive the expression for unit step response of Underdamped second order system.	9	L3	CO3

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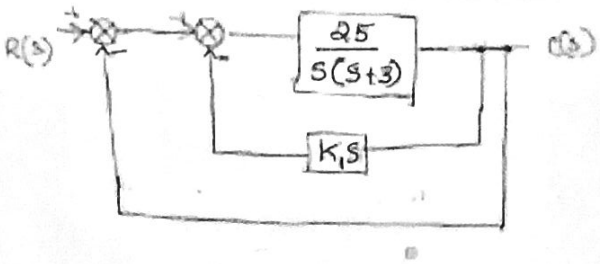
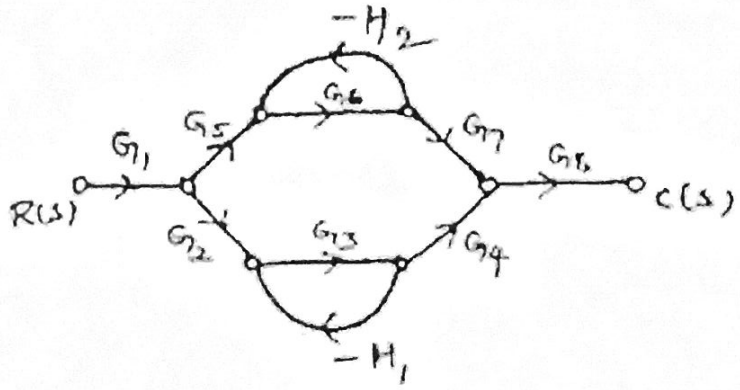
	b	Find K1 so that ζ=0.35. Find the corresponding time domain specification for the figure below. 	10	L3	CO3
	c	Describe the Masons gain formula.	6	L2	CO2
		OR			
4	a	For a unity feedback control system with $G(s) = \frac{64}{S(S+9.6)}$ Write the output response to a unit step input. Determine: i)The response at t=0.1second ii) Settling time for ±2%	7	L3	CO3
	b	Find the C(s)/ R(s) for the signal flow graph below in Fig. 	10	L3	CO2
	c	A unity feedback system has $G(s) = \frac{K}{S(S+2)(S^2+2S+5)}$ i) For a unit ramp input it is desired that eSS ≤ 0.2. Find K. ii) Find ess if $r(t) = 2 + 4t + \frac{t^2}{2}$	8	L3	CO3

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