CONTINUOUS INTERNAL EVALUATION– 2

Dept:EC	Sem / Div:4A&B	Sub:Control Systems	S Code:18EC43
Date:25/06/2021	Time: 9:30-11:00 AM	Max Marks: 50	Elective:N

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

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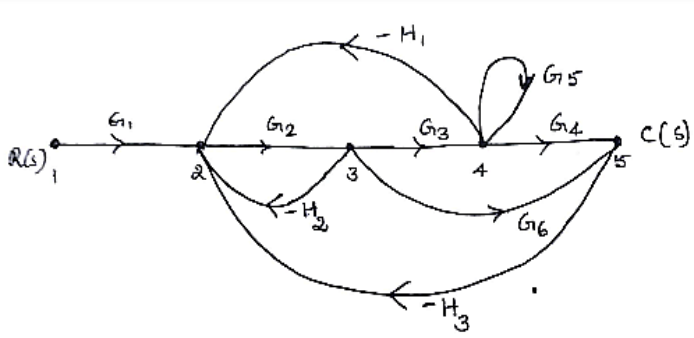
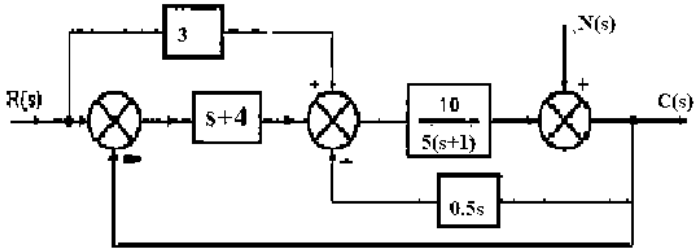
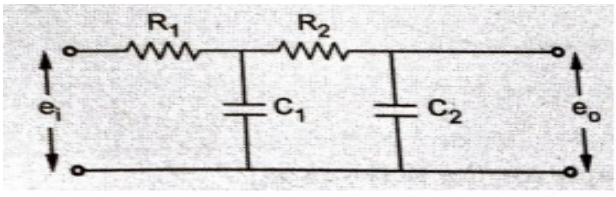
QN		Questions	Marks	RBT	COs
		PART A			
1	a	Find the C(s)/ R(s) for the signal flow graph below in Fig. 	10	L3	CO2
	b	Define signal flow graph and list the properties of the signal flow graph.	7	L2	CO2
	c	The performance equations of a controlled system are given by the following set of linear algebraic equations. Draw the block diagram and determine C(s)/R(s). $E_1(s)=R(s)-H_3(s)C(s)$, $E_2(s)=E_1(s)-H_1(s)E_4(s)$, $E_3(s)=G_1(s)E_2(s)-H_2(s)C(s)$, $E_4(s)=G_2(s)E_3(s)$, $C(s)=G_3(s)E_4(s)$	8	L3	CO2
		OR			
2	a	The System block diagram is shown in fig. , find the C(s)/N(s) if R(s)=0. 	9	L3	CO2
	b	Derive an expression for steady state error for a simple closed loop system.	8	L3	CO3
	c	Find Eo(s)/Ei(s) for the system given in Fig. by using Mason's gain formula 	8	L2	CO2

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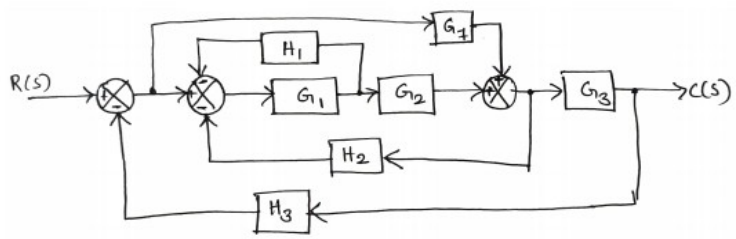
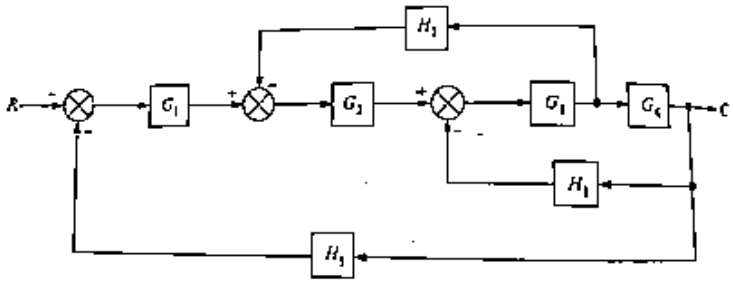
		PART B			
3	a	Obtain the steady state error e_{ss} of Type-0, Type-1 and Type-2 systems for Step input and Ramp input.	9	L3	CO3
	b	For unity feedback control system the open loop transfer function,G(s)= $\frac{10(s+2)}{s^2(s+1)}$ and find i) the positional, velocity and acceleration error constant ii) steady state error when the input is $R(s)=\frac{3}{s}+\frac{2}{s^2}+\frac{1}{3s^3}$	7	L3	CO3
	c	For the block diagram shown in figure,determine the transfer function C(s)/R(s) using block diagram reduction technique. 	9	L3	CO2
		OR			
4	a	Convert the block diagram to signal flow graph and find the transfer function. 	10	L3	CO2
	b	What are static error coefficients?Derive the formula for each input applied. How they are related to the steady state error.	10	L2	CO3
	c	The open-loop transfer function of a system with unity feedback is given by $G(s)=\frac{40(s+2)}{s(s+1)(s+4)}$ Determine (i) all the error constants and (ii) error for ramp input with magnitude 4.	5	L2	CO3