CONTINUOUS INTERNAL EVALUATION- 3

Dept: EC	Sem / Div:4AB	Sub: Control Systems	S Code:18EC43
Date:5/8/21	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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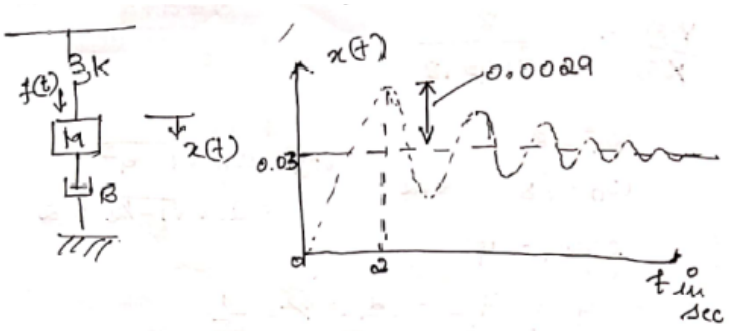
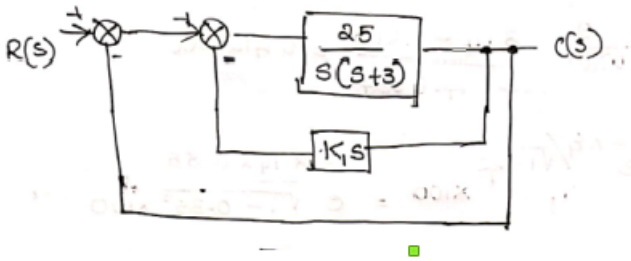
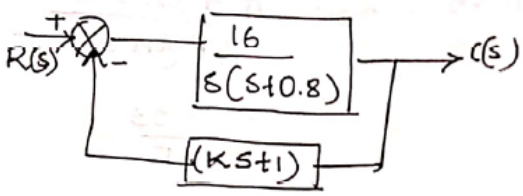
QN		Questions	Marks	RBT	COs
		PART A			
1	a	Derive the expression for unit step response of underdamped second order system.	8	L2	CO3
	b	Figure shows a mechanical vibratory system, when a force of 8.9N is applied to the system the mass oscillator as shown is figure below. Determine the value of M, B and K. 	10	L3	CO3
	c	Find K1 so that $\mathscr{E}$=0.35. Find the corresponding time domain specification for the figure below. 	7	L3	CO3
		CO3			
2	a	Define peak time and derive the expressions for the same.	10	L3	CO3
	b	A positional control system with velocity feedback in figure below. What is the response c(t) to the unit step input. Given that Ɛ=0.5. Also calculate rise time, peak time, maximum overshoot and settling time. 	10	L3	CO3
	c	Write a short note on PID controllers	5	L2	CO3
		PART B			

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3	a	Sketch the root locus for the system $G(s)H(s)=\frac{K}{s(s+3)(s+5)}$. Determine the range of K for which the system will have damped oscillating response	13	L3	CO4
	b	Using RH-Criterion, determine the stability of the systems represented by the following characteristic equations. $(i)\ s^4+2s^3+8s^2+4s+3=0$ $(ii)\ s^5+s^4+3s^3+9s^2+16s+10=0.$	12	L3	CO3
	c	What are the Advantages of Root locus.	6	L2	CO4
		OR			
4	a	A feedback control system is described by $G(s)=\frac{10}{s(s+0.2)(s+0.01)}$ $\wedge$ $H(s)=1$ .Construct the Asymptotic log magnitude plot and exact phase plot. From this determine I.Gain crossover and Phase crossover frequencies. II.Gain margin and Phase margin III.The stability of the close loop system	13	L3	CO4
	b	Define the following terms I) Stable system ii) Unstable system iii) Critically stable system iv) Conditionally stable system.	6	L2	CO3
	c	Define a) Gain Margin b) Phase Margin c) Gain cross over frequency	6	L2	CO4