Code No: P18EET05

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
III B.TECH I SEMESTER END REGULAR EXAMINATIONS, JAN/FEB– 2022/23
CONTROL SYSTEMS
(ECE Branch)

Time: 3 hours Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

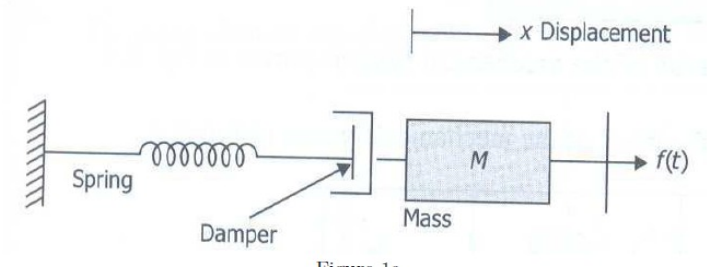
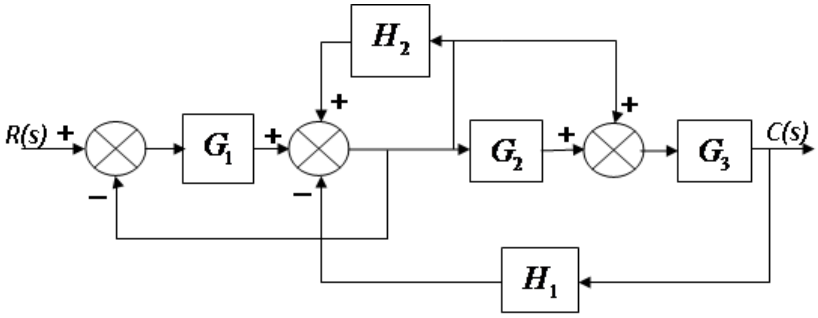
PART-A

Answer all the questions in Part-A (5X2=10M)

Q.No.		Questions	Marks	CO	KL
1.	a)	What are the advantages of signal flow graph over block diagram reduction process?	[2M]	1	
	b)	List out the different Standard test signals?	[2M]	2	
	c)	What are the advantages of Frequency Response Analysis?	[2M]	3	
	d)	What is the significance of Compensation?	[2M]	4	
	e)	What are the properties of state transition matrix.	[2M]	5	

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
2.		Determine the transfer function for the mechanical system shown in Figure 1.  Figure 1.	[10M]	1	
		OR			
3.		Determine the transfer function of the system shown in figure (2  . Figure (2)	[10M]	1	
		UNIT-II			

4.		For a unity feedback system the open loop transfer function is given by G(S)=200/S(S+1) . Determine i) maximum overshoot ii) rise time iii) settling time and iv) steady state error if the input is a unit step.	[10M]	2	
		OR			
5.	a)	A unity feedback system is characteristic by an open loop transfer function G(S) = $\frac{K}{S(S+4)}$. Determine the gain 'K' so that they will have a damping ratio 0.6. For this value of 'K' determine the settling time, peak overshoot and for a unit step input.	[5M]	2	
	b)	For a unity feedback control system the open loop transfer function is G(s)= 10(s+2)/ s^2(s+1) , Determine the position and velocity error constants.	[5M]	2	
		UNIT-III			
6.	a)	A unity feedback system has a forward path transfer function G(S) = $\frac{K(S+13)}{S(S+3)(S+7)}$. Using R – H criterion, find the range of 'K' for which the closed loop system is stable.	[5M]	3	
	b)	What is the effect of adding pole and zero to a open loop system G(S) H(S) an root loci?	[5M]	3	
		OR			
7.		Draw Bode plot and obtain gain cross over Frequency for the following transfer function ,G(s) = $\frac{20}{[S(3S+1)(4S+1)]}$	[10M]	3	
		UNIT-IV			
8.		Explain the lead compensator? Obtain the transfer function of lead compensator and draw pole-zero plot	[10M]	4	
		OR			
9.	a)	Compare Phase lead compensator with Phase lag compensator	[5M]	4	
	b)	Explain the significance of compensation.	[5M]	4	
		UNIT-V			
10.	a)	Explain the terms : (i) State Variables and (ii) State transition matrix	[5M]	5	
	b)	Describe the transfer function from state model of field controlled of DC motor	[5M]	5	
		OR			
11.	a)	Explain (i) controllability and (ii) observability of a system.	[5M]	5	
	b	Consider a system having state model $\begin{bmatrix}\dot{X}_1\\ \dot{X}_2\end{bmatrix}=\begin{bmatrix}-2 & -3\\ 4 & 2\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix}+\begin{bmatrix}3\\ 5\end{bmatrix}U$ and Y=$\begin{bmatrix}1 & 1\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix}$ with D=0. Obtain its transfer function.	[5M]	5	

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