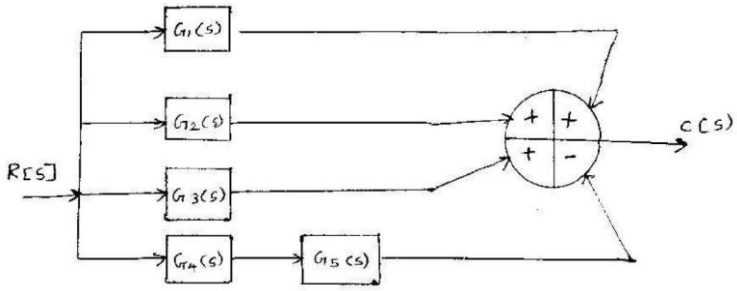
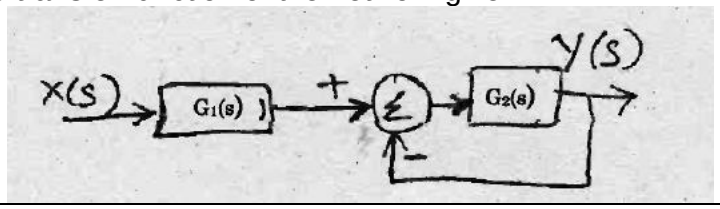
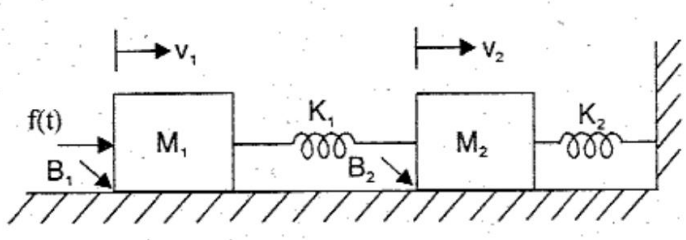
PANIMALAR ENGINEERING COLLEGE

(An Autonomous Institution, Affiliated to Anna University Chennai)

QUESTION BANK

UNIT- I -< SYSTEMS AND REPRESENTATION >				
	PART A (2 Marks)	**Bloom's Level**	**Course Outcome**	**Marks Allotted**
1.	Write Masons Gain formula.	[BL2]	[CO1]	[2]
2.	Distinguish between open loop and closed loop system.	[BL2]	[CO1]	[2]
3.	Define transfer function.	[BL1]	[CO1]	[2]
4.	Define non-touching loop.	[BL1]	[CO1]	[2]
5.	Write the analogous electrical elements in force voltage analogy for the elements of mechanical translational system.	[BL3]	[CO2]	[2]
6.	Write the analogous electrical elements in force current analogy for the elements of mechanical translational system.	[BL3]	[CO2]	[2]
7.	Write the force balance equation of ideal mass, spring and dashpot element.	[BL2]	[CO2]	[2]
8.	What are the basic components of block diagram?	[BL1]	[CO1]	[2]
9.	Write down the transfer function of the system whose block diagram is shown below 	[BL2]	[CO1]	[2]
10.	Find the transfer function of the network given 	[BL2]	[CO1]	[2]
	Descriptive Questions (13 /15/16 Marks)			
1.	For the mechanical system shown draw the force voltage and force current analogous circuit. 	[BL4]	[CO2]	[13]
2.	Consider the system shown in figure and obtain the transfer function using Mason's gain formula.	[BL4]	[CO1]	[13]

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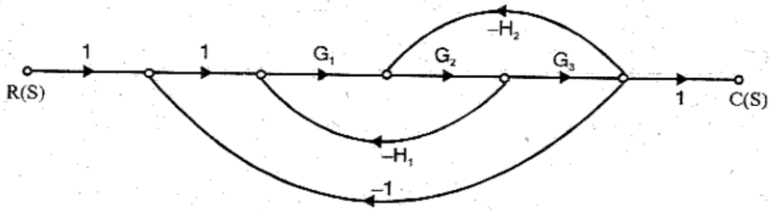
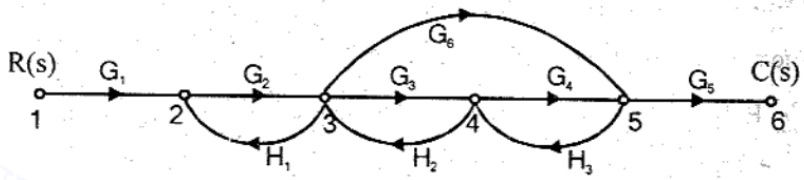
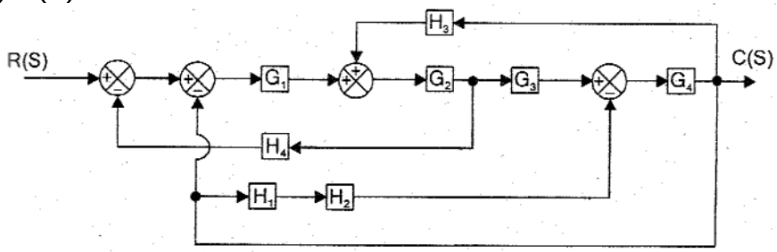
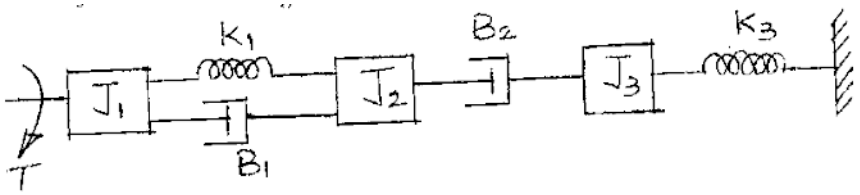
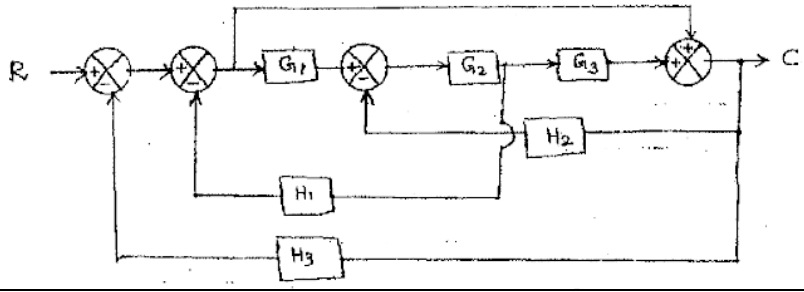
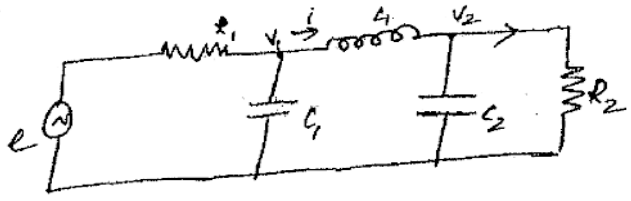
				
3.	The signal flow graph of a feedback control system is shown in figure. Determine the closed loop transfer function using Mason's gain formula. 	[BL4]	[CO1]	[13]
4.	Using block diagram reduction technique obtain the transfer function C(S)/R(S) 	[BL4]	[CO1]	[13]
5.	Write the differential equation governing mechanical rotational system for the system shown and also find T-V analogy and T-I analogy for the same 	[BL4]	[CO2]	[13]
6.	(i) Determine the transfer function of armature controlled DC motor (ii) Determine the transfer function of field controlled DC motor	[BL2]	[CO1]	[13]
7.	A block diagram is shown, convert it into equivalent signal flow graph and find C/R 	[BL6]	[CO1]	[16]
8.	Find the transfer function $V_2(s)/E(s)$ of the electrical circuit shown 	[BL4]	[CO2]	[13]
9.	Simplify the following diagram using block diagram reduction method	[BL4]	[CO1]	[13]

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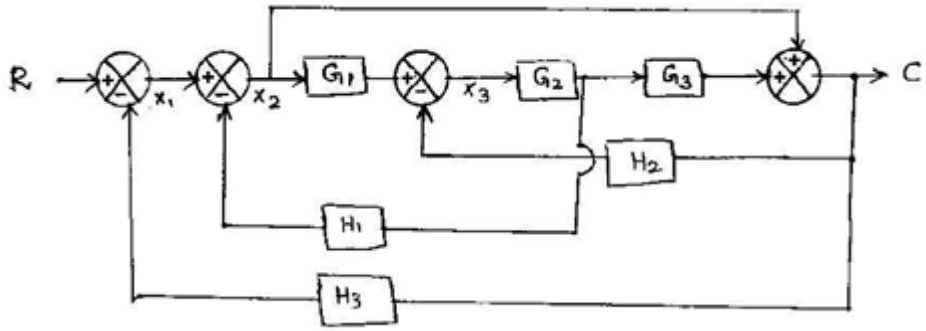
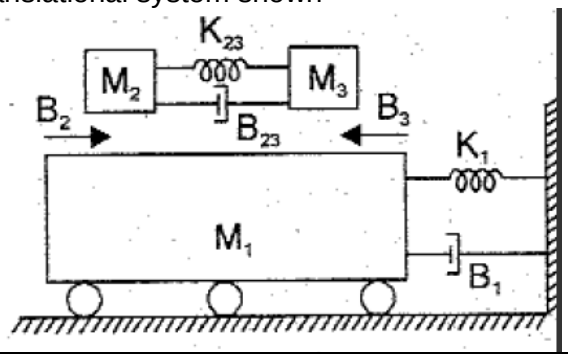
				
10.	Draw the force-voltage and force-current analogous circuit for the mechanical translational system shown 	[BL4]	[CO1]	[13]

UNIT- II -<TIME RESPONSE >				
	PART A (2 Marks)	**Bloom's Level**	**Course Outcome**	**Marks Allotted**
1.	With reference to time response of control system define peak time	[BL1]	[CO3]	[2]
2.	The closed loop transfer function of second order system is given by $400/s^2+4s+400$ determine the damping ratio and natural frequency of oscillation.	[BL3]	[CO3]	[2]
3.	Write the equations of K_p, K_v, K_a.	[BL2]	[CO3]	[2]
4.	What are type '0' and type '1' system?	[BL2]	[CO3]	[2]
5.	What are the various time domain specifications?	[BL1]	[CO3]	[2]
6.	Define Ramp signal.	[BL1]	[CO3]	[2]
7.	How the system is classified depending on the value of damping?	[BL1]	[CO3]	[2]
8.	What are generalized error coefficients?	[BL1]	[CO3]	[2]
9.	Sketch the response of a second order under damped system	[BL2]	[CO3]	[2]
10.	State basic properties of root locus.	[BL2]	[CO3]	[2]
	Descriptive Questions (13 /15/16 Marks)			
1.	Explain about time domain specification in detail with neat sketch and relevant expression	[BL2]	[CO3]	[13]
2.	Derive the expression for under damped second order system with unit step input	[BL2]	[CO3]	[13]
3.	Derive the expression for un-damped and over-damped second	[BL2]	[CO3]	[13]

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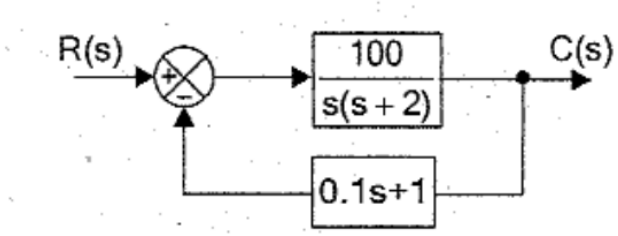
	order system			
4.	The open loop transfer function of a unity feedback system is given by G(s) = K/S (ST+1) where K& T are constants. By what factor should the amplifier gain be reduced so that the peak overshoot of unit step response of the system is reduced from 75% to 25%.	[BL4]	[CO3]	[13]
5.	A unity feedback control system has an open loop transfer function G(s)= $K/S(S^2+4S+13)$ sketch root locus	[BL4]	[CO3]	[13]
6.	sketch root locus for a unity feedback control system has an open loop transfer function G(s)= K/S(S+2)(S+4)	[BL4]	[CO3]	[13]
7.	A positional control system with velocity feedback is shown in figure. What is the response of the system for unit step input? 	[BL4]	[CO3]	[13]
8.	The open loop transfer function of a servo mechanism with unity feedback is G(S)= 10/S(0.1S+1). Evaluate the static error constants of the system. Obtain the steady state error of the system, when subjected to an input given by the polynomial, $r(t)= a_0+a_1t+(a_2/2)t^2$	[BL4]	[CO3]	[13]
9.	Sketch the root locus for the unity feedback system whose open loop transfer function is $G(s)H(s)=K/S(S+4)(S^2+4S+20)$	[BL4]	[CO3]	[13]
10.	(i) The unity feedback system is characterized by an open loop transfer function G(S) = K/S(S+10). Determine the gain K, so that the system will have the damping ratio of 0.5 for this value of K. Determine peak overshoot and time to peak overshoot for a unit step input. (ii) The response of the servomechanism is, $C(t)= 1+0.2e^{-60t}-1.2e^{-10t}$ when subjected to the unit step input obtain an expression for closed loop transfer function. Determine the undamped natural frequency and damping ratio	[BL4]	[CO3]	[16]

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