

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2026

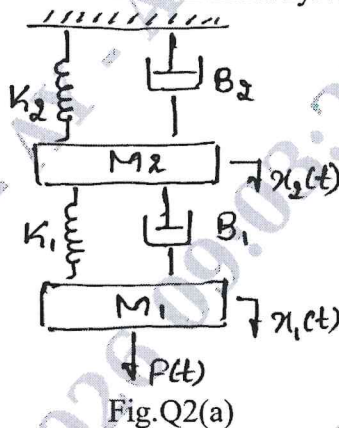
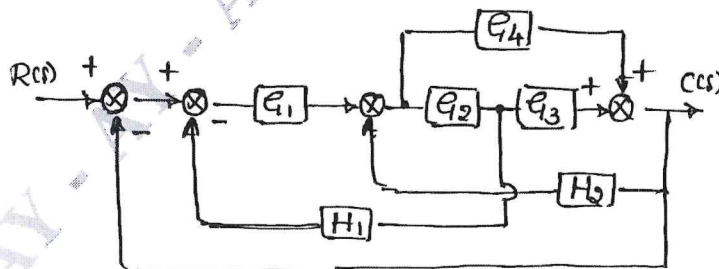
Control Engineering



Max. Marks: 100

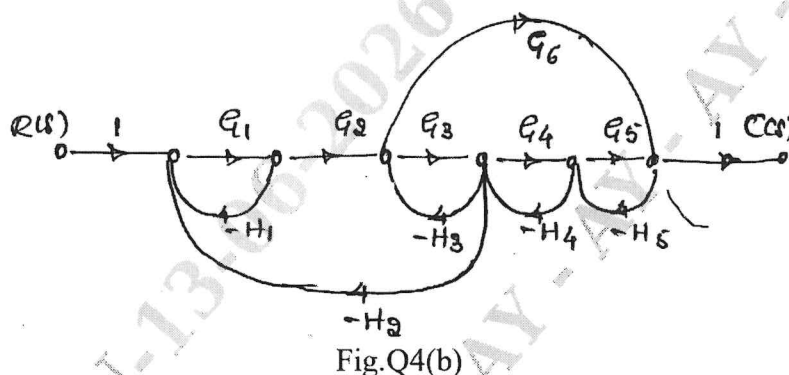
*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks, L: Bloom's level, C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Explain open loop and closed loop control system, with two examples for each.	10	L2	CO1
	b.	What are the requirements of a control system? Briefly explain.	5	L1	CO1
	c.	Draw the block diagram of proportional plus integral controller and explain.	5	L2	CO1
OR					
Q.2	a.	Determine the transfer function of mechanical system show in Fig.Q2(a).	15	L3	CO1
	b.	Explain with block diagram on proportional plus derivative controller.	5	L2	CO1
Module – 2					
Q.3	a.	Explain with block diagram, series and feedback compensation.	6	L2	CO3
	b.	Reduce the block diagram shown in Fig.Q3(a) to its simplest possible form and find its closed loop transfer function.	14	L3	CO3



OR

Q.4	a. Explain : i) Lead compensator ii) Lag compensator.	6	L2	CO3
	b. Find the transfer function by using Mason's gain formula for the signal flow graph shown in the Fig.Q4(b).	14	L3	CO3



Module – 3

Q.5	a. Define : i) Delay time ii) Rise time iii) Peak time iv) Maximum overshoot.	8	L1	CO2
	b. Derive an expression for time response of first order system subjected to i) Step input ii) Ramp input.	12	L3	CO2

OR

Q.6	a. Obtain an expression for time response of the second order mechanical system subjected to unit step input for under damped case. Also show the response curve.	12	L2	CO2
	b. A unity feedback system is characterised by open loop transfer function : $G(s) = \frac{10}{s^2 + 2s + 6}$ Determine the following when the system subjected to unit step input i) Damping ratio ii) Undamped natural frequency iii) Peak overshoot iv) Peak time.	8	L4	CO2

Module – 4

Q.7	a.	Analyze the stability of the system given by characteristics equation : $S^6 + 3s^5 + 5s^4 + 9s^3 + 8s^2 + 6s + 4 = 0$ By Routh-Hurwitz criterion.	8	L5	CO4
	b.	Sketch the root locus plot for the system with OLTF. $G(s)H(s) = \frac{K(s+3)}{s(s+1)(s+2)}$	12	L4	CO4

OR

Q.8		Sketch the root locus plot for the system with OLTF $G(s)H(s) = \frac{K}{s(s+2)(s+4)(s+6)}$ Also find the range of 'K' for which the system is stable.	20	L5	CO4
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Module – 5

Q.9	a.	Explain Nyquist stability criteria and list the advantages of Nyquist plot	6	L2	CO4
	b.	Comment on stability of the system using Nyquist stability criterion whose open loop transfer function is given by : $G(s)H(s) = \frac{K}{s(s+2)(s+10)}$	14	L3	CO4

OR

Q.10		Sketch the Bode plot for the system with $G(s)H(s) = \frac{2}{s(s+1)(1+0.2s)}$ Also obtain gain margin and phase margin and crossover frequencies.	20	L5	CO4
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