Hall Ticket Number :										

R-15

Code: 5G244

II B.Tech. II Semester Supplementary Examinations November 2023

Linear Control Systems

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 32+8=40, will be treated as malpractice.

			Marks	CO	BL
		UNIT–I			
1.	a)	Distinguish open loop and closed loop control system	6M	1	2
	b)	Derive the transfer function of an ac servo motor	8M	1	2
		OR			
2.	a)	Derive the transfer function of armature-controlled dc motor	6M	1	2
	b)	Explain the effect of feedback in reducing parameter variations.	8M	1	1
		UNIT–II			
3.	a)	A unity feedback control system has an open loop transfer function of $G(s) = K/ s(s^2+4s+3)$. Sketch the root locus	7M	2	1
	b)	For the given system, Sketch the root locus and find the steady state error constants for unit step, unit ramp and unit parabolic input $G(s) = 1/ s^2+s+2)$ and $H(s) = 1/(s+1)$, $(t^2/2)\,u(t)$	7M	2	1
		OR			
4.		A unity feedback system is characterized by the open loop transfer function G(s) = 1/s*(0.5s+1) (0.2s+1). Determine the steady state error for unit step, unit ramp and unit acceleration inputs.	14M	2	2
		UNIT–III			
5.		Find the roots of the characteristic equations for systems whose open loop transfer functions are given below: i) G(s) H(s)= 1/ [(s+2) (s+4)] ii) G(s)H(s) = 1(s+3) / [s(s+3) (s+8)] iii) G(s) = 9 / [s2*(s+2)].	14M	3	2
		OR			
6.		Sketch the root locus of the system whose open loop transfer function $G(s) = K /S(S+2)(S+4)$. Find the value of K so that the damping ratio of the closed loop system is 0.5	14M	3	2
		UNIT–IV			
7.		Sketch the bode plot of a feedback system which has G(S)H(S) = 100*(S+4) / [S*(S+0.5) *(S+10)]. Also comment on the stability of the system.	14M	3	2
		OR			
8.		Sketch the Polar plot for a system with loop transfer function $G(S)H(S) = K(1+S)^2/ S^3$. Find the range of value of K for which the system is stable.	14M	3	2
		UNIT–V			
9.		Explain design of the basic lead compensator using Bode plot	14M	4	1
		OR			
10.		Obtain the state space representation of the field controlled and Armature controlled DC motor	14M	4	2

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