Course Code: 1940206 **Roll No:** **MLRS- R19**

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

II B.Tech II Sem Supply End Examination, March 2022

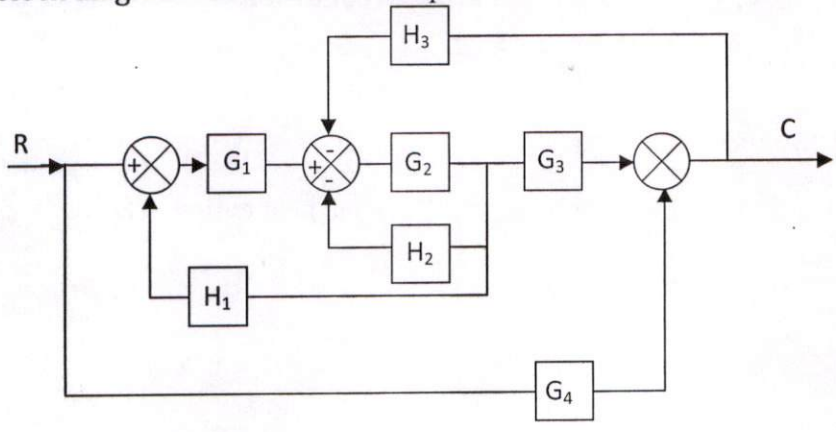
Control Systems

(EEE)

Time: 3 Hours. **Max. Marks: 70**

Note: 1. Answer any FIVE questions.
2. Each question carries 14 marks and may have a, b as sub questions.

1	a)	What are the characteristics of negative feedback?	7M	CO1	BL1
	b)	State control system. And explain its classifications.	7M	CO1	BL2
2		Determine the transfer function of the block diagram shown below using block diagram reduction technique.	14M	CO1	BL5



3	a)	What are the difficulties in R-H stability criterion? Explain how you can overcome them.	6M	CO2	BL1
	b)	Define type and order of a control system, and find the type and order of the following systems: i. $G(s)H(s) = 100/ s(s^2+4s+200)$ ii. $G(s)H(s) = 200/s^2(s^2+10s+200)$ iii. $G(s)H(s) = 4(s^2+10s+100)/[s(s+3)(s^2+2s+10)]$ iv. $G(s)H(s) = 200/(1+01s)(1+0.5s)$	8M	CO2	BL3
4	a)	Find the time response specifications of a second order system for the given transfer function $G(S)=(14(S+3))/(S(S+5)(S^2+2S+2))$.	7M	CO2	BL4
	b)	Write down the procedure for construction of Bode plot. And also mention its applications.	7M	CO2	BL1
5	a)	A system is given by $G(s) = (4s+1)/[s^2(s+1)(2s+1)]$. Sketch the Nyquist plot & hence determine the stability of the system.	10M	CO3	BL5
	b)	Compare polar with Nyquist plot.	4M	CO3	BL4

6	Design a suitable lag compensator root locus for the system with, $G(S) = \frac{K}{S(S+1)(S+2)}$ meet the specifications as a. Damping ratio = 0.5 b. $K_v \geq 5\ sec^{-1}$ c. Undamped natural frequency = 0.7 rad/sec		14M	CO4	BL6
7	a)	What is compensation? Mention the different types of compensators.	7M	CO4	BL2
	b)	Explain state model and output model with suitable example.	7M	CO1	BL3
8	a)	Convert the following system matrix to canonical form $\begin{bmatrix} 1 & 2 & 1 \\ -1 & 0 & 2 \\ 1 & 3 & -1 \end{bmatrix}$	7M	CO1	BL4
	b)	Consider the differential equation system given by $2\dddot{y} + 3\ddot{y} + 5\dot{y} + 2y = u$ $y(0)=0.1, \dot{y}(0)=0.05.$ Obtain the response y(t),subjected to the given initial condition	7M	CO1	BL5

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CO: Course Outcomes BL Blooms Taxonomy Levels

Note:1. Font style: Cambria.

2.The Course Outcome (CO) and Bloom's Taxonomy Level (BL) shall be mentioned for each question.