ANURAG Engineering College
(An Autonomous Institution)
III B.Tech. I Semester Supplementary Examinations, June/July – 2024
CONTROL SYSTEMS ENGINEERING
(ELECTRONICS AND COMMUNICATION ENGINEERING)

Time: 3 Hours   **Max. Marks: 75**

Section – A (Short Answer type questions)   (25 Marks)
Answer All Questions

		Course Outcome	B.T Level	Marks
1.	Define transfer function. What are its limitations?	CO1	L1	2M
2.	Write the importance of Signal Flow Graph in control systems.	CO1	L2	3M
3.	Distinguish between type and order of the system.	CO2	L2	2M
4.	What are the effects of integral control action?	CO2	L2	3M
5.	What is the effect of adding poles to G(s) H(s) on the root loci?	CO3	L1	2M
6.	Write limitations of Routh's stability.	CO3	L2	3M
7.	Draw the pole zero location of lag compensator.	CO4	L2	2M
8.	Define phase margin and gain margin.	CO4	L2	3M
9.	Define Observability.	CO5	L2	2M
10.	Write Properties of State Transition Matrix.	CO5	L2	3M

Section B (Essay Questions)
Answer all questions, each question carries equal marks.   (5 X 10M = 50M)

		Course Outcome	B.T Level	Marks
11. A)	i) What are the effects of feed back in control system?	CO1	L2	4M
	ii) Find the transfer function of a given signal flow graph?		L3	6M
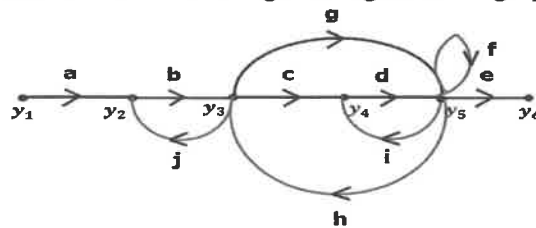
OR

B)	i) Distinguish between Open loop control system and closed loop control system?	CO1	L2	4M
	ii) For the given electrical system shown in figure, find the transfer function?		L3	6M
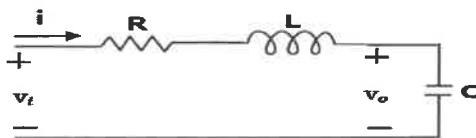
12. A)	i) Determine the response of the critically damped second order system for unit step input?	CO2	L3	4M
	ii) Obtain the response of a unity feedback system whose open loop transfer function is $G(S)=\dfrac{4}{S(S+5)}$, for unit step input?			6M

OR

B)	Explain the time domain specifications?	CO2	L3	10M

13. A)	Determine the stability of given characteristic equation, $S^7+6S^6+24S^5+S^4+2S^3+3S^2+S+2=0$	CO3	L3	10M

OR

B)	A Unity feedback control System has an open loop transfer function $G(s) = \dfrac{K}{s*(s2+4s+13)}$. sketch the root locus?	CO3	L3	10M

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14. A)	Draw the Nyquist plot for the system whose open loop transfer function is $G(s) = \dfrac{K}{S(S-2)(S-10)}$. Determine the range of K for which closed loop system is stable.	CO4	L3	10M

OR

B)	The open loop transfer function of a unity feedback system is given by $G(s) = \dfrac{1}{S(1+S)(1+2S)}$. Sketch the polar plot and determine the gain margin and phase margin.	CO4	L3	10M

15. A)	Find the transfer function of the given system. $X' = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} X + \begin{bmatrix} 0 \\ 5 \end{bmatrix} U$; $Y = \begin{bmatrix} 0 & 1 \end{bmatrix} X$; $X(0) = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$	CO5	L3	10M

OR

B)		CO5	L3	10M
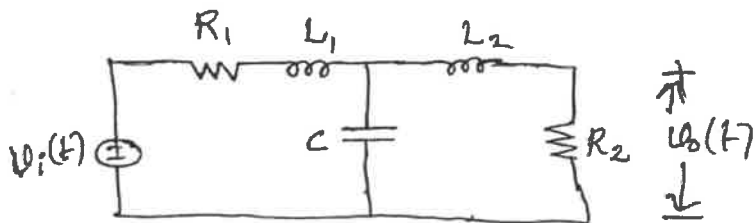
Find the state model of the given network.