R18 Regulation *Subject code:2P4DB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

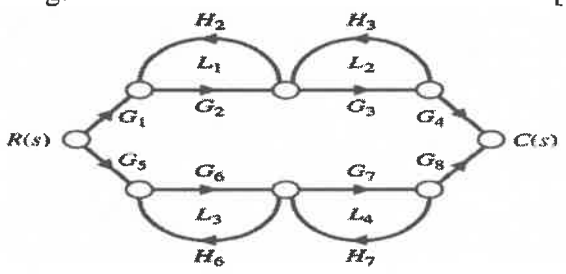
B.Tech IV Semester Supplementary Examinations, December 2024

CONTROL SYSTEMS

(ECE)

Maximum Marks: 70 Date:05.12.2024 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A			
All the following questions carry equal marks (10X2M=20) Marks)		CO	Bloom Tx
1	Define Transfer function.	1	L1
2	Distinguish between open loop and closed loop systems	1	L1
3	List the standard test input signals.	2	L1
4	Define steady state error.	2	L1
5	Define gain margin and phase margin.	3	L1
6	Write the drawbacks in frequency domain plots?	3	L1
7	What is use of type number and order of a system in case of drawing of polar plot?	4	L1
8	Write the formulas for the transfer function of lag compensator?	4	L1
9	List the advantages of state space representation?	5	L1
10	Define controllability and observability.	5	L1
Part-B			
Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	Define the impulse response of the system. Also find the impulse response of the system with open loop transfer function [10M] $$G(S) = \frac{10}{S(S+3)}$$	1	L3
	OR		
12	Find C(s)/R(s) for a control system represented by signal flow graph shown in Fig. [10M] 	1	L3

13	Determine the static error coefficients for a unity feedback system given by $G(s) = \frac{k}{S^2(s+20)(s+30)}$ [10M]	2	L3
	OR		
14	Write short notes on effect of PI controller and PD controller? [10M]	2	L2
15	Develop the Root locus for $G(s)H(s) = \frac{K}{s(s+6)(s+7)}$ [10M] Also find range of 'K' for system to be stable	3	L4
	OR		
16	Draw the bode plot for the unity feedback system ,whose open loop transfer function is $G(s)=\frac{10}{s[s+5]}$ calculate gain cross over frequency [10M]	3	L4
17	What is Nyquist stability criterion? And also explain relative stability. [10M]	4	L2
	OR		
18	A. Derive maximum lead angle ϕm and α of a lead compensator. [5M] B. Compare polar plot and Nyquist plot. [5M]	4	L3
19	Determine the state space representation of the $\frac{y(s)}{U(s)} = \frac{1}{s^3+4s+13}$ [10M]	5	L3
	OR		
20	A. Explain the components in a state space representation. [5M] B. Write the advantages and dis advantages of state space representation. [5M]	5	L3