



B.Tech IV Semester Supplementary Examinations, December 2024

CONTROL SYSTEMS

(EEE)

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
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13	Determine the static error coefficients for a unity feedback system given by $G(s) = \frac{k}{s^2(s+20)(s+30)}$ <p style="text-align: right;">[10M]</p>	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 ϕ_m 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 $\frac{y(s)}{U(s)} = \frac{1}{s^3+4s+13}$ <p style="text-align: right;">[10M]</p>	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