

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VI (NEW) EXAMINATION – WINTER 2020

Subject Code:2161707

Date:20/01/2021

Subject Name:Control System Design

Time:02:00 PM TO 04:00 PM

Total Marks: 56

Instructions:

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		Marks
Q.1	(a) Explain cascade compensation	03
	(b) Explain phase lead compensator in detail.	04
	(c) Explain the steps to plot the lead compensator using Root locus	07
Q.2	(a) Explain lag compensation	03
	(b) Explain Deadbeat response	04
	(c) Explain the steps for plotting phase lag compensator using bode plot	07
Q.3	(a) Explain Prefilter design	03
	(b) Explain the state space model of RLC series circuit	04
	(c) Explain Full State feedback controller in detail.	07
Q.4	(a) Explain controllability	03
	(b) Explain Observable canonical form	04
	(c) Explain Robust PID controller in detail.	07
Q.5	(a) Explain Observability	03
	(b) Explain Internal Model design	04
	(c) Explain state feedback observer technique in detail.	07
Q.6	(a) Explain the concept of positive and negative semi-definite	03
	(b) Explain Lyapunov Stability Criteria in detail.	04
	(c) Explain LQR controller	07
Q.7	(a) Explain considerations that need to be taken in designing robust controller	03
	(b) Explain diagonal canonical form	04
	(c) Explain optimal controller.	07
Q.8	(a) Explain Riccati Equation	03
	(b) Explain the state space model of DC motor plant	04
	(c) Explain steps to design phase lead-lag compensation using root locus method.	07