Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI EXAMINATION – WINTER 2015

Subject Code:160104 **Date:14/12/ 2015**

Subject Name: Basic Control Theory

Time:2:30pm to 5:00pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Give the difference between open loop and closed loop control system.	**07**
	(b)	Draw the block diagram of closed loop system and explain one example in detail.	**07**
Q.2	**(a)**	Derive steps for plotting the root locus.	**07**
	(b)	Derive the necessary steps for plotting the bode plot.	**07**
		OR	
	(b)	Derive the Mason's gain formulae.	**07**
Q.3	**(a)**	Explain the different types of rules for block diagram reduction method.	**07**
	(b)	Define steady state error and derive steady state error for type 0, 1, 2 systems with standard test input signals.	**07**
		OR	
Q.3	**(a)**	Define transient response specifications with neat diagram along with equations.	**07**
	(b)	Define the following terms: phase crossover frequency, gain crossover frequency, gain margin and phase margin.	**07**
Q.4	**(a)**	Explain the steps for designing the polar plot with one example.	**07**
	(b)	Explain the steps for plotting the Nyquist plot.	**07**
		OR	
Q.4	**(a)**	Explain the difference between conventional control theory and modern control theory.	**07**
	(b)	Explain the difference between manmade control system and natural control system	**07**
Q.5	**(a)**	Explain the different steps for designing SFG.	**07**
	(b)	Explain the transient response for first order system.	**07**
		OR	
Q.5	**(a)**	Explain Routh's Hurtwitz criterion along with its function.	**07**
	(b)	Explain the following terms: State, State Variables and State models.	**07**

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