Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – SUMMER • 2014

Subject Code: 170302 **Date: 03-06-2014**

Subject Name: Physiological System Modeling

Time: 02.30 pm - 05.00 pm **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 physiological system and engineering control system using suitable example.	**07**
	(b)	Enlist and explain the basic properties of engineering, which are used for the physiological modeling.	**07**
Q.2	**(a)**	What do you understand by linear model of physiological system? Explain linear model of respiratory mechanics.	**07**
	(b)	Explain lumped parameter model and distributed parameter model using suitable example.	**07**
		OR	
	(b)	Explain muscle stretch reflex model. Determine the steady state operating point of muscle stretch reflex model.	**07**
Q.3	**(a)**	Explain the model of cardiac output regulation.	**07**
	(b)	What is type-1 diabetes? Explain the model of regulating diabetes.	**07**
		OR	
Q.3	**(a)**	What is the significance of O_2 and CO_2? Explain the regulation of it in human body.	**07**
	(b)	Enlist and explain the different types of response? Derive the equation for closed loop and open loop of a lungs mechanics model.	**07**
Q.4	**(a)**	Enlist & Explain the sub component of Neuromuscular Reflex Motion model.	**07**
	(b)	What is closed loop system? Explain the effect of closed loop configuration on the performance of system in terms of external disturbances and parameter variation.	**07**
		OR	
Q.4	**(a)**	What is Routh-harwitz stability criterion, explain the stability of lung mechanics model with integral control and proportional control.	**07**
	(b)	Explain the integral control and derivative feedback configuration of closed loop system in detail.	**07**
Q.5	**(a)**	Explain a model of circulatory control. And also explain the frequency response with suitable simulink model.	**07**
	(b)	Explain a basic eye movement system and wetheimer's saccade eye model	**07**
		OR	
Q.5	**(a)**	Explain parametric and nonparametric system identification method. Explain any one in detail.	**07**
	(b)	Explain the different problem encountered during the system identification.	**07**

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