Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. Sem. - V - Examination – June- 2011

Subject code: 150304

Subject Name: Modeling and simulation of Biological systems

Date:30/06/2011 **Time: 10:30 am – 01:00 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)**	With help of neat diagram describe the model of Cardiac output regulation & derive the necessary differential equations.	**07**
	(b)	Derive the governing differential equation of a distributed parameter model of unmyelinated nerve fibre.	**07**
Q.2	**(a)**	Describe cardiovascular variability model.	**07**
	(b)	Describe the chemical regulation of ventilation as a physiological system model, derive the necessary differential equations & draw its SIMULINK implementation.	**07**
		OR	
	(b)	Explain the regulation of blood glucose by a physiological system model.	**07**
Q.3	**(a)**	Explain the model of neuromuscular Reflex Motion with its necessary equations, block diagram & SIMULINK implementation	**07**
	(b)	Describe how recording of electrical activity of neuron during a saccade.	**07**
		OR	
Q.3	**(a)**	With help of neat diagram explain West Heimer's Saccade eye movement model	**07**
	(b)	Describe model for Glucose –insulin regulation. Draw its SIMULINK diagram.	**07**
Q.4	**(a)**	With help of neat diagram describe a Occulomotor Muscle model	**07**
	(b)	Explain muscle stretch reflex as a physiological control system.	**07**
		OR	
Q.4	**(a)**	Discuss the limitation of west Heimer's model	**07**
	(b)	What are the factors to be considered for designing eye muscle model?	**07**
Q.5	**(a)**	Explain the difference between Engineering & Physiological Control Systems	**07**
	(b)	Draw and explain simulink model for steady state analysis of muscle stretch reflex model.	**07**
		OR	
Q.5	**(a)**	Explain Venous return curve with necessary graphs.	**07**
	(b)	With example differentiate between distributed and lumped parameter model.	**07**

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