Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- Vth SEMESTER–EXAMINATION – MAY/JUNE - 2012

Subject code: 150304 **Date: 07/06/2012**

Subject Name: Modelling & Simulation of Biological Systems

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)**	Explain conceptual model & mathematical model.	**07**
	(b)	Explain the physiological control system for muscle stretch reflex.	**07**
Q.2	**(a)**	Explain Open loop verses close loop system with necessary example.	**07**
	(b)	Describe the pressure & Volume changes of cardiac output with proper graphs.	**07**
		OR	
	(b)	Determine equilibrium point for muscle stretch reflex model with nonlinear characteristics.	**07**
Q.3	**(a)**	Draw & explain the steady-state analysis of glucose regulation for normal, Type - I & II diabetic patients.	**07**
	(b)	Explain the SIMULINK model for heart rate & arterial blood pressure.	**07**
		OR	
Q.3	**(a)**	Explain the chemical regulation of ventilation. What is the respiratory controller?	**07**
	(b)	Explain the robinson's model.	**07**
Q.4	**(a)**	Describe the saccade characteristics.	**07**
	(b)	Draw & explain the frequency response graphs for glucose-insulin model.	**07**
		OR	
Q.4	**(a)**	What do you mean by system identification? How inverse problem analysis could be helpful?	**07**
	(b)	Explain the agonist & antagonist neurological signals.	**07**
Q.5	**(a)**	What is integral control? Explain with necessary example.	**07**
	(b)	Draw the main sequence diagrams for saccadic eye movement.	**07**
		OR	
Q.5	**(a)**	Draw westheimer's saccadic eye movement model.	**07**
	(b)	Draw the schematic model for regulation of glucose & insulin.	**07**

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