

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 versus 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**
