Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V- EXAMINATION – SUMMER 2016

Subject Code: 150304 **Date: 17/05/2016**

Subject Name: Modelling & Simulation of Biological Systems (Institute Elective - II)

Time: 02:30 PM to 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.**
4. **Notations have conventional meaning.**

Q.1	**(a)**	Discuss about neurological control signals.	**07**
	(b)	What are the considerations while developing the model for cardiovascular system?	**07**
Q.2	**(a)**	What remains the nature of "source" and "sink" in SIMULINK development of Lung mechanics system as a whole? Narrate.	**07**
	(b)	Giving suitable example, discuss the physiological control system with terminologies.	**07**
		OR	
	(b)	Discuss: development of computational fluid diagram of cardiovascular system.	**07**
Q.3		Taking suitable examples, explain the terms with reference to 'Models": lumped parameter model, distributed parameter model, static model, dynamic model, linear model, intermediate variables, control variable.	**14**
		OR	
Q.3	**(a)**	Enlist advantages and applications of MATLAB.	**07**
	(b)	Discuss the principles of superposition. Where and how does it help in model formation?	**07**
Q.4	**(a)**	How does the simulation of pulmonary mechanics and lung mechanics differentiate?	**07**
	(b)	Enlist the dependent and independent variables while framing models for Eye Movements. Name the model.	**07**
		OR	
Q.4	**(a)**	Enlist the tools applied for steady state analysis of muscle stretch reflex action.	**07**
	(b)	What do you mean by frequency domain analysis? Narrate it by taking reference of lung mechanics. Clearly state the nature of variables.	**07**
Q.5	**(a)**	Justify the statement: "Modeling is an art for physiological systems too".	**07**
	(b)	What considerations does one can give for models concerning respiration mechanics? Comment on the dependent variables participating.	**07**
		OR	
Q.5	**(a)**	Explain the frequency responses curves for any one physiological system.	**07**
	(b)	How does the non-linearity of the model can be treated? Take suitable example to explain it clearly.	**07**

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