

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-VII EXAMINATION – WINTER 2015**

**Subject Code: 170302****Date:07/12/2015****Subject Name: Physiological System Modeling****Time: 10:30am to 1:00pm****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) Differentiate between physiological and engineering control systems. **07**  
 (b) What are linear models of physiological system? **07**
- Q.2** (a) Draw computational flow diagram of cardiac system. **07**  
 (b) Explain the pulmonary mechanics modeling and simulation. **07**
- OR**
- (b) Explain airways-full model for respiratory mechanism. **07**
- Q.3** (a) How pulmonary and cardiovascular models interact? **07**  
 (b) Differentiate between opened loop and closed loop dynamics. **07**
- OR**
- Q.3** (a) Draw the computational flow diagram for cardiopulmonary software development. **07**  
 (b) What is significance of cheyne-stokes breathing model. **07**
- Q.4** (a) Write a note on oculomotor muscle model. **07**  
 (b) What is Routh-harwitz stability criterion, explain the stability of lung mechanics model with integral control and proportional control. **07**
- OR**
- Q.4** (a) Explain linear muscle model. **07**  
 (b) Draw and explain the frequency responses of glucose-insulin model with necessary graphs. **07**
- Q.5** (a) Explain the different problem encountered during the system identification. **07**  
 (b) Discuss a case study of blood glucose regulation. **07**
- OR**
- Q.5** (a) Explain muscle stretch reflex model. Determine the steady state operating point of muscle stretch reflex model. **07**  
 (b) Explain non parametric and parametric identification methods. **07**

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