

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2014

Subject code: 711104**Date: 21-06-2014****Subject Name: Modeling, Simulation and Computer Application****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 system modeling and simulation. **07**
 (b) Classify system variables and write their importance. **07**

- Q.2** (a) Explain conversion of state space representation to transfer function form by giving a suitable example. **07**
 (b) Explain the use of probability in simulation. Describe Binomial distribution and Exponential distribution probability density functions and cumulative distribution functions. **07**

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- (b) Describe the idealized translational passive elements giving their basic governing mathematical representation. **07**
Q.3 (a) Get transfer function form of a second order differential equation for a damped system. **07**
 (b) Explain RC circuit and its importance. Write a program for showing the effect of circuit parameters. **07**

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- Q.3** (a) Sketch a physical model of an automobile suspension system. Write only system equations. **07**
 (b) Draw RLC circuit and make a model to simulate a second order system. Mention important parameters and their effects on the response of the system. **07**

- Q.4** (a) Derive an expression for simulating the dynamics of a hard disk drive read arm system. **07**
 (b) What is the significance of analogy? Explain giving example. **07**

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- Q.4** (a) For modeling mechanical systems, describe idealized rotational passive elements with governing equations and appropriate sketches. **07**
 (b) Model and simulate a mechanical accelerometer and discuss the characteristics of the same. **07**

- Q. 5** (a) Give classification of systems. Explain in brief. **07**
 (b) Explain random variables and their significance. **07**

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- Q. 5** (a) Model a DC motor for simulating its performance. Write down system equations and get a transfer function. **07**
 (b) Explain Monte Carlo simulation technique. **07**