

GUJARAT TECHNOLOGICAL UNIVERSITY
ME Semester –I Examination Feb. - 2012

Subject code: 712106N**Date: 15/02/2012****Subject Name: Modeling, Simulation and Computer Application****Time: 10.30 am – 01.00 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 analogous representation of models. Give analogous representation between mechanical and electrical systems. **07**
(b) Discuss different types of models with help of examples **07**

- Q.2** (a) Explain the concept of System. Explain different types of systems with examples **07**
(b) Give a physical model of an automobile suspension system. Also carry out its mathematical modeling deriving its equation in matrix form. **07**

OR

- (b) Discuss unforced response of second order mechanical system and write MATLAB program for it **07**

- Q.3** (a) Discuss Inverted Pendulum model and write its MATLAB program **07**
(b) Discuss modeling of R-L-C series circuit and write a MATLAB program for it **07**

OR

- Q.3** (a) Explain stochastic systems in brief. Explain giving examples **07**
(b) Explain Monte Carlo method. Use it to find the area under the curve **07**

- Q.4** (a) A manufacturer claims that only 3% of his products supplied by him are defective. A random sample of 500 products contained 25 defectives. Test the claim of the manufacturer. **07**
(b) Write short note on simulation toolboxes of MATLAB **07**

OR

- Q.4** (a) Model a printer belt drive system with an objective of determining the effect of the belt spring constant “k”. Assume the radius of the pulleys as r, the angular rotation of the motor shaft as Θ . And angular rotation of the driven pulley as Θ_p . Assume suitable nomenclature for various parameters and simulate the system. **07**
(b) Explain different random number generator **07**

- Q.5** (a) Justify the statement “Simulation is a necessary tool in engineer research”. **07**
(b) Write short note on simulink **07**

OR

- Q.5** (a) Different types of shift register **07**
(b) Various simulation software used in engineering giving brief description **07**
