

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. IST Semester–Remedial Examination – July- 2011****Subject code: 712106N****Subject Name: Modeling Simulation & Computer Application****Date: 13/07/2011****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) What is a system? Explain all types of system with an example of each. **07**
(b) Explain linear and nonlinear system with an example of each. **07**

- Q.2** (a) Discuss types of model with an example of each. **07**
(b) What is simulation? Why should we simulate a system? State steps to be followed in simulating a system. **07**

OR

- (b) Differentiate between continuous event model and discrete event model. Also define: Entity, Activity, State and Event of a system. **07**
- Q.3** (a) Model any first order system and write a Matlab program for it. State inputs and outputs of the system clearly. **07**
(b) Discuss modeling of automobile suspension system and write its system equations. **07**

OR

- Q.3** (a) Discuss unforced response of second order mechanical system and write Matlab program for it. **07**
(b) Write a short note on various simulation softwares which can be used in Mechanical Engineering. **07**
- Q.4** (a) Discuss inverted pendulum model and write its Matlab program. **07**
(b) Discuss advantage of Matlab and discuss various simulation toolboxes available in it. **07**

OR

- Q.4** (a) Discuss modeling of R-L-C series circuit and write a Matlab program for it. **07**
(b) Write a short note on simulink. **07**
- Q.5** (a) Explain Monte Carlo method and state the points which make it different than other simulation. **07**
(b) 500 articles from a factory are examined and found to be 2% defective. 800 similar articles from a second factory are found to have only 1.5% defective. Can it reasonably be concluded that the product of the first factory are inferior to those of second? **07**

OR

- Q.5** (a) 100 electric bulbs are found to be defective in a lot of 5000 bulbs. Find the probability that at the most 3 bulbs are defective in a box of 100 bulbs. **07**
[$\exp(-2) = 0.1353$]
(b) A random sample of 200 villages from Coimbatore district gives the mean population per village at 485 with a S.D. of 50. Another random sample of the same size from the same district gives the mean population per village at 510 with a S.D. of 40. Is the difference between the mean values given by the samples statistically significant? Justify your answer. **07**
