Seat No.:	Enrolment No
	GUJARAT TECHNOLOGICAL UNIVERSITY
	M. E SEMESTER – I • EXAMINATION – WINTER • 2013

Date: 23-12-2013

Subject code: 711901N Subject Name: Modelling, Analysis and Simulation 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. 07 Q.1 (a) Explain various steps in model building. **(b)** Explain Monte-Carlo simulation technique with the help of example. 07 **Q.2** (a) What is random number? How they are used in simulation? 07 (b) Describe the different tests to be performed for randomness. 07 OR **(b)** Prepare relative frequency distribution of telephone inquiries per one-hour interval. 07 Calculate mean and variance for the data given below. No. of inquiries (N) 3 4 5 No. of 1-hr intervals with N 315 142 9 2 40 1 inquiries Explain the following terms: 4. Queuing 07 Q.3 (a) 1. Scatter diagram 5. Time series 2. Curve fitting 6. Inverse problems 7. Multiplicative Congruent Techniques (MCT) 3. Heuristics (b) Define Gamma Family distribution. List them along with their mean and variance. 07 OR Q.3 (a) Develop basic model for a linear relationship between a dependent variable y and 07 an independent variable x. A set of data is given below. 0 2 2 X 5 4 3 Also calculate the coefficient of correlation. 07 **(b)** Write short note on cluster analysis. **Q.4** (a) Explain various stages of simulation to be used to investigate the properties of a real system. Also show flow-chart for the same. (b) What is curve fitting? Discuss general shapes of regression curve with appropriate 07 equations. OR (a) What is the importance of simulation? Explain the simulation process in detail with 07 **Q.4** using flow-chart. **(b)** Explain language classification chart for simulation techniques 07 07 **Q.5** (a) Explain stochastic processes with examples. **(b)** Discuss different traffic simulation models with their applications. 07 OR Q.5 (a) What is the importance of queuing? Discuss various areas in which queuing system 07 is used. (b) Customers arrive at a sales counter manned by a single person according to a **07** poisson process with a mean rate of 20 per hour. The time required to serve a customer has an exponential distribution with a mean of 100 seconds. Calculate the

average waiting time of a customer.