Fifth Semester Examination – 2006

QUANTITATIVE TECHNIQUES – II

Full Marks – 70

Time : 3 Hours

Answer Question No. **1** which is compulsory

and any **five** from the rest.

The figures in the right-hand margin

indicate marks.

1. Answer the following questions :   2×10

   (i)   Define system and model, state the
         difference between them.

P.T.O.

(ii) Arrival time of customer's is given for a simulation starting at zero time. Find the inter-arrival time and arrival rate per hour.

Customer No.	Arrival Time (in seconds)
1	3
2	5
3	8
4	10
5	14

(iii) Find the correct value of the constant 'A' that makes the following equation for Y, a probability density function.

$$Y = 0.5 + A(x + 1.5) \qquad 1 <= X <= 2$$

$$0 \qquad\qquad elsewhere$$

(iv) Differentiate between discrete event model and continuous model.

(v) Explain briefly a method to generate random number.

(vi) What are the advantages and disadvantages of simulation modeling?

(vii) What are the important parameter in a queuing system?

(viii) Define utilization and occupancy, state the difference between these two factors.

(ix) What are the advantages of using general purpose language for simulation programming?

(x) Explain briefly application of simulation in inventory problem.

2. (a) Explain the Monte Carlo simulation with suitable example. 5

(b) Explain the computational technique of simulation for discrete model. 5

3. (a) State the rejection method for generation of random numbers. 5

(b) For the following data compute the average queue length if the simulation time computed at 10.5 minutes and total number of customer in the system is 5. 5

No. of Customer	0	1	2	3	4	5
Time (T)	4.2	3.1	1.8	1.4	0	0

4. Explain the simulation of a telephone system. State the behavior in the case of very high arrival rate. 10

5. For a 1-server queue with Poisson arrival pattern and exponential service time, plot the following two qualities as a function of the utilization factor.

(i) The average queue length.

(ii) The probability of queue length exceeding 5.

Make sure to take enough points for higher value of ρ so that meaningful curves are obtained. 10

6. (a) State the factors in selection of a discrete system simulation language. 5

(b) How many types of simulation language are there ? Classify them. 5

7. (a) Draw the flow chart for 1-server queue simulation. 7

(b) What is the main function of simulator ? State some device of this kind and explain. 3

8. Write notes on : 2.5×4

    (a) GPSS

    (b) Stochastic variable with sample

    (c) Fixed time step *vs* next event simulation

    (d) Role of random number in simulation.

———