

NEW SCHEME

 rinivas Institute of Technology
 Library, Mangalore

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Fifth Semester M.C.A Degree Examination, January/February 2005
Master of Computer Applications
System Simulation & Modelling

Time: 3 hrs.]

[Max.Marks : 100

Note: Answer any FIVE full questions.
 Statistical tables are allowed.

1. (a) What is simulation? State the advantages of simulation. (6 Marks)
- (b) Differentiate between continuous and discrete systems. (4 Marks)
- (c) With the help of a flow chart, explain the steps involved in simulation study. (10 Marks)

2. (a) Explain the characteristics of a queuing system. (10 Marks)
- (b) Customers arrive at a single chair barber shop at random from 1 to 10 minutes apart. Each possible value of inter arrival time has the same probability of occurrence. The service time has the following distribution

Service time	Prob.
3	0.2
5	0.35
6	0.2
8	0.25

Simulate the barber shop for 10 customers and find the average waiting time, server utilization and average service time. (10 Marks)

3. (a) Explain event scheduling algorithm with a suitable example. (15 Marks)
- (b) What are pseudo random numbers? Explain the factors to be considered while selecting a random number generator. (5 Marks)

4. (a) Test the following sequence of 30 random numbers for uniformity using χ^2 -test given $\chi^2_{.05, 9} = 16.9$ (10 Marks)

0.36	0.76	0.23	0.97	0.19	0.11	0.49	0.21	0.56	0.66
0.83	0.3	0.99	0.40	0.60	0.29	0.05	0.74	0.87	0.49
0.96	0.17	0.01	0.64	0.47	0.78	0.65	0.44	0.28	0.02

- (b) Explain the method of generating exponential variates using inverse transform technique. (5 Marks)
- (c) Generate 5 Poisson variates with mean 0.8. (5 Marks)

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5. (a) Briefly explain the steps involved in developing input model. (10 Marks)
- (b) The vehicles arrived at a petrol bunk in a 5 minute period between 6 A.M to 10 P.M was monitored for days given below.

Arrival per period	0	1	2	3	4	5	6	7	8	9	10
Frequency	15	12	8	10	10	7	4	3	5	4	2

Use χ^2 test to check whether the data follows Poisson distribution at 5% level of significance. (10 Marks)

6. (a) What is verification of simulation models? List the suggestions given for verification of models. (8 Marks)
- (b) Describe 3-step approach to validation by Naylor and Finger. (12 Marks)
7. (a) Explain the types of simulation with respect to output analysis. Give examples. (6 Marks)
- (b) Explain the methods of reducing initialization bias in steady state simulation. (8 Marks)
- (c) Briefly explain the measures of performance of simulation models. (6 Marks)
8. (a) Briefly explain the event oriented simulation tools. (8 Marks)
- (b) Explain the concept of CPD simulation and memory simulation. (12 Marks)

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