

(4)

7. Write a computer program to simulate an inventory system with large number of policies to determine the following :

- (i) Average number of daily back orders,
- (ii) Average Daily Buffer Stock and
- (iii) Average daily shortage cost.

Choose appropriate system boundaries. 14

Unit-IV

8. Differentiate Static Vs. Dynamic Stochastic simulation experiments by choosing appropriate examples, and derive an expression to find run-length of static simulation experiments. 14

9. (a) Discuss the following techniques for reducing the variance in simulation experiments without increasing the sample size :

- (i) Correlated sampling, and
- (ii) Stratified sampling. 8

- (b) Write short note on any two of the following simulation languages :

- (i) DYNAMO
- (ii) SIMSCRIPT
- (iii) SIMULA. 6

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Printed Pages : 4

MCA / M12

SYSTEMS SIMULATION

Paper-MCA-203

Time allowed : 3 hours] [Maximum marks : 80

Note : (i) There are nine questions in this paper.
Attempt five questions in all.

(ii) Question No. 1 is compulsory.

(iii) Attempt remaining four questions by selecting only one question from each unit.

1. (a) What are the steps involved in the process of simulation ? 3
- (b) What are state variables and how do they influence the complexity of the system ? 3
- (c) Explain the role of Time-Scaling in Analog Simulation. 3
- (d) What is the need of Monte Carlo computation ? Give example. 3
- (e) Discuss the affect of waiting time and idle time in a queuing system through example. 3

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- (f) What do you understand by 'Forecasting through Simulation' ? 3
- (g) Define Central Limit theorem. Discuss its importance in the design of simulation experiments. 3
- (h) What do you understand by process oriented simulation languages ? 3

Unit-I

2. (a) Identify any two problems of your own experience that you think can be solved using computer simulation rather than analytically. 6
- (b) Explain the difference between Analog, Digital and Hybrid Simulation. 6
- (c) What are limitations of Simulation ? 2
3. (a) Differentiate static and dynamic models by choosing appropriate examples. 6
- (b) What are general characteristics of system ? How would you justify them ? 4
- (c) Describe the components of a "Super Bazar" and identify its entities, attributes and activities. 4

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Unit-II

4. Develop algorithms simulators for the following systems :
- (i) Chemical Reactor.
- (ii) Second Order Non-linear Feedback Servo System. 7x2
5. (a) Describe inverse transformation method for generating a sample from a given non-uniform distributions. How it can be further extended to derive a sample from exponential probability distribution function ? 5+5
- (b) Write a program to determine the approx. value of square root of 3 using 3000 random numbers. 4

Unit-III

6. List out general characteristics of queuing system. For a single server queuing system :
- (i) Prove mathematically that arrival pattern follows Poisson distribution, and
- (ii) Determine the expression for average number of customers in the system. 14

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