

7. (a) Explain the functions and attributes of GPSS. Discuss briefly about GPSS block diagram symbols. 6
- (b) Describe the main tasks involved in preparing a computer program for simulation. 4
8. Write short notes on any two : 5 + 5
- (i) Variance Reduction Techniques
- (ii) Deterministic and non-deterministic models
- (iii) Simulation of a Telephone system.

Set-1

SIMULATION AND MODELING

Full Marks : 70

Time : 3 hours

Answer Q. No. 1 and any five from Q. No. 2 to Q.No.8

The figures in the right-hand margin indicate marks

1. Answer the following questions : 2 x 10

- (a) Define a model. What do you mean by model construction ?
- (b) Differentiate between model verification and validation.
- (c) What do you mean by system engineering ?
- (d) What are the salient aspects of GPSS package ?
- (e) What are the properties of random numbers ?
- (f) What are the measures of probability functions ?

mean, Variance / Standard Deviation.

(g) Differentiate between interval-oriented and evented methods for updating clock time.

(h) Generate two random variates from an exponential distribution having mean value of 8.

(i) Discuss how logistic function is more realistic than modified exponential growth function.

(j) What are the limitations of simulation ?

2. (a) Explain the dynamics of an Inventory Control System, and propose a simulation model that takes care of all uncertainties associated with it. 5

(b) Write an algorithm to simulate multi-server queue explaining each step clearly. 5

3. (a) Why the random numbers generated by computers are called pseudo random numbers ? Discuss the congruence methods of generating random numbers. 5

(b) Calculate the probability of there being n arrivals ($n = 0, 1, 2, \dots, 10$) in an interval of 10 secs when the arrivals have a Poisson distribution with a mean value of 10. 5

4. (a) Differentiate between the numerical computation technique for discrete and continuous models with suitable examples. 6

(b) Explain the process of simulation with the help of a flowchart. 4

5. (a) Discuss the principle of Inverse Probability Integral Transformation to generate non-uniform random samples. What is its drawback ? 6

(b) Explain about Monte Carlo simulation with suitable example. 4

6. (a) What is Discrete Event Simulation and what are the main constituents of a DES model ? 5

(b) Taking a specific example of your choice, describe the above procedure briefly. 5