

2. (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
3. Write short notes on any two : 5 + 5
- (i) Variance Reduction Techniques
- (ii) Deterministic and non-deterministic models
- (iii) Simulation of a Telephone system.

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 × 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.

(Turn Over)

(2)

- (g) Differentiate between interval-oriented and event-driven 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

(3)

- (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