Exam.Code:0918
Sub. Code: 6794 (4)

1059

B.E. (Computer Science and Engineering)
Sixth Semester
CS-603: Modeling and Simulation

Time allowed: 3 Hours Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part.*

x-x-x

1Q:
i) What is vectorization in MATLAB? (1)
ii) Give the name and syntax of function which is used for reading ASCII files that are formatted into columns of data with different data types in MATLAB. (1)
iii) List different Control statements of GPSS. (1)
iv) What is event elimination rule? (1)
v) What are exogenous activities? (1)
vi) Give the names of three basic components of queuing systems. (1)
vii) Generate five pseudo-random numbers using Mid square method with 1120 as seed number. (1)
viii) What is purpose of Event list and Event routine in next event time advance approach? (1)
ix) Briefly explain the difference between Analytical Solution and Simulation. (1)
x) Briefly explain different limitations of JIT Compiler in MATLAB. (1)

Part-A

2Q. A server facility consists of two servers in series, each with its own FIFO queue. A customer completing service at server 1 proceeds to server 2, while a customer completing service at server 2 leaves the facility. Assume that the inter-arrival times of customers to server 1 are IID exponential random variables with mean 1 minute. Service times of customers at server 1 are IID exponential random variables with mean 0.7 minute, and service times of customers at server 2 are IID exponential random variables with mean 0.9 minute. Assume that there is travel time from the exit from server 1 to the arrival to queue 2 (or to server 2). Assume this travel time is distributed uniformly between 0 and 2 minutes. Run the simulation for exactly 1000 minutes and estimate for each server the expected average delay in queue of a customer, the expected time average number of customers in queue and the expected utilization.
Identify state variables and events in the system giving reasons.
Draw and explain event graph of above system Also develop flow chart diagrams for the event routines identified by you. (10)

3Q. a) Explain different advantages and disadvantages of Simulation. (5)
3Q. b) Explain Components and organization of a Discrete Event Simulation Model in detail. (5)

4Q a) Explain different steps in sound simulation study. (5)
4Q. b) Explain Numerical Integration by Monte Carlo Simulation with example. (5)

Part-B

5Q. a) Generate sequence of ten random numbers by Multiplicative Congruency using seed as 69. constant multiplier as 13 and modulo as 100. (5)
5Q. b) Explain SIM mode of Transfer Block in GPSS with example. (5)

6Q. a) Explain features and usage of any Network Simulator. (5)
6Q.b) Write a MATLAB Program for generation of random variates following Poisson distribution. (5)

7Q. a) The Theory predicts the proportion of beans. in the four groups A. B. C and D should be 9 : 3 : 3 : 1 In an experiment among 1600 beans. the numbers in the four groups were 882, 313, 287 and 118. Does the experiment result support the theory that there is no difference between experimental values and theoretical values? (The table value of Chi-Square for 3 degree of freedom at 5% level of significance is 7.81). (6)
7Q. b) Write a MATLAB program to solve roots of a quadratic equation $Ax^2+BX+C=0$ where A, B and C are coefficients and input by user. (4)

x-x-x