CBCS SCHEME

USN 17CS834

Eighth Semester B.E. Degree Examination, July/August 2022
System Modeling and Simulation

Time: 3 hrs. Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. List any five circumstances, when the simulation is the appropriate and when it is not. **(05 Marks)**

b. Write the advantages and disadvantages of simulation. **(05 Marks)**

c. Explain with a flow chart the steps involved in simulation study. **(10 Marks)**

OR

2 a. Explain event-scheduling / Time advance algorithm with example. **(10 Marks)**

b. Develop a manual simulation table for single server queuing system of a grocery shop for 6 customers and find, (i) Average waiting time of customer (ii) Idle time of server (iii) Average time customer spends in system. (iv) Probability wait customers arrive at shop randomly from 1 to 8 minutes and have equal probability. Service time varies from 1 to 6 minutes. The random digits for IAT and ST are 913, 727, 015, 948, 309 and 84, 10, 74, 53, 17, 79 respectively.

ST	1	2	3	4	5	6
P	0.10	0.20	0.30	0.25	0.10	0.05

(10 Marks)

Module-2

3 a. Explain discrete distribution and continuous distribution with examples. **(10 Marks)**

b. What is Poisson process? Mention the properties of Poisson process. **(10 Marks)**

OR

4 a. Explain the characteristics of a queuing system. **(10 Marks)**

b. State and explain Kendal's notation for queuing system. **(10 Marks)**

Module-3

5 a. Explain combined linear congruential method for random number generation. **(10 Marks)**

b. The sequence of numbers 0.44, 0.81, 0.14, 0.05, 0.93 has been generated. Use the Kolmogorov-Smirnov test with $\alpha = 0.05$ to determine if the hypothesis that the numbers are uniformly distributed on the interval (0, 1) can be rejected. Compare F(X) and $S_n(X)$ on a graph (where $D_\alpha = 0.565$) **(10 Marks)**

OR

6 a. Write a step by step procedure to generate random variate using inverse transform technique for exponential distribution. **(10 Marks)**

b. Explain acceptance rejection technique. Generate 3 Poisson variate with mean 0.2. Consider the random numbers 0.4357, 0.4146, 0.8353, 0.9952, 0.8004 **(10 Marks)**

Module-4

7 a. List the steps involved in the development of a useful model of Input data and also write the important suggestions to be noted while collecting the data. **(10 Marks)**

b. Explain the different methods used to identifying the distribution with data. **(10 Marks)**

OR

8 a. Using goodness of fit test, test whether random numbers are uniformly distributed based on Poisson assumption with level of significance $\alpha = 0.05$, $\hat{\alpha} = 3.64$. Sample data are

Interval	0	1	2	3	4	5	6	7	8	9	10	11
Observed frequency	12	10	19	17	10	8	7	5	5	3	3	1

[where $\chi^2_{0.05}|11.1|$] **(10 Marks)**

b. Explain the types of simulation with respect to the output analysis. **(10 Marks)**

Module-5

9 a. Explain with neat diagram, model building, verification and validation. **(10 Marks)**

b. Describe the three steps approach to validation by Naylor and Finger. **(10 Marks)**

OR

10 a. Explain output analysis for terminating and steady state simulation. **(10 Marks)**

b. Explain optimization vice simulation. **(10 Marks)**

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