



Eighth Semester B.E. Degree Examination, Dec.2023/Jan.2024 System Modelling and Simulation

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. List circumstances when simulation is appropriate tool and when it is not appropriate tool. (08 Marks)
- b. Write the different areas of application of simulation. (03 Marks)
- c. Explain different types of models. (05 Marks)

OR

- 2 a. Explain event-scheduling / time advance algorithm. (06 Marks)
- b. Consider a single server queuing system with interarrival time and service time details are

Inter arrival time	1	1	6	3	7	5	2	4	1
Service time	4	2	5	4	1	5	4	1	4

Prepare simulation table for the given data using event scheduling approach and stop simulation when clock reaches 18. Also write the server utilization time and maximum queue length. (10 Marks)

Module-2

- 3 a. Explain characteristics of queuing system. (08 Marks)
- b. Write a note on:
 - i) Queuing notation for queuing system.
 - ii) Steady state behavior of M/G/1 queue. (08 Marks)

OR

- 4 a. Explain :
 - i) Bernoulli trials and Bernoulli distribution
 - ii) Binomial distribution. (08 Marks)
- b. Explain :
 - i) Uniform distribution
 - ii) Exponential distribution. (08 Marks)

Module-3

- 5 a. Write the properties of random numbers and mention important consideration for generating random numbers. (08 Marks)
- b. Explain linear congruential method and generate three random numbers for $X_0 = 27$, $a = 17$, $c = 43$ and $m = 100$. (08 Marks)

OR

- 6 a. What do you mean by Acceptance Rejection Technique? Generate 3 poisson variates with mean $\alpha = 0.2$. The random numbers are 0.4357, 0.4146, 0.8353, 0.9952, 0.8004, 0.7945. (08 Marks)
- b. Develop a step by step procedure to generate random variate using inverse transform technique for exponential distribution. (08 Marks)

Module-4

- 7 a. Explain four steps in the development of a useful model. (08 Marks)
b. Explain goodness of fit tests. (08 Marks)

OR

- 8 a. Explain types of simulation with respect to output analysis. Give examples. (08 Marks)
b. Briefly explain different ways of selecting data when data is not available. (08 Marks)

Module-5

- 9 a. Explain output analysis for steady state simulation. (08 Marks)
b. Explain output analysis for terminating simulation. (08 Marks)

OR

- 10 a. With a neat diagram, explain model building verification and validation. (08 Marks)
b. Discuss 3 steps approach for validation process as formulated by Naylor and Finger. (08 Marks)

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