Name:	
Enrolment No:	

UPES
End Semester Examination, December 2023

Course: Modeling and Simulation   **Semester: III**
Program: MCA   **Time : 03 hrs.**
Course Code: CSEG8003   **Max. Marks: 100**

Instructions:

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Distinguish between the continuous random variables and discrete random variables with suitable examples.	4	CO1
Q 2	Describe various key components of a worldview in discrete-event simulation, and discuss their importance in modelling complex systems.	4	CO2
Q 3	For a fast-food restaurant identify the entities, attributes, activities, events and state variables.	4	CO2
Q 4	Define optimization in the context of simulation modelling. Explain how optimization can be applied to improve the performance or efficiency of a system.	4	CO3
Q 5	Explain the concept of terminating simulations and steady-state simulations. What are the fundamental differences between these two types of simulations with respect to output analysis?	4	CO4
SECTION B			
(4Qx10M= 40 Marks)			
Q 6	Explain, in detail, through a flow diagram, all the steps followed for a simulation study.	10	CO1
Q 7	A computer repair person is beeped each time there is a call for service. The number of beeps per hour is known to occur in accordance with a Poisson distribution with a mean of $\alpha = 2$ per hour. Compute (i) the probability of 2 beeps in the next one hour (ii) the probability of two or more beeps in in one hour period.	10	CO2
Q 8	Validation is the process of assessing whether a simulation model accurately represents the real-world system. Discuss the challenges and techniques involved in validating a complex simulation model.	10	CO3
Q 9	Explain the concept of sensitivity analysis in the context of optimization. How can sensitivity analysis help in refining the parameters and constraints of an optimization model?	10	CO4

SECTION-C
(2Qx20M=40 Marks)

Q 10	Describe the meaning and process of input modeling. Briefly mention the four major steps for input modeling in the simulation study. Discuss in detail the process of Histogram analysis and Q-Q plot for identifying the probability distribution from the data. OR The highway between Atlanta, Georgia and Athens, Georgia has a high incidence of accidents along its 100 kilometres. Public safety officers say that the occurrence of accidents along the highway is randomly (uniformly) distributed, but the news media say otherwise. The Georgia Department of Public Safety published records for the month of September. These records indicated the point at which 30 accidents involving an injury or death occurred, as follows (the data points representing the distance from the city limits of Atlanta): 88.3 40.7 36.3 27.3 36.8 91.7 67.3 7.0 45.2 23.3 98.8 90.1 17.2 23.7 97.4 32.4 87.8 69.8 62.6 99.7 20.6 73.1 21.6 6.0 45.3 76.6 73.2 27.3 87.6 87.2 (a)Use the histogram for understanding the distribution of the location of accidents. (b) Use the Kolmogorov–Smirnov test to discover whether the distribution of location of accidents is uniformly distributed for the month of September. (Reference statistic D = 0.24)	20	CO2
Q 11	Given the following distributions: (i)Normal (10, 4) (ii)Triangular (4, 10, 16) (iii) Uniform (4, 16) Find the probability that $6 < X < 8$ for each of the distributions.	20	CO2