


Name:			
Enrolment No:			
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES End Semester Examination, May 2023			
Course: Modelling and Simulation of Digital Systems Program: M.Tech (CSE) Course Code: CSEG 7005		Semester: II Time: 03 hrs. Max. Marks: 100	
Instructions: Attempt all questions.			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	Let's say that 80% of all business startups in the IT industry report that they generate a profit in their first year. If a sample of 10 new IT business startups is selected, find the probability that exactly seven will generate a profit in their first year.	4	CO1
Q 2	If a patient is waiting for a suitable blood donor and the probability that the selected donor will be a match is 0.2, then determine the expected number of donors who will be tested until a match is found including the matched donor.	4	CO2
Q 3	The probability of Ron going on time to school is 80%. Find the probability that Ron goes on time for the eighth time for the first ten days of school?	4	CO3
Q 4	A watch manufacturing company wants to reduce the number of defective pieces. It took an average of 100 lots and found that 7 watches from each lot were defective. Find out the probability of 10 watches being defective in a single lot?	4	CO4
Q 5	Differentiate between validation and verification process.	4	CO1
SECTION B (4Qx10M= 40 Marks)			
Q 6	Discuss the concept of actor based simulation model with example.	10	CO2
Q 7	Develop a graph based simulation model and explain the concept.	10	CO3
Q 8	Explain the following random number generation methods: a) Multiplicative Congruential Method b) Mixed Congruential Method	10	CO4

	Or		
	Describe the following clustering methods: a) Density based clustering b) Hierarchical Clustering		
Q 9	Write down all the steps which are essential for Monte Carlo Simulations.	10	CO2
SECTION-C (2Qx20M=40 Marks)			
Q 10	Explain the role of data visualization tools in modelling and simulations. Take any sample case study of your choice and justify your answer.	20	CO 4
Q 11	<p>Universal Bank is considering opening a drive in window for customer service. Management estimates that customers will arrive at the rate of 15 per hour. The teller whom it is considering to staff the window can service customers at the rate of one every three minutes. Assuming Poisson arrivals and exponential service, find</p> <p>a) Average number in the waiting line. b) Average number in the system. c) Average waiting time in line. d) Average waiting time in the system.</p> <p style="text-align: center;">Or</p> <p>One Saree shop has a single cashier. During the rush hours, customers arrive at the rate of 10 per hour. The average number of customers that can be processed by the cashier is 12 per hour. On the basis of this information, find the following:</p> <p>a) Probability that the cashier is idle b) Average number of customers in the queuing system c) Average time a customer spends in the system d) Average number of customers in the queue e) Average time a customer spends in the queue</p>	20	CO 4