

**SVKM's NMIMS**  
**MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING**

Programme: B. Tech (IT)

Year: III

Semester: V

**Academic Year: 2019-20** ✓

Subject: Computer Simulation and Modeling

Date: 14 November 2019

Marks: 70

Time: 10.00 am - 1.00 pm ✓

Durations: 3 (hrs)

No. of Pages: 02

**Final Examination (2019-20)/ Re-Examination (2018-19)** ✓

**Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.**

- 1) Question No. 1 is compulsory.
- 2) Out of remaining questions, attempt any 4 questions.
- 3) **In all 5 questions to be attempted.**
- 4) All questions carry equal marks.
- 5) **Answer to each new question to be started on a fresh page.**
- 6) **Figures in brackets on the right hand side indicate full marks.**
- 7) **Assume suitable data if necessary.**

Q1a. X and Y are jointly continuous with joint pdf

$$f(x, y) = \begin{cases} cx^2 + \frac{xy}{3} & \text{if } 0 \leq x \leq 1, 0 \leq y \leq 2 \\ 0 & \text{otherwise} \end{cases}$$

Find c, P(X + Y ≥ 1) and marginal pdf's of X and Y (7 marks)

Q1b In the above function f(x,y), are X and Y independent (justify). Find cov (X, Y). (7 marks)

Q2a. A classical inventory problem concerns the purchase and sale of newspapers. The paper seller buys the papers for 33 cents each and sells them for 50 cents each. Newspapers not sold at the end of the day are sold as scrap for 5 cents each. Newspapers can be purchased in bundles of 10. Thus, the paper seller can buy 50, 60, and so on. There are three types of Newsday's, "good," "fair," and "poor," with probabilities of 0.35, 0.45 and 0.2 respectively. The distribution of papers demanded on each of these days is given in table. The problem is to check the optimal number of papers the newspaper seller should purchase. In this case seller decide to purchase daily 70 papers. This will be accomplished by simulating demands for 8 days and recording profits from sales each day. (7 marks)

Demand	Demand Probabilities		
	Good	Fair	Poor
40	0.03	0.1	0.44
50	0.05	0.18	0.22
60	0.15	0.4	0.16
70	0.2	0.2	0.12
80	0.35	0.08	0.06
90	0.15	0.04	0
100	0.07	0	0

RN for demand and type of day	40	14	35	44	23	72	82	95	60	36
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- Q2b. Briefly explain the steps in a sound simulation study with flow chart (7 marks)
- Q3a. Explain Sequential allocation approach and linked allocation approach with proper example (7 marks)
- Q3b. What is Simlib and briefly explain any six functionalities of Simlib (7 marks)
- Q4a. Explain Components and Organization of a Discrete-Event Simulation Model with flowchart (7 marks)
- Q4b. Briefly explain any five techniques for increasing Model Validity and Credibility (7 marks)
- Q5a Explain different types of simulation with regard to output analysis (7marks)
- Q5b Explain transient and steady state behavior of a stochastic process (7 marks)
- Q6a. An eight-digit telephone number consists of exactly two zeroes. One of the digits is repeated thrice. Remaining three digits are all distinct. If the first three digits (from left to right) are 987, then find the probability of having only one 9, one 8 and one 7 in the telephone number. (7 marks)
- Q6b. A dice is rolled three times and the sum of the numbers appearing on the uppermost face is 15. The chance that the first roll was a four is: (7 marks)
- Q7a. Describe time-shared computer model and job-shop model (7 marks)
- Q7b. Briefly explain advantages, disadvantages, and pitfalls of simulation (7 marks)