

Tribhuvan University
Institute of Science and Technology
2080
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Bachelor Level / Third Year /Fifth Semester/Science
Computer Science and Information Technology (CSC317)
(Simulation and Modelling)
(NEW COURSE)

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Section A

Attempt any TWO questions.

(2×10 = 20)

1. Why model of a system is built? What is static model? Differentiate between static and dynamic mathematical models in simulation. (2 + 2 + 6)
2. What is storage in GPSS? Describe the blocks associated to storage in GPSS. A machine tool in a manufacturing shop is turning out parts at the rate of one every 5 minutes. As they are finished the parts go to an inspector who takes 10 ± 3 minutes to examine each one and rejects 10% of the parts. Represent the system in GPSS using the concept of facility and run the simulation for 500 parts. (2 + 3 + 5)
3. What are the two main properties of random numbers? Test whether the 3rd, 7th, 11th, and so on numbers in the sequence in the following random number sample are auto-correlated. ($Z_\alpha = 0.05$ and $Z_{0.025} = 1.96$) (3 + 7)
0.12 0.01 0.23 0.28 0.89 0.31 0.64 0.28 0.83 0.93 0.99 0.15 0.33 0.35 0.91 0.41 0.60 0.27
0.75 0.88 0.68 0.49 0.05 0.43 0.95 0.58 0.19 0.36 0.69 0.87

Section B

Attempt any EIGHT questions.

(8×5 = 40)

4. Explain Markov chain with suitable example. (5)
5. What are steps involved in simulation study? Explain. (5)
6. Generate 10 random integers using Linear congruential method where $m = 1000$, $a = 19$, $c = 6$, and $X_0 = 13$. (5)
7. Explain different estimation methods which are used in simulation output analysis. (5)
8. Define verification and validation. Explain the process of model verification in brief. (2 + 3)
9. What is feedback system? Explain with example. (3 + 2)
10. What is Calling Population? Explain Arrival and Service process in a queue. (1 + 4)
11. Explain the Monte Carlo simulation method with example. (5)
12. Write short notes: (5)
 - a) Non-stationary Poisson Process
 - b) Poker Test