

Tribhuvan University
Institute of Science and Technology
2075

Bachelor Level / fifth-semester / Science Full marks: 60 **Computer Science and Information Technology(CSC317)** Pass marks: 24 (Simulation and Modeling) 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.

Group A

Long Answer Questions:

Attempt any two questions. (2x10=20)

1. Differentiate between analog and digital methods of simulation. Explain the analog method of simulation with the help of suitable examples.
2. Use a multiplicative congruential method to generate a sequence of three digits random numbers between (0, 1) with $X_0=27$, $a=3$ and $m=1000$. Use any one of the uniformity tests to find out whether the generated numbers are uniformly distributed or not? (Critical value for $\alpha=0.05$ and $N=5$ is 0.565).
3. Why is GPSS called transaction flow oriented language? A machine tool in a manufacturing shop is turning out parts at the rate of every 5 minutes. When they are finished, the parts are sent to an inspector, who takes 4 ± 3 minutes to examine each one and rejects 15% of the parts. Draw and explain a block diagram and write a GPSS program to simulate using the concept of facility.

Group B

Short answer Questions:

Attempt any eight questions. (5x8=40)

4. Differentiate between static physical and dynamic physical models.
5. Describe different phases of simulation study with the help of flow charts.
6. Why are the random numbers generated by computers called pseudo random numbers? List out different types of errors that may occur while generating pseudo-random numbers.
7. Define confidence interval. How do you use estimation methods in simulation output analysis? Explain.
8. Describe the process of model building, verification and validation in detail with examples.
9. Define traffic intensity and server utilization. Write down the kendall's notation for the queuing system.
10. **What do you understand about feedback systems? Explain**
11. How do you update the clock time in simulation? Explain.
12. "There is no unified theory in simulation". Verify it.
13. List out the entities, attributes, activities and events for Banking, Communication, Production, Inventory and Supermarket systems.