Tribhuvan University
Institute of Science and Technology
2076
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Bachelor Level / Third Year /Fifth Semester/Science — Full Marks: 60
Computer Science and Information Technology (CSc.317) — Pass Marks: 24
(Simulation and Modelling) — Time: 3 hours.

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

Section A

Attempt any two questions. **(2×10 = 20)**

1. Define queuing system. Explain different queuing disciplines. Also explain different performance measures for evaluation of queuing system.

2. Differentiate between chi-square test and KS test for uniformity. Use KS test to check for the uniformity for the input set of random numbers given below. 0.54, 0.73, 0.98, 0.11, 0.68, 0.45. Assume level of significance to be $D\alpha=0.05 \Rightarrow 0.565$.

3. What do you understand by static mathematical model? Explain with example. Differentiate between stochastic and deterministic activities.

Section B

Attempt any eight questions. **(8×5 = 40)**

4. Discuss the merits and demerits of system simulation.
5. Explain markov's chain with a suitable example.
6. Define arrival pattern. Explain non-stationary Poisson process.
7. Differentiate between validation and calibration. How can we perform validation of a model?
8. Use Mixed congruential method to generate a sequence of random numbers with $X_0= 27$, a= 17, m=100 and c=43.
9. What do you understand by replication of runs. Why is it necessary?
10. Explain generation of non uniform random number generation using inverse method.
11. Parts are being made at the rate of one every 10 minutes. They are of two types, A and B. And are mixed randomly with about 10% being type B. A separate inspector is assigned to examine each part. Inspection of part A takes 6 ± 2 minutes while B takes 10 ± 2 minutes. Both inspector rejects 10% of parts they inspect. Draw GPSS block diagram to simulate the above problem for 100 parts.

12. Write short notes on **(any two)**: **(2×2.5 = 5)**

a. System and its environment
b. Simulation run statistics