

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Simulation and Modeling (New)

Semester: Spring

Year : 2025
Full Marks : 100
Pass Marks : 45
Time : 3 hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Define simulation and modeling. Explain the different component of the system. 7
- b) Explain how we can compute the given integral using Monte Carlo method. Use it to find the value of π . 8
2. a) Draw a Cobweb model to investigate a market in which the supply and demand functions are same. 7
 $D = 12.4 - 1.2P$
 $S = 1.0 + 0.9P_{-1}$
 $P_0 = 1.0$
- b) Consider a sample of 16 data points 0.15, 0.32, 0.48, 0.74, 0.22, 0.91, 0.63, 0.08, 0.55, 0.39, 0.27, 0.83, 0.17, 0.70, 0.44, 0.98. Perform a Kolmogorov-Smirnov (KS) test to determine if the sample follows a uniform distribution. Use a significance level of $\alpha = 0.05$. 8

OR

- What are the properties of random numbers? Generate seven 4-digit random numbers using the linear congruential generation method.
3. a) Explain Linear and nonlinear differential equation. Write CSMP III code for automobile suspension system. 7
 - b) Write differential equation of automobile suspension wheel system and draw analog computer for it. 8
 4. a) What are the various types of calls? Simulate the telephone system for delayed call system. 7
 - b) What is discrete system simulation? How are utilization and occupancy measured in discrete system simulation? Explain with a suitable example. 8

OR

- Differentiate Next event oriented and Fixed increment time advance mechanism.
5. a) Explain gap test and poker test to check the independence of random numbers. 7
 - b) Explain the organization of SIMSCRIPT language with suitable example. 8
 6. a) Write GPSS code for manufacturing shop model with necessary assumptions also draw the block diagram. 7
 - b) Why is elimination of initial bias important? What are various nature of problems in simulation. 8
 7. Write short notes on: (Any two) 2×5
 - a) Steps of Simulation
 - b) Real time Simulation
 - c) Elimination of Initial Bias