

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Simulation and Modeling

Semester: Fall

Year : 2019
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

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) What is a model? Explain different types of model with suitable example. 8
b) Explain various principles used in modelling. 7
2. a) What do you understand by time-advance mechanism? Explain its types briefly. 7
b) What are the advantages and disadvantages of Monte Carlo method? Estimate the value of π using Monte Carlo method. 8
3. a) Describe the importance of partial differential equations in simulation. Explain hybrid computers. 8
b) Simulate Autopilot system and write CSMP code for it. 7
4. a) When line is busy or link is not available, call cannot be connected and hence the call gets lost. Explain the scenario with the states involving each condition. 8
b) How are utilization and occupancy measured in simulation? Explain with reference to telephone system. 7
5. a) A quality control chart has been maintained for the weights of paint cans taken from a conveyor belt at a fixed point in a production line. Sixteen (16) weights obtained today, in order of time, are as follows: 8

68.2 71.6 69.3 71.6 70.4 65.0 63.6 64.7
65.3 64.2 67.6 68.6 66.8 68.9 66.8 70.1

Use the run test, at approximately a 0.015 level, to determine whether the weights of the paint cans on the conveyor belt deviate from randomness.[Given: $Z_{0.025}=1.96$]

- b) What are the two desired properties of pseudo random numbers? 7
Generate random numbers using Linear Congruential method with $x_i=27$,

$a=17$, $c=43$ and $m=100$ and test their uniformity using Kolmogorov Smirnov test with 5% level of significant. [Given: $D_{0.05}=0.565$]

6. a) Explain different types of BLOCKS in GPSS. 8
- b) Why do we need analysis of simulation output? Explain the replication of run. 7
7. Write short notes on: (**Any two**) 2×5
- a) Real Time Simulation
- b) Elimination of Initial bias
- c) Components of queuing system