POKHARA UNIVERSITY

Level: Bachelor Semester: Fall Year : 2017
Programme: BE Full Marks: 100
Course: Simulation and Modeling 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 system modelling? How are models verified and validated? Explain. 8
   b) What is an initial bias? What are the different methods to eliminate it? 7
2. a) What is Monte Carlo method? Find the value of π using this method. 8
   b) How is an electric circuit modeled in analog computer? Model the following equations for an analog computer. 7

$$MX'' + DX' + KX = F(t)$$

3. a) What is CSSL and why were they developed? Explain the structure of CSMP III 7
   b) What is bootstrapping? How is the arrivals of an event are generated and analyzed in discrete system simulation? 8
4. a) Workers come to a supply store at the rate of one every 5±2 minutes. Their requisitions are processed by one of two clerks who takes 8±4 minutes for each requisition. The requisitions are then passed to a single store keeper who fills them one at a time, taking 4±3 minutes for each request. Simulate the queue of workers and measure the distribution of time taken for one thousand requisitions to be filled. Draw a GPSS block diagram and write program for the same. 8
   b) Explain the organization of a SIMSCRIPT program with suitable diagram. 7
5. a) Suppose we have a sequence of 4000, 3 digit number (from 000 to 999) and if we can expect about 400 members in each of the range. The observed value is given as: 8

Range	No. of observed occurences
0-99	425
100-199	378
200-299	395
300-399	415
400-499	340
500-599	370
600-699	410
700-799	382
800-899	365
900-999	394

Perform chi-square test for the test of randomness of occurrence at 1% significance level. For n=10 classes ,$\propto$= 2.09

   b) The sequence of numbers 0.54, 0.73, 0.97, 0.10, and 0.67 has been generated. Use the Kolmogorov- Smirnov test $\alpha = 0.05$ to determine if the hypothesis that the numbers are uniformly distributed on the interval [0,1] can be rejected. (Note that critical value of D for $\alpha = 0.05$ and $\mu = 5$ is 0.565). 7
6. a) Discuss about the experimental nature of simulation. How is it different from analytical method. 7
   b) What are different calls in telephone system? What happens when each type of all call occurs? How and when statistics is gathered during these various types of cells? 8
7. Write short notes on: (**Any two**) 2×5
   a) Feedback System
   b) Principle of modeling
   c) Replication of run