POKHARA UNIVERSITY

Level: Bachelor Semester:Fall Year : 2020
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 Simulation and Model? Explain various models that are involved while simulating system. 7
   b) How performance of a single server queue can be measured? Explain in detail. 8
2. a) Explain the numerical computation techniques for continuous Model. 7
   b) Draw the cobweb model (in graph) for : 8
      i) Fluctuation of market price.
      ii) Cobweb model for market economy graph from given data.
      $D= 12.4 - 1.2\ P$, $S= 8.0 - 0.6\ P_{-1}$, $D= S$, $P_0=1.0$
3. a) What is an analog method? Design an analog computer for human liver. The equations for human liver are 7
      $dx_1/dt = -k_{12}\ x_1 + k_{21}\ x_2$
      $dx_2/dt = k_{12}\ x_1 - (k_{21} + k_{23})\ x_2$
      $dx_3/dt = k_{23}\ x_2$
   b) Explain about the simulation of an automobile wheel with CSMP III program for it. 8
4. a) How is statistics gathered in simulation? Explain with reference to telephone system. 8
   b) Calls are lost when lines are busy or link is not free. Explain various steps involved to simulate this system. 7
5. a) Define pseudo random numbers. The following numbers have been generated 0.44, 0.19, 0.88, 0.27, 0.55, 0.13, 0.63, 0.74, 0.11 and 0.33. Use the Kolmogorov-Smirnov Test with α=0.05 to determine, if the 7

hypothesis that the numbers are uniformly distributed on interval [0, 1] can be rejected. [Use the critical value of D for α =0.05and N=10 is 0.410.]

   b) A sequence of random numbers is given below. Use chi-square test with α=0.05 to test whether these numbers are serially auto correlated.(Use $\chi^2_{0.05,7}$ =14.067) 8

49, 95, 82, 19, 41, 31, 12, 53, 62, 40, 87, 83, 26, 01, 91, 55, 38, 75, 90, 35, 71, 57, 27, 85, 52, 08, 35, 57, 88, 38, 77, 86, 29, 18, 09, 96, 58, 22, 08, 93, 85, 45, 79, 68, 20, 11, 78, 93, 21, 13, 06, 32, 63, 79, 54, 67, 35, 18, 81, 40, 62, 13, 76, 74, 76, 45, 29, 36, 80, 78, 95, 25,52.

6. a) What are DSSLs? Explain GPSS with example to solve discrete system problem. 8
   b) Write a SIMSCRIPT program for MAIN routine of the telephone system 7
7. Write short notes on: **(Any two)** 2×5
   a) Elimination of initial bias.
   b) Replication of Run.
   c) Differential Equations.