

POKHARA UNIVERSITY

Level: Bachelor Semester: Spring Year : 2017
 Programme: BE Full Marks: 100
 Course: Simulation and Modelling 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) Define Verification and Validation of model. Explain the iterative process of calibrating of a model with example. 8
 b) What is Monte-Carlo Simulation method? Can this be used as a accuracy method? Use it to derive the value of pi. 7
2. a) What are the steps involved in computer simulation? Explain with neat diagram. 8
 b) What is differential equation? How can this be used to represent feedback system? Explain it to simulate a autopilot system. 7
3. a) List the advantage and disadvantage of analog simulation. Draw the suitable analog computer model for the following set of differential equations. 8

$$dx_1/dt = -k_{12}X_1 + k_{21}X_2$$

$$dx_2/dt = -k_{12}X_1 - (k_{21} + k_{23})X_2$$

$$dx_3/dt = k_{23}X_2$$

 b) Explain telephone call simulation for delayed call system. 7
4. a) What are the major differences between measuring utilization and occupancy? Explain the event oriented time advance mechanism. 8
 b) Use Runs up and runs down test to determine the following sequence of number can be accepted or rejected on hypothesis of independence where $\alpha=0.05$. 7

0.34	0.90	0.25	0.89	0.87	0.44	0.12	0.21	0.46	0.67
0.83	0.76	0.79	0.64	0.70	0.81	0.94	0.74	0.22	0.74
0.96	0.99	0.77	0.67	0.56	0.41	0.52	0.73	0.99	0.02
0.47	0.30	0.17	0.82	0.56	0.05	0.45	0.31	0.78	0.05
0.79	0.71	0.23	0.19	0.82	0.93	0.65	0.37	0.39	0.42
0.99	0.17	0.99	0.46	0.05	0.66	0.10	0.42	0.18	0.49

5. a) Consider a bank with 3 service counter where customer arrival time is in average of 5, with a variance of 2 minutes. If any customers find the first service counter busy, he/she goes to another service counter, but it takes 3 extra minutes to move into the another service counter, similar condition for reaching to third counter. It takes average of 10 minutes to provide service to any customer with 2, 3, 4 minutes' variance respectively at counter 1,2 and 3. Develop GPSS model considering 20% customer do not get proper services. 8
 b) List the advantage of using simulation package over programming language. Explain the types of discrete system simulation language. 7
6. a) Which output analysis method is favorable when the output is interdependent? Explain it with reference of example. 8
 b) If the same process is repeated for multiple runs, which of the analysis method is used and how? 7
7. Write short notes on: (**Any two**) 2×5
 a) Distributed Lag Model
 b) Properties of Random Numbers
 c) Feedback system