

B.Sc. (I. T.) Sem. - V (2011 Course) : WINTER - 2018

SUBJECT: SIMULATION AND OR

Day: Tuesday
Date: 04/12/2018

W-2018-1109

Time: 02.30 pm to 05.30 pm
Max Marks: 80

N.B:

- 1) Question No.1 is **COMPULSORY**.
- 2) Attempt **ANY FIVE** questions out of remaining **SEVEN** questions.
- 3) Figures on the right indicate **FULL** marks.

- Q.1** A dentist schedules all his patients for 30 minutes appointments. Some of the patients take more or less than 30 minutes depending on the type of dental treatment. Following table shows different types of tasks along with their probabilities and time needed to complete the tasks. **(25)**

Type of Task	Probability of task	Time required (Minutes)
Filling	0.40	45
Crown	0.15	60
Cleaning	0.20	15
Extraction	0.10	45
Check up	0.15	15

Simulate the clinic for four hours and determine the average waiting time for the patients and percentage of the time for which the doctor was idle. Assume that all patients reach the clinic exactly at the scheduled arrival time starting at 8 A.M. Use the following random numbers:
93, 13, 24, 25, 74, 48, 36, 20.

- Q.2** With the help of flow chart explain 'Departure Routine' in a queuing simulation model. **(11)**
- Q.3** a) Explain the term 'period of a random number generator'. Compute Z_i for the following LCG and state whether it has full period or not. **(08)**
 $Z_i = (2Z_{i-1}) \text{ mod } 13, Z_0 = 1$
- b) State the conditions under which a LCG is called PMMLCG. **(03)**
- Q.4** a) State and briefly explain three parameters used for defining probability distributions. **(05)**
- b) State three methods of generating random variates and explain any one of them with suitable example. **(06)**
- Q.5** With the help of a flow chart explain various steps involved in solving a problem using Monte Carlo Simulation technique. **(11)**
- Q.6** It has been decided to study functioning of 'An emergency room in a hospital' using simulation technique. State whether the simulation should be static or dynamic, deterministic or stochastic and continuous or discrete. Justify your answer. **(11)**
- Q.7** State and describe the desirable software features of simulation software. **(11)**
- Q.8** What are the common sources of randomness in a manufacturing system? Discuss briefly any two of them. **(11)**

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