

--	--	--	--	--	--	--	--	--	--

Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Modeling and Simulation

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions, selecting at least TWO questions from each part.
 2. Use of Statistical tables allowed.

PART – A

- 1
 - a. With the help of an example, explain the components of a system. (05 Marks)
 - b. Explain briefly the inventory system in simulation. (05 Marks)
 - c. With a neat flow chart, briefly explain the different steps involved in simulation study. (10 Marks)

- 2
 - a. Briefly explain manual simulation using event scheduling for single channel queue. (08 Marks)
 - b. Six trucks are used to haul coal from the entrance of a small mine to the railroad. Each truck is loaded by one of two loaders. After loading a truck immediately moves to the scale to be weighed. Both the loaders and the scale have first come first serve waiting line for trucks. After being weighed, a truck begins a travel time and then after ward returns to the loader queue. It is assumed that 5 of the trucks are at the loaders and 1 is at the scale at time θ . The activity times are given in the following table:

Loading time (min) :	10	5	15	5	10
Weighing time (min):	12	16	12	12	12
Travel time (min):	40	60	80	60	40

Simulate the system for 25 minutes, estimate the loader and scale utilization. (12 Marks)

- 3
 - a. What are pseudo random numbers? List the errors which occur during the generation. (05 Marks)
 - b. Use linear congruential method to generate a sequence of three random numbers for $X_0 = 27$, $a = 8$, $c = 47$ and $m = 100$. (05 Marks)
 - c. A sequence of 1000 four digit numbers has been generated and an analysis indicates the following combinations and frequencies. Four different digits = 565, one pair = 392, two pairs = 17, three like digits = 24 and remaining are four like digits. Based on the poker test, test whether these numbers are independent, $X_{0.05,3}^2 = 7.81$. (10 Marks)

- 4
 - a. Explain inverse transform technique for weibull distribution and triangular distribution. (10 Marks)
 - b. What is inverse transform technique? Derive an expression for exponential distribution. (10 Marks)

PART – B

- 5
 - a. Explain briefly Poisson distribution and geometric distribution. (10 Marks)
 - b. What is acceptance –rejection technique? Generate 3 Poisson variates with mean $\alpha = 0.2$. Use the following random numbers 0.4357, 0.4146, 0.8353, 0.9952, 0.8004. (10 Marks)

- 6 a. Discuss briefly variance reduction technique. (10 Marks)
 b. Explain variables – verification and validation of simulation models. (10 Marks)

- 7 a. Explain how a histogram is constructed and how it is used in identifying the shape of a distribution. (08 Marks)
 b. Records pertaining to the monthly number of Job related injuries at an underground coal mine were being studied by a federal agency. The values for the past 100 months were as follows :

Injuries per month	:	0	1	2	3	4	5	6
Frequency of occurrence	:	35	40	13	6	4	1	1

Apply Chi – square goodness of fit test to these data to test the hypothesis that the underlying distribution is Poisson. Use $\alpha = 0.05$. (12 Marks)

- 8 a. Explain briefly, how system to be simulated in GPSS simulation language, with example. (10 Marks)
 b. Develop simulation model using Arena simulation package for queuing system, production system. (10 Marks)

* * * * *