

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-1 EXAMINATION (FEB 2018)
B-Tech (6th SEM)

Course Code: 16B22CI621

Max. Marks: 15

Course Name: Data Analysis and Simulation Techniques

Max. Time: 1 HRS

Course Credit: 4

Note: All questions are compulsory

- Q. No. 1 Suppose a Car manufacturing and selling company wants you to analyze their previous sale data and predict which type of Car (Sedan, Jeep, SUV, Hatchback) should be send to different showrooms so as to achieve maximum sale and minimum travel of cars from manufacturing plant to the showrooms. **[5 Marks]**
 Explain all steps of Data Analysis Process with relevant questions you will consider for the above said scenario.

- Q. No. 2 A book store wishes to carry "Ramayana" in stock. Demand is probabilistic and replenishment of stock takes 2 days (i.e. if an order is placed in March 1, it will be delivered at the end of the day on March 3). The probabilities of demand are given below: **[5 Marks]**

Demand (Daily)	Probability
0	0.05
1	0.10
2	0.30
3	0.45
4	0.10

Each time an order is placed, the store incurs an ordering cost of Rs. 10 per order. The store also incurs a carrying cost of Rs. 0.50 per book per day. The inventory carry cost is calculated on the basis of stock at the end of each day.

The manager of the book store wishes to compare two options for his inventory decision.

A: Order 5 books when the inventory at the beginning of the day plus orders outstanding is less than 8 books.

B: Order 8 books when the inventory at the beginning of the day plus orders outstanding is less than 8 books.

Currently (beginning of the 1st day) the store has stock of 8 books plus 6 books ordered 2 days ago and expected to arrive next day.

Using Monte-Carlo Simulation for 10 cycles, recommend which option the manager should choose.

Use random numbers as follows:
89, 34, 78, 63, 61, 81, 39, 16, 13, 73.

- Q. No. 3 Consider an example from a maintenance shop. The inter-arrival time at toolcrib is Poisson distributed with an average time of 10 minutes. The length of service time is assumed to be exponential distributed with mean of 6 minutes. Queue length is assumed to be infinity. Find. **[5 Marks]**
- (i) The probability that person has to wait at the booth.
 - (ii) Average length of the queue.
 - (iii) Average time an operator spends in the queue.
 - (iv) The manager will install second booth when an arrival would have to wait 10 minutes or more. By how much must the rate of arrival be increased to justify the second booth?
 - (v) Estimate the fraction of day toolcrib operator will be idle.
 - (vi) The probability that there will be six or more operators waiting for the service.