00801

MANAGEMENT PROGRAMME

Term-End Examination

June, 2012

MS-51 : OPERATIONS RESEARCH

Time : 3 hours *Maximum Marks : **100***

(Weightage 70%)

Note : *Answer **any four** questions. All questions carry **equal marks.***

1. (a) " Operations Research is an aid for the executive in making his/her decisions by providing him/her with needed quantitative information based on the scientific method of analysis ".

   Discuss the statement and give examples to demonstrate how OR is helpful in decision making.

   (b) A company produces two types of items say type X and type Y. Item Y is of superior quality while item X is of lower quality. Profits on the two types of items are Rs 30 and Rs 40 respectively. The data about resources required and availability of resources are given below :

REQUIREMENT

	ITEM X	ITEM Y	CAPACITY AVAILABLE
RAW MATERIAL (KGS)	60	120	12000
MACHINE HOURS (Per piece)	8	5	630
ASSEMBLY (hours)	3	4	500

How should the company manufacture the two types of items in order to get the maximum overall profits ?

2. (a) Explain Saddle Point, pure and mixed strategy, and theory of dominance in game theory.

(b) Khanna bakery keeps stock of popular brand of cake. Previous experience indicates the daily demand as given here :

Daily Demand	0	10	20	30	40	50
Probability	0.01	0.20	0.15	0.50	0.12	0.02

Consider the following sequence of random numbers :-

48,78,19,51,56,77,15,14,68,09 using this sequence , simulate the demand for next 10 days. Find out the stock situation if the owner of the bakery decides to make 30 cakes every day. Also estimate the average daily demand for the cakes on the basis of simulated data.

3. (a) Discuss the applications of dynamic programming in decision making. How is this different from linear programming ?

(b) State Bellman's Principle of optimality and explain by an illustrative example how it can be used to solve multistage decision problems.

4. (a) What are the various types of inventory ? Why they are maintained ? Explain the various costs related to inventory.

(b) A leading orchard owner of Saharanpur has annual demand of 60,000 wooden packing boxes. The cost of placing an order is Rs 800 and the inventory carrying cost is 25 percent . The price of a packing box is Rs 10. The supplier of the boxes offers 2 percent discount if 10000 or more boxes are purchased and 4% if 15000 boxes are purchased. What should be the quantity of boxes ordered and should the orchard owner accept the discount ?

5. (a) What do you understand by :

(i) queue length

(ii) traffic intensity

(iii) the service channels state three applications of waiting line theory in business enterprises ?

(b) Self-help canteen employs one cashier at its counter , 8 customers arrive every 10 minutes on an average . The cashier can serve at the rate of one customer per minute. Assume Poisson's distribution for arrival and exponential distribution for service patterns. Determine :

(i) Average number of customers in the system.

(ii) Average queue length

(iii) Average time a customer spends in the system

(iv) Average waiting time of each customer . If 8 customers arrive every 20 minutes instead of 10 minutes what will be the effect on (i), (ii), (iii) and (iv) ?

6. Write short notes on ***any four*** of following :

(a) Branch and Bound Theorem

(b) Degeneracy in LP problem

(c) Non - Linear Programming

(d) GOMORY's cutting Plane Algorithm

(e) Sensitivity Analysis