01/5/2019

Roll No. ..... Total Pages : 4

13244

CMMS/M-19

OPTIMIZATION MODELS FOR BUSINESS DECISIONS

Paper : MBA-201

Time : Three Hours] [Maximum Marks : 70

Note : Q. No. 1 is compulsory and from remaining 8 questions attempt any *five* questions.

1. Compulsory Question

(a) Assumptions of Linear programming.

(b) Discuss the role of sensitivity analysis in linear programming.

(c) Explain ABC analysis with advantages.

(d) Difference between PERT and CPM.

(e) Goal programming.

2. XYZ tobacco company purchases tobacco and stores in warehouses located in the following four cities :

Warehouse location	Capacity (Tonnes)
City A	90
City B	50
City C	80
City D	60

The warehouses supply tobacco to cigarette companies in three cities that have the following demand :

Cigarette Company	Demand (Tonnes)
Bharat	120
Janata	100
Red Lamp	110

The following rail road shipping costs per tonnes (in hundred rupees) have determined :

Warehouse location	Bharat	Janata	Red lamp
A	7	10	5
B	12	9	4
C	7	3	11
D	9	5	7

Because of railroad construction, shipments are temporarily prohibited from warehouse at City A to Bharat Cigarette Company.

(a) Find the optimum distribution of XYZ tobacco company.

(b) Are these multiple optimum solution ? If Yes, identify them.

3. Two competitors are computing for the market share of the similar product. The payoff matrix in terms of their advertising plan is shown below :

Competitor A	Competitor B		
	No Advertising	Medium Advertising	Heavy Advertising
No Advertising	10	5	–2
Medium Adv.	13	12	13
Heavy Advertising	16	14	10

Suggest optimal strategies for the two times and net outcome there of.

4. Max (Total profit) $Z = 4x_1 + 3x_2$

Subject to :

$$2x_1 + x_2 \leq 1000 \quad \text{(i)}$$

$$x_1 + x_2 \leq 800 \quad \text{(ii)}$$

$$x_1 \leq 400 \quad \text{(iii)}$$

$$x_2 \leq 700 \quad \text{(iv)}$$

Solve it by simplex method.

5. In the modification of a plant layout of a factory four new machines M_1, M_2, M_3 and M_4 are to be installed in a machine shop. There are five vacant places A, B, C, D and E available. Because of limited space, machine M_2 cannot be placed at C and M_3 cannot be placed at A. The cost of locating a machine at a place (in hundred rupees) is as follows :

		Location				
		A	B	C	D	E
Machine	M_1	9	11	15	10	11
	M_2	12	9	–	10	9
	M_3	–	11	14	11	7
	M_4	14	8	12	7	8

Find the optimal assignment schedule.

6. What are inventory models ? Enumerate various types of inventory models and describe them briefly.

7. In a railway marshalling yard, goods train arrive at a rate of 30 trains per day. Assuming that the interarival time follows an exponential distribution and service time (time taken to hump a train) distribution is also exponential with a average of 36 minutes. Calculate :

(a) Expected queue size (line length).

(b) Probability that the queue size exceeds 10. If the imput of trains increases to an average of 33 per day, what will be the change in (i) and (ii) ?

8. Define operations research as a decision-making science. (a) Give main characteristics of OR (b) Discuss the scope of OR.

9. Write a detailed note on simulation : its models, phases and applications.
