Exam Code: 1383
Sub. Code: 9466

2021
B. Voc. (Logistic Management)
Fifth Semester
LEM-505: Operations Research

Time allowed: 3 Hours Max. Marks: 80

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting one question from each Unit.*

x-x-x

I. Attempt any four of the following:-

a) Explain the concept of duality in linear programming.

b) Explain the balanced and unbalanced problems in transportation.

c) What is two person zero sum game?

d) Vitamin V and W are found in two different foods Fl and F2. One unit of food Fl contains 2 units of vitamin V and 5 units of vitamin W. one unit of food F2 contains 4 units of vitamin V and 2 units of vitamin W. one unit of food Fl and F2 cost Rs 30 and Rs 25 respectively. The minimum daily requirements (for a person) of vitamin V and W is 40 and 50- units respectively. Assuming that anything in excess of daily minimum, requirement of vitamin V and W is harmful, find out the optimal mixture of food Fl and F2 at the minimum cost which meets the daily minimum requirement of vitamin V and W. formulate this as a linear programming problem.

e) A company has to assign four workers A, B, C and D to four jobs W, X, Y and Z. the cost of matrix is given below:

Jobs (cost in Rs)					
		W	X	Y	Z
Workers	A	1000	1200	400	700
	B	600	500	300	800
	C	200	300	400	500
	D	600	700	300	1000

Suggest an optimal assignment schedule to minimize the total cost pertaining thereto.

P.T.O.

f) For the following game, find out optimal strategies of A and B and value of game using principle of dominance:

		Player – B			
		B1	B2	B3	B4
Player – A	A1	7	6	8	9
	A2	-4	-3	9	10
	A3	3	0	4	2
	A4	10	5	-2	0

(4x5)

UNIT – I

II. Explain the meaning and scope of operations research. (15)

III. Minimize $Z=4X_1+3X_2$

Subject to constraints

$$200X_1 + 100X_2 \geq 4000$$
$$X_1 + 2X_2 \geq 50$$
$$40X_1 + 40X_2 \geq 1400$$
$$X_1, X_2 \geq 0$$

Solve the above problem using simplex method. (15)

UNIT – III

IV. The personnel department of a construction company recruits three categories of workers A, B and C of 100, 70 and 85 numbers respectively from centres P, Q , R and S. Their hourly rates (in Rs.) are given by the matrix below. Find the recruitment pattern at the lowest cost.

		Centre				
		P	Q	R	S	Requirement
Category	A	12	13	15	14	100
	B	15	14	13	12	70
	C	10	12	14	13	80
	Availability	35	70	100	50	255

V. What is an assignment problem? Discuss its method of solution. Give two areas of its application. (15)

UNIT – III

VI. What is a queuing problem? What are the assumptions of queuing models? (15)

VII. Six jobs are performed first over machine - I and then over machine - II. The order of completion of the jobs has no significance. Find the sequence of the job that minimizes the total elapsed time. Also find the total time elapsed and idle time on machine - I and machine - II. The time for each job on each machine is given below:

Hours						
Job No.	1	2	3	4	5	6
Machine – I	8	12	7	10	11	9
Machine – II	10	7	11	6	12	8

(15)

UNIT – IV

VIII. What are simulation techniques? Explain the applications of simulation techniques for decision making. (15)

IX. Solve the following game theory using graphical method:-

		B	
		B1	B2
A	A1	-6	7
	A2	4	-5
	A3	-1	-2
	A4	-2	5
	A5	7	-6

(15)

x-x-x