

B.B.A. Semester - 5 (CBCS) Examination**Oct/Nov - 2021 (NEW COURSE)****Statistics Group - Fundamentals of Operations Research (Elective)****Time: 2:30 Hours****Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

- Q.1 1. Explain role of: operations research in decision making. (14)
 2. Give three important definition of O.R.

OR

- Q.1 1. What are the essential features of the O.R.
 2. State and explain characteristics of O.R.
- Q.2 1. Discuss the similarities and difference between minimization and maximization (14)
 problems using graphical solution approach of linear programming.
 2. Solve the problem graphically

$$\text{Max}Z = 4X_1 + 3X_2$$

Subject to constraint

$$3x_1 + 4X_2 \leq 24$$

$$8x_1 + 6x_2 \leq 48$$

$$X_1 \leq 5$$

$$X_2 \leq 6$$

$$X_1, X_2 \geq 0$$

OR

- Q.2 An animal feed company must produce 200 kg. of mixture consisting of ingredients X 1
 And X2. The ingredients X1 cost Rs.3 per kg and X2 cost rs. 5 per kg. not more than 80
 kg. of X1 can be used and at least 60 kg. of X2 must be used. Find minimum cost mixture.
 Formulate and solve graphically
- Q.3 1. Give similarities and dissimilarities between graphic method and simplex method (14)
 of linear programming problem.
 2. Explain Simplex method for maximization case of Linear programming problem.

OR

- Q.3 Solve the problem by Simplex Method.

$$\text{Max } Z = 2X_1 + 5X_2$$

Subject to constraint

$$x_1 + 4X_2 \leq 24$$

$$3x_1 + X_2 \leq 21$$

$$x_1 + X_2 \leq 9$$

$$X_1, X_2 \geq 0$$

- Q.4 1. Explain in brief Vogel's approximation Method. (14)
 2. When is the solution to a problem said to be a "degenerate One"? How will one
 overcome the problem?

OR

- Q.4 A company has received a contract to supply gravel for three new construction projects
 located in towns A,B,C .Construction engineers have estimated the required amounts of
 gravel which will be needed at these construction projects.

Project Location	weekly requirement(truck loaded)
A	144
B	204
C	82

The company has three gravel pits located in towns, W, X and Y respectively. The gravel required by the construction projects can be supplied by these three plants. The amount of gravel which can be supplied by each plant is as follows:

Plant	W	X	Y
Amount available (truck loads)	152	164	154

The company has computed the deliver cost from each plant to the project site. These costs (in Rupees) are shown in the following table:

Cost per truck load (;000:Rs.)

Plant		A	B	C
	W	8	16	16
	X	32	48	32
	Y	16	32	48

Schedule the shipment from each plant to each project in such a manner so as to minimize the total transportation cost within the constraints imposed by plant capacitated and project requirements. Find the minimum cost.

- Q.5 1. What is Assignment Problem? (14)
 2. How you Solve A problem Of Maximization in Assignment Problem?

OR

- Q.5 Solve the Assignment problem for minimizing total time for doing all the jobs.

Operators	job				
	1	2	3	4	5
1	6	2	5	3	6
2	2	5	8	7	7
3	7	8	6	9	8
4	6	2	3	4	5
5	9	3	8	9	7
6	4	7	4	6	8
