

B.B.A. Semester - 5 (Remedial) (CBCS) Examination**Feb/Mar. -2021 (NEW COURSE)****Statistics Group - Fundamentals of Operations Research(Elective)****Time: 1:30 Hours****Marks: 42****Instructions:**

1. Figures to the right indicate marks.
2. There are five questions in the question paper.
3. Answer any three of the following questions.

- Q.1 XYZ farm is engaged in breeding pigs. The pigs are fed on various products grown on the farm. Because of the need to ensure certain nutrient constituents, it is necessary to buy additional one or two products, which we shall call A and B. the nutrient constituents (vitamins and proteins) in each unit of the product are given below. (14)

Nutrient constituents	Nutrient constituent in the product		Minimum requirement of Nutrient constituents
	A	B	
1	36	6	108
2	3	12	36
3	20	10	100

Product A costs Rs. 20 per unit and Product B costs Rs. 40 per unit. Determine how much of products A and B must be purchased so as to provide the pigs nutrients not less than the minimum required, at the lowest possible cost. Solve the LP by graphically.

- Q.2 A company is spending Rs. 1000 on Transportation of its units from three plants to four distribution centers. The supply and demand of units, with unity cost of Transportation are given as: (14)

Distribution center					
Plant	D1	D2	D3	D4	Availability
P1	19	30	50	12	7
P2	70	30	40	60	10
P3	40	10	60	20	18
Requirements	5	8	7	15	

What can be the maximum saving by optimal scheduling?

- Q.3 Five different machines can do any of the five required jobs. With different profits resulting from each assignment as shown in the adjoining table. Find out maximum profit possible through optimal assignment. (14)

Machine					
Job	A	B	C	D	E
1	30	37	40	28	40
2	40	24	27	21	36
3	40	32	33	30	35
4	25	38	40	36	36
5	29	62	41	34	39

- Q.4 Solve by simplex Method. (14)

$$\text{Max } Z = 2x_1 + 5x_2$$

Subject to

$$x_1 + 4x_2 \leq 24$$

$$3x_1 + x_2 \leq 21$$

$$x_1 + x_2 \leq 9$$

$$x_1, x_2 \geq 0$$

- Q.5 Write any two. (14)

1. What is Operations Research?
2. Give the role and significance of operations research?
3. Give difference between T.P. and A.P.
4. Define: Slack variables, surplus variable, artificial variables
