

B.B.A. Semester - 5 (CBCS) Examination**Oct/Nov. - 2018****STATISTICS GROUP: FUNDAMENTALS OF OPERATION RESEARCH (ELECTIVE)****Time: 2:30 Hours****Marks: 70****Instructions:**

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

Q-1(A) What is operations research? (07)

Q-1(B) Give any three definitions of operations' research? (07)

OR

Q-1(A) Give the role and significance of operations research? (07)

Q-1(B) State and explain characteristics of operations research? (07)

Q-2(A) What do you understand by a LPP? What are its major limitations? (07)

Q-2(B) Explain Graphic Method. (07)

OR

Q-2 XYZ farm is engaged in breeding pigs. The pigs are fed on various products grown on the farm. Because of the need 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 A	B	Minimum requirement of Nutrient constituents
1	36	6	108
2	3	12	36
3	20	10	100

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

Q-3(A) Explain the following. (07)

(1) Slack variables (2) Surplus variables (3) Artificial variables.

Q-3(B) How do maximization and minimization problems differ when applying the Simplex Method? (07)

OR

Q-3 Solve the following problem by simplex Method (14)

Maximum $Z = 3X_1 + 2X_2$

Subject to the constraints

$$-X_1 + 2X_2 \leq 4$$

$$3X_1 + 2X_2 \leq 14$$

$$X_1 - X_2 \leq 3$$

$$X_1, X_2 \geq 0$$

Q-4(A) What do you understand by Transportation Problem? (07)

Q-4(B) Explain degeneracy in Transportation problem. (07)

OR

- Q-4 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 unit cost of Transportation are given as: (14)

Distribution centre					
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	

- Q-5(A) Write similarities and dis similarities between T.P and AP (07)

- Q-5(B) Explain unbalanceness in Assignment problem how you solve it? (07)

OR

- Q-5 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
