647510 **BBAopeEC537D** **Seat No :_____**

B.B.A. Semester - 5 (*CBCS*) Examination

March/April– 2019

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) Give role and significance of O.R. in Business and Industries for scientific decisions. (7)

(B) What are the essential features of O.R.? (7)

OR

(A) State and Explain Characteristics of Operational Research. (7)

(B) How does O.R. assist management in decision making? (7)

Q.2 (A) Explain the graphical method of showing a L.P.P. (7)

(B) Solve following L.P.P. by graphic method (7)

Min z = $3x1 + 5x2$

Sub to constraint,

$$x1 + x2 = 200$$
$$x1 \leq 80$$
$$x2 \geq 60$$
$$x1 \geq 0,\ x2 \geq 0$$

OR

Mr. Sandip wants to invest Rs. 1,00,000/- in a combination of only two stock portfolios, with the maximum investment allowed in either portfolio set at Rs. 75,000/-. The firm portfolio has an overage rate of return of 10 % where as the Second has 20 %. In term of risk factors associated with these portfolios, the first has a risk rating of 4 (On a scale from 0 to 10) and the second has 9. Since you wish to maximize your return, you will not accept an average rate of return below 12% or a risk factor above 6. Hence you then face the important question How much should you invest in each Portfolio? Formulate this as a L.P.P. and solve it graphically. (14)

Q.3 (A) Explain North –West corner rate method for solving a transportation problem. (7)

(B) Find initial solution by VAM method (7)

Factory	**Warehouse**				**Supply**
	W1	W2	W3	W4	
F1	21	16	25	13	11
F2	17	18	14	23	13
F3	32	27	18	41	19
Requirement	6	10	12	15	

OR

A company has received a contract to supply gravel for three new construction projects located in towns A, B and C construction engineers have estimated the required amounts of gravel which will be needed at these construction projects. (14)

Project Location :	A	B	C
Weekly requirement : (Truck loads)	144	204	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 each project site. These costs (in rupees) are shown in the following table:

Cost per truck load ('000'Rs.)

		A	B	C
Plant	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 capacities and project requirement. Find the minimum cost.

Q.4 (A) What is Assignment Problem? (7)

(B) Explain Hungarian method for solving an A.P. (7)

OR

Solve the following travelling Salesman problem. (14)

	TO				
From	A	B	C	D	E
A	-	12	24	25	15
B	6	-	16	18	7
C	10	11	-	18	12
D	14	17	22	-	16
E	12	13	23	25	-

Q.5 (A) Explain Basic Assumptions of L.P.P. (7)

(B) Explain Advantages and disadvantages of L.P.P. (7)

OR

Solve following LPP by simplex method. (14)

Max Z = $4x1 + 5x2 - 3x3$

Subject to Constraints.

$x1 + x2 + x3 = 10$

$x1 + x2 \geq 1$

$2x1 + 3x2 + x3 \leq 30$

$x1, x2, x3 \geq 0$

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