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

B.B.A. Semester - 5 (Remedial) (*CBCS*) Examination
March/April-2022(Old Course)
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) Explain characteristics of operations research and its limitations. (07)

(b) Give the role and significance of O.R. in business and industry for scientific decisions. (07)

OR

Q-1(a) What is Operation research? (07)

(b) Give three definitions of Operations research and explain. (07)

Q-2(a) Explain Hungarian Method for assignment problem. (07)

(b) Give difference between transportation and assignment problem. (07)

OR

Q-2 Five different machines can do any of the five required jobs, with different profits resulting from each assignment as shown in the adjoin 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-3(a) Explain : (i) surplus variable (07)

(ii) Slack variable

(iii) Artificial variable in terms of Linear programming

(b) Explain Simplex Method. (07)

OR

Q-3 Max Z = $5x_1 + 7x_2$ (14)

Subject to

$2x_1 + 3x_2 \leq 13$

$3x_1 + 2X_2 \leq 12$

$X_1, x_2, \geq 0$ solve by simplex method.

Q-4(a) Explain any one initial method of transportation problem. (07)

(b) Explain unbalanceness n transportation problem how you overcome it. (07)

OR

Q-4 Solve the following transportation problem. (14)

Factory	Warehouse				capacity
	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	

Q-5(a) Explain Graphic method. Explain Hungarian Method for assignment problem. (07)

(b) Solve the following linear programming problem graphically (07)

Maximum Z = 4X1 + 6X2

Subject to constraints

X1+X2 =5

X1 ≥ 2

X2 ≤ 4

X1,x2 ≥ 0Give difference between transportation and assignment problem.

OR

Q-5 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

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