

B.B.A. Semester - 5 (CBCS) Examination**Oct/Nov. - 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)	What is Operations Research?	07
Q.1(b)	What are the essential features of O.R. approach?	07

OR

Q.1(a)	Write 3 important definitions of O.R.	07
Q.1(b)	Give limitations of O.R.	07
Q.2	Find optimum solution of given transportation problem.	14

Factory/warehouse	W_1	W_2	W_3	W_4	Capacity
F_1	21	16	25	13	11
F_2	17	18	14	23	13
F_3	32	27	18	41	19
Requirement	6	10	12	15	

OR

Q.2(a)	What is transportation problem? What do you understand by it?	07
Q.2(b)	Explain Vogel's approximation method for solve a transportation problem.	07
Q.3	A methods engineer wants to assign five new methods to four work centres. The assignment of new methods will increase productions and they are given below. If only one method can be assigned to a work centre, determine the optimal assignment:	14

Methods	Increase in production (unit)			
	Work Centres			
	I	II	III	IV
A	38	29	33	22
B	26	27	28	28
C	34	25	32	29
D	33	21	26	28
E	31	26	31	26

OR

Q.3(a)	Give difference between Transportation problem and Assignment problem.	07
Q.3(b)	Is Assignment problem is a special case of transportation problem?	07
Q.4	Solve the problem by Simplex Method.	14

$$\begin{aligned} \text{Max } Z &= 2X_1 + 5X_2 \\ \text{Subject to constraint} \\ X_1 + 4X_2 &\leq 24 \\ 3X_1 + X_2 &\leq 21 \\ X_1 + X_2 &\leq 9 \\ X_1, X_2 &\geq 0 \end{aligned}$$

OR

Q.4(a)	What is linear programming problem?	07
Q.4(b)	Write characteristics of linear programming problem.	07
Q.5	Solve the following linear programming problem graphically	14

$$\begin{aligned} \text{Maximum } Z &= 4X_1 + 6X_2 \\ \text{Subject to constraints} \\ X_1 + X_2 &= 5 \\ X_1 &\geq 2 \\ X_2 &\leq 4 \\ X_1, X_2 &\geq 0 \end{aligned}$$

OR

Q.5(a)	Explain graphic method.	07
Q.5(b)	Give difference between Simplex Method and Graphic Method	07
