

B.B.A. Semester - 5 (Remedial) (CBCS) Examination**March/April-2023 (NEW COURSE)****Statistics Group - Fundamentals of Operations 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
 (b) What are the essential features of O.R. approach? 07

OR

- Q.1 (a) Write 3 important definitions of O.R. 07
 (b) Give limitations of O.R. 07
 Q.2 Solve the following linear programming problem graphically 14
 Maximum $Z = 4X_1 + 6X_2$
 Subject to constraints
 $X_1 + X_2 = 5$
 $X_1 \geq 2$
 $X_2 \leq 4$
 $X_1, X_2 \geq 0$

OR

- Q.2 (a) Explain graphic method. 07
 (b) Give difference between Simplex Method and Graphic Method 07
 Q.3 Solve the problem by Simplex Method. 14
 Max $Z = 2X_1 + 5X_2$
 Subject to constraint
 $X_1 + 4X_2 \leq 24$
 $3X_1 + X_2 \leq 21$
 $X_1 + X_2 \leq 9$
 $X_1, X_2 \geq 0$

OR

- Q.3 (a) What is linear programming problem? 07
 (b) Write characteristics of linear programming problem. 07
 Q.4 Find optimum solution of given transportation problem. 14

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

OR

- Q.4 (a) What is transportation problem? What do you understand by it? 07
 (b) Explain Vogel's approximation method for solve a transportation problem. 07
 Q.5 A methods engineer wants to assign five new methods to four work centres. The 14
 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:

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.5 (a) Give difference between Transportation problem and Assignment problem. 07
 (b) Is Assignment problem is a special case of transportation problem? 07
