

B.B.A. Semester - 5 (Remedial) (CBCS) Examination**March/April-2025 (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.

Que.1 **A.** Explain Scope of operations research. (07)

Que.1 **B.** Explain advantages and drawbacks of O.R. model (07)

OR

Que.1 **A.** What are essential features of the O.R. Model (07)

Que.1 **B.** Briefly mention the various phases of O.R. (07)

Que.2 **A.** Explain advantage and drawback of L.P.P. (07)

Que.2 **B.** Explain graphic Method. (07)

OR

Que.2 Solve by graphic method. (14)

$$\text{Min } Z = 2000x + 1600y$$

Subject to Constraints

$$6x + 2y \geq 12,$$

$$2x + 2y \geq 8,$$

$$4x + 12y \geq 24,$$

$$x \leq 7, y \leq 7,$$

$$x, y \geq 0$$

Que.3 **A.** Define : (1) Slack Variables. (2) Surplus Variable. (3) Artificial Variable. (07)

B. Explain Simplex Method. (07)

OR

Que.3 Two machines A and B used in manufacturing footballs and volleyballs. (14)

The machine A is used for 2 minutes and the machine B is used for 3 minutes to manufacture a football, while the machine A is used for 4 minutes and machine B is to be used for 2 minutes to manufacture a volley ball. Each machine can be used for at most 2 hours a day. Each football gives a profit of Rs. 4 and each volleyball gives a profit of Rs. 5. How many foot balls and volleyballs should be manufactured so that profit is maximum?

Que.4 **A.** Find initial solution by North West Corner Rule Method. (07)

Factory	Warehouse				Supply
	W ₁	W ₂	W ₃	W ₄	
F ₁	21	16	25	13	11
F ₂	17	18	14	23	13
F ₃	32	27	18	41	19
Demand	6	10	12	15	

B. Show how to balance the transportation model when it is unbalanced. (07)

Also explain the interpretation of the optimal solution of an unbalanced transportation problem.

OR

Que.4 Find the optimal solution of the following transportation problem. (14)

	D ₁	D ₂	D ₃	D ₄	D ₅	Supply
O ₁	20	10	15	20	19	40
O ₂	5	8	12	5	7	30
O ₃	6	15	10	7	10	50
O ₄	8	12	11	8	14	70
Demand	40	60	20	40	60	

Que.5

- A.** A compute Centre has got four expert programmers. The centre needs four application programmes to be developed. The head of the computer centre after studying carefully the programmes to be developed, estimates the computer time (in minutes) required by the respective experts to develop the application programmes as follows. (07)

programmers	programmes				
		A	B	C	D
	1	120	100	80	90
	2	80	90	110	70
	3	110	140	120	100
	4	90	90	80	90

- B.** How will you handle the following situations in an assignment problem (07)
- (i) maximization
 - (ii) unbalanced problem.

OR

- Que.5 A captain of a cricket team has to allot five middle positions to five batsmen. (14)
- The average runs scored by each batsman at these positions are as follows:

Batsmen	Batting positions					
		III	IV	V	VI	VII
	A	40	40	35	25	50
	B	42	30	16	25	27
	C	50	48	40	60	50
	D	20	19	20	18	25
	E	58	60	59	55	53
