

2025

**BUSINESS ADMINISTRATION — HONOURS**

**Paper : BBAA-501-CC 9**

**(Quantitative Techniques in Management)**

**Full Marks : 75**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

**Group - A**

1. Answer **any ten** questions :

2×10

- (a) State any two objectives of Quantitative Techniques in management.
- (b) Define feasible solution.
- (c) What is an assignment problem?
- (d) State any two assumptions of Linear Programming.
- (e) What is a pay-off table?
- (f) State any two decision-making criteria under uncertainty.
- (g) State one difference between transportation and assignment problems.
- (h) What is float time?
- (i) A firm produces products X and Y. Profit per unit of X is ₹ 5 and Y is ₹ 3. Write the objective function.
- (j) If two events A and B are independent with  
 $P(A) = 0.5$  and  $P(B) = 0.2$ , find  $P(A \cap B)$ .
- (k) Given the pay-offs - 5, 0 and 8, find the maximum loss.
  - (l) Calculate project duration if critical activities take 5, 7, and 8 days.
- (m) If the value of the game is zero, state whether the game is fair or unfair.
- (n) State one limitation of the graphical method that leads to the use of the Simplex Method.
- (o) Name the type of constraints that require the Big-M Method.

**Group - B**

2. Answer **any five** questions :

5×5

- (a) Discuss the steps involved in formulating a Linear Programming Problem.
- (b) What are artificial variables? Why are they required in LPP?

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(c) Explain the concept of probability and its applications in management.

(d) Solve the following LPP using the Simplex Method :

$$\text{Maximize } Z = 5x + 4y$$

subject to :

$$6x + 4y \leq 24$$

$$x + 2y \leq 6$$

$$x, y \geq 0$$

(e) Draw the network diagram and find the critical path :

Activity	Duration (days)
A – B	4
A – C	3
B – D	5
C – D	6

(f) Solve the following  $2 \times 2$  game using saddle point method :

A \ B	B1	B2
A1	7	5
A2	6	4

(g) A company manufactures two products A and B. Profit per unit of A is ₹ 6 and B is ₹ 8.

Each unit of A requires 2 hours and B requires 4 hours of labour. Total labour hours available are 24. Formulate the LPP.

(h) Explain PERT and its applications in project management.

(i) Explain the terms basic solution, basic feasible solution and optimal solution.

### Group - C

Answer *any three* questions.

10×3

3. Solve the following Transportation problem by Vogel's Approximation Method :

	I	II	III	Supply
A	6	4	1	76
B	3	8	7	80
C	4	4	2	74
Demand	82	108	25	

(3)

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4. Maximize  $Z = 12x + 16y$

subject to :  $10x + 20y \leq 120$

$8x + 8y \leq 80$

$x, y \geq 0$

Find the optimal solution using graphical method.

5. A project schedule has following characteristics :

Activity	1 - 2	1 - 3	2 - 4	3 - 4	3 - 5	4 - 9	5 - 6	5 - 7	6 - 8	7 - 8	8 - 10
Time	4	1	1	1	6	5	4	8	1	2	5

(i) Construct the network.

(ii) Compute earliest event time and latest event time.

(iii) Determine critical path and total project duration.

6. Using LCM, solve this Transportation problem :

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

7. The following table represent the pay-off matrix with respect to Player A. Solve it optimally using dominance property.

		Player B			
		1	2	3	4
Player A	1	6	2	4	8
	2	2	-1	1	12
	3	2	3	3	9
	4	5	2	6	10

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