0311E1017

Candidate's Seat No : _____

B.B.A. Sem.-5 Examination

CC-304

Operations Research & QT

November-2025

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions

1. Figures on right indicate marks
2. Use of simple calculator is allowed
3. Graph will be provided by request.

Q-1 (A) Give application of Operations Research (OR) in various fields. 7

(B) Solve the following LPP by graphical method: 7

Max $Z = 2x + 5y$

Subject to the constraint

$x \leq 400$

$y \leq 300$

$x + y \leq 600$

$x, y \geq 0$

OR

Q-1 (A) Solve the following LPP by graphical method: 7

Max $Z = 8x + 12y$

Subject to the constraint

$x + y \leq 9$

$3x + 6y \leq 36$

$x, y \geq 0$

(B) Write dual of the following problem 7

Minimize $Z = 5x + 7y$

Subject to the constraint

$x + y \leq 4$

$3x + 8y \leq 24$

$5x + 2y \geq 10$

$x, y \geq 0$

Q-2 (A) Explain Matrix Minima Method by giving example. 7

(B) Solve the following problem by North West Corner Method. 7

	A	B	C	D	Supply
I	60	40	10	50	14
II	80	90	20	60	17
III	40	30	60	20	5
Demand	6	10	16	4	36

OR

Q-2 (A) Solve the following problem by Vogel's Method. 7

	A	B	C	Supply
I	70	120	90	16
II	80	100	60	10
III	100	90	120	12
Demand	8	11	19	38

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(B) Solve the following problem by Matrix Minima Method. 7

	A	B	C	Supply
I	15	13	33	1
II	19	14	27	3
III	35	30	15	5
Demand	4	2	3	9

Q-3 (A) Define the following terms: 7

1. Activity
2. Event
3. Dummy Activity

(B) Prepare PERT chart and find float time. 7

Activity	1 – 2	2 – 3	2 – 4	3 – 4	4 – 5
Days	15	5	9	8	13

OR

Q-3 (A) Prepare PERT chart and find Critical Path. 7

Activity	1 – 2	2 – 3	2 – 4	3 – 5	4 – 5	3 – 6	4 – 6
t_0	3	2	4	5	5	2	4
t_m	4	8	10	8	8	3	7
t_p	6	10	14	13	13	4	8

(B) Prepare PERT chart and find Critical Path. 7

Activity	1 – 2	1 – 3	2 – 3	2 – 4	3 – 4	4 – 5
Time	4	6	2	3	2	4

Q-4 (A) Define the following terms: 7

1. Two-Person zero-sum game.
2. Balanced assignment problem.
3. Saddle point.

(B) Solve the game whose payoff matrix is given by 7

$$\begin{bmatrix} 1 & 7 \\ 2 & 2 \end{bmatrix}$$

OR

Q-4 (A) Assign works to persons so that the total working hours in minimum. 7

		Works			
		P	Q	R	S
Persons	A	120	150	180	80
	B	130	100	90	140
	C	100	120	150	130
	D	70	80	90	140

(B) If player A and B toss a dice. If even number occurs on both dice, player A gets 8 Rs., if odd number occurs on both dice, player A gets 6 Rs., If one gets odd and other gets even, player B gets 5 Rs., Determine the best strategy for each player. 7

Q-5 Do as directed: (Any 7) 14

1. The _____ are called players.
   a) Competitors
   b) Individuals
2. A game is called a fair game if the value of game is _____.
   a) Zero
   b) One

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3. Resulting gain in the form of a matrix in a true-person zero-sum game is called _____
   a) Pay-off matrix
   b) Saddle point
4. Activity is denoted by _____
   a) Arrow
   b) Circle
5. Event is denoted by _____
   a) Arrow
   b) Circle
6. In constructing a network, Each _____ starts from an _____
   a) Activity, Event
   b) Event, Activity
7. In North-West Corner-rule, the transportation _____ is totally ignored.
   a) Cost
   b) Demand
8. In transportation problem, if the number of cells in which allocations are made is less than _____ the solution is known as degenerate solution.
   a) $m + n - 1$
   b) $m + n + 1$
9. In unbalanced transportation problem, _____
   a) Total demand is equal to total supply
   b) Total demand is not equal to total supply
10. The constants after inequality in dual problem becomes coefficient of the objective function in primal problem.
    a) True
    b) False
11. Graphical method is used to solve a linear programming problem having more than 2 variables.
    a) True
    b) False
12. Linear programming was first introduced by Marshal Edworth.
    a) True
    b) False