

## BBA Sem-5 Examination

## CC 304

## Operations Research &amp; Q.T

August 2021

Time : 2-00 Hours]

[Max. Marks : 50

## SECTION - I

- Q-1 (A) Write Mathematical formulation of Linear Programming Problem and write dual of the following problem 10 Marks

Minimize

$$Z = 5x + 7y$$

Subject to the following constraints

$$x + y \leq 5$$

$$3x + 8y \leq 20$$

$$5x + 2y \geq 12$$

$$x, y \geq 0$$

- (B) Find the values of  $x$  and  $y$  which maximize the objective function 10 Marks

$$Z = 8x + 12y$$

Subject to the following constraints

$$x + y \leq 9$$

$$x + 2y \leq 12$$

- Q-2 (A) What is Balanced Transportation Problem and Unbalanced Transportation Problem and Solve the below Transportation Problem by Matrix Minima Method. 10 Marks

	$D_1$	$D_2$	$D_3$	$D_4$	Supply
$O_1$	30	60	30	120	30
$O_2$	90	70	60	30	50
$O_3$	120	60	150	270	20
Demand	20	40	30	10	100

- (B) Obtain Optimum Solution of the following Transportation Problem. 10 Marks

	$D_1$	$D_2$	$D_3$	$D_4$	Supply
$O_1$	16	14	11	15	14
$O_2$	18	19	12	16	17
$O_3$	14	13	16	12	5
Demand	6	10	16	4	

- Q-3 (A) Define the following terms with Example. 10 Marks

1. Activity
2. Event
3. Dummy Activity
4. Network
5. Optimistic Time

- (B) Draw PERT Diagram, obtain Critical Path and find EST, EFT, LST, LFT & Total Float 10 Marks

Activity	1-2	1-3	2-3	2-4	3-4	4-5	3-6	5-6	2-7	6-7
Time	10	13	5	6	2	4	2	1	2	2

Q-4 (A) Write Mathematical Formulation of Assignment Problem and Explain Hungarian Method 10 Marks

(B) Answer the following: 10 Marks

1. Solve the following Assignment Problem to minimize the total cost.

		Machines			
		A	B	C	D
Jobs	P	260	280	40	150
	Q	190	170	380	180
	R	260	240	110	130
	S	100	190	150	80

2. Solve the following Game.

		Player B		
		150	20	30
Player A	60	60	50	70
	-70	-70	40	0

### SECTION - II

Q-5 Multiple Choice Questions: (Attempt Any 10) 10 Marks

- Basic condition for applying MODI method is
  - $m + n - 1$
  - $m + n + 1$
  - $m + n$
  - $m \times n$
- In Balanced Transportation Problem
  - Total Demand is not Equal to Total Supply
  - Total Demand is Equal to Total Supply
- Penalty Method is also known as
  - Vogel's Method
  - Matrix Minima Method
  - North West Corner Method
- For a transportation matrix of order  $4 \times 3$ , how many no. of occupied cells are there for non-degenerate solution?
  - 7
  - 6
  - 5
  - None
- All variables in LPP must take non-negative values
  - True
  - False
- Linear programming was first introduced by
  - Walker & Kelly
  - US Navy
  - George B Dantjng & Marshall Wood
  - None of the above
- The linear inequalities or equations representing the restriction of resources in the problem are known as Objective function.
  - True
  - False

8. In LPP, if there are two variables then \_\_\_\_\_ method is used.  
i) *Simplex*  
ii) *Graphical*
9. The objective of assignment problem is to assign number of jobs to persons so that the time taken to complete the job is \_\_\_\_\_.  
i) *Maximum*  
ii) *Minimum*  
iii) *Neutral*
10. The Assignment Problem is a special case of \_\_\_\_\_.  
i) *Replacement Problem*  
ii) *Transportation Problem*  
iii) *Sequencing Problem*  
iv) *None of the above*
11. Saddle point does not exist if \_\_\_\_\_.  
i) *Maxi - Min = Mini - Max*  
ii) *Mini - Max  $\neq$  Maxi - Min*
12. Longest Path of the Network is known as \_\_\_\_\_.  
i) *Programme Evaluation & Review Technique*  
ii) *Critical Path Method*  
iii) *Total Float*
13. The direction of the network should be from left to right.  
i) *True*  
ii) *False*
14. The time of dummy activity is \_\_\_\_\_.  
i) *1*  
ii) *0*  
iii) *Can be any value*
15. By Dominance property the size of the payoff matrix is reduced to \_\_\_\_\_.  
i) *4  $\times$  4*  
ii) *2  $\times$  2*  
iii) *3  $\times$  3*
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