



## BRAINWARE UNIVERSITY

### Term End Examination 2020 - 21

Programme – Post Graduate Diploma in Hospital Management

Course Name – Operation Research

Course Code - PGDHMC303

Semester / Year - Semester III

Time allotted : 75 Minutes

Full Marks : 60

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

### Group-A

(Multiple Choice Type Question)

1 x 60=60

1. (Answer any Sixty )

(i) The graphical method of Linear Programming Problem can be applicable if there are only

- |                                 |                  |
|---------------------------------|------------------|
| a) 3 variables                  | b) 2 variables   |
| c) Infinite number of variables | d) none of these |

(ii) PERT stands for

- |   |  |
|---|--|
| a) Positive Error Reporting Time            | b) Programme Evaluation Review Technique     |
| c) Programme Evaluation and Research Theory | d) Process Evaluation and Research Technique |

(iii) Which one of the following is a part of every game theory model?

- |                  |               |
|------------------|---------------|
| a) Players       | b) Payoffs    |
| c) Probabilities | d) Strategies |

(iv) The game is called fair game if the value of game is

- |             |             |
|-------------|-------------|
| a) Zero     | b) negative |
| c) positive | d) non-zero |

(v) The northwest corner rule requires that we start allocating units to shipping routes in the:

- a) Middle cell
- b) Lower right corner of the table
- c) upper left hand corner of the table
- d) upper right corner of the table

(vi) PERT & CPM are

- a) Statistical tool
- b) Time-even tool
- c) Network Analysis
- d) All of these

(vii) In a transportation problem, items are allocated from sources to destinations

- a) at a maximum cost
- b) at a minimum cost
- c) at a minimum profit
- d) at a minimum revenue

(viii) In Vogel's Approximation Method, the opportunity cost associated with a row is determined by

- a) The difference between the smallest cost and the next smallest cost in the row
- b) The difference between the smallest unused cost and the next smallest unused cost in the row
- c) The difference between the smallest cost and next smallest unused cost in the row
- d) none of these

(ix) A point where maximin = minimax, is called

- a) Saddle point
- b) Solo point
- c) Cut off point
- d) none of these

(x) The solution to a transportation problem with 'm' rows (supplies) & 'n' columns (destination) is feasible if number of positive allocations are

- a)  $m+n$
- b)  $m*n$
- c)  $m+n-1$
- d)  $mn-1$

(xi) Which of the following statements regarding critical paths is true?

- a) The shortest of all paths through the network is the critical path
- b) Some activities on the critical path may have slack.

c) Every network has exactly one critical path.

d) On a specific project, there can be multiple critical paths, all with exactly the same duration.

(xii) Operation research analysis does not

a) Predict future operation

b) Build more than one model

c) Collect the relevant data

d) Recommended decision and accept

(xiii) A constraint in an LP model restricts

a) value of the objective function

b) Value of the decision variable

c) Use of the available resources

d) All of these

(xiv) The objective function for a L.P model is  $3x_1+2x_2$ , if  $x_1=20$  and  $x_2=30$ , what is the value of the objective function?

a) 0

b) 50

c) 60

d) 120

(xv) Linear programming problem involving only two variables can be solved by

a) Big M method

b) Simplex method

c) Graphical method

d) none of these

(xvi) To convert ? inequality constraints into equality constraints, we must

a) add a slack variable

b) subtract an artificial variable

c) subtract a surplus variable and an add artificial variable

d) add a surplus variable and subtract an artificial variable.

(xvii) An optimal of an assignment problem can be obtained only if

a) each row and column has only one zero element

b) each row and column has at least one zero element

c) the data are arrangement in a square matrix

d) none of these

(xviii) The method used for solving an assignment problem is called

- a) reduced matrix method
- b) MODI method
- c) Hungarian method
- d) none of these

(xix) In an assignment problem

- a) one agent can do parts of several tasks
- b) one task can be done by several agents
- c) each agent is assigned to its own best task
- d) none of these

(xx) Game theory models are classified by the

- a) Number of players
- b) sum of all payoffs
- c) Number of strategies
- d) all of these

(xxi) A mixed strategy game can be solved by

- a) algebraic method
- b) matrix method
- c) graphical method
- d) all of these

(xxii) When the sum of gains of one player is equal to the sum of losses to another player in a game, this situation is known as

- a) biased game
- b) zero-sum game
- c) fair game
- d) All of these

(xxiii) A dummy activity is required when

- a) Two or more activities have the same starting events.
- b) Two or more activities have different ending events
- c) Two or more activities have the same ending events
- d) The network contains two or more activities that have identical starting and ending events

(xxiv) CPM is:

- a) Critical Project Management
- b) Critical Path Management

c) Critical Path Method

d) Crash Project Method

(xxv) A queue follows \_\_\_\_\_

a) FIFO (First In First Out) principle

b) LIFO (Last In First Out) principle

c) Ordered array

d) Linear tree

(xxvi) In a departmental store customers arrive at a rate of 20 customers per hour. The average number of customers that can be handled by cashier is 24 per hour. What is arrival rate in this problem?

a) 20

b) 3

c) 24

d) 10

(xxvii) In a departmental store customers arrive at a rate of 20 customers per hour. The average number of customers that can be handled by cashier is 24 per hour. Probability that cashier is idle?

a) 1

b) 1/6

c) 5

d) 5/6

(xxviii) Which of the following is not a rule of network construction?

a) Each defined activity is represented by one and only one arrow.

b) A network should have only initial and one terminal node.

c) Identical initial and final nodes can identify two activities.

d) Only as few dummy activities should be included as is warranted.

(xxix) An event that represent the joint completion of more than one activity is known as

a) Burst event

b) Joint event

c) Merge event

d) none of these

(xxx) The purpose of the transportation approach for locational analysis is to minimize

a) total costs

b) total shipping costs

c) total variable costs

d) total fixed costs

(xxxii) Which of the following statements about the northwest corner rule is false?

a) One must exhaust the supply for each row before moving down to the next row.

b) One must exhaust the demand requirements of each column before moving to the next column.

c) When moving to a new row or column, one must select the cell with the lowest cost.

d) One must check that all supply and demand constraints are met.

(xxxiii) A transportation problem has a feasible solution when

a) all of the improvement indexes are positive

b) the number of filled cells is one less than the number of rows plus the number of columns

c) the solution yields the lowest possible cost

d) all demand and supply constraints are satisfied

(xxxiv) The total cost of the optimal solution to a transportation problem

a) is calculated by multiplying the total supply (including any dummy values) by the average cost of the cells

b) cannot be calculated from the information given

c) is found by multiplying the amounts in each cell by the cost for that cell for each row and then subtract the products of the amounts in each cell times the cost of each cell for the columns

d) can be calculated based only on the entries in the filled cells of the solution

(xxxv) In a minimization problem, a negative improvement index in a cell indicates that the

a) solution is optimal

b) total cost will increase if units are reallocated to that cell

c) total cost will decrease if units are

d) current iteration is worse than the

reallocated to that cell

previous one

(xxxv) Operations Research was known as an ability to win a war without really going in to a

- a) Battle field
- c) War

- b) Fighting
- d) Both Battle field and Fighting

(xxxvi) Allocation problems can be solved by

- a) Linear Programming Technique
- c) Both Linear Programming Technique and Non – Linear Programming Technique

- b) Non – Linear Programming Technique
- d) none of these

(xxxvii) Graphic method can be applied to solve a LPP when there are only ----- variable

- a) One
- c) Two

- b) More than One
- d) Three

(xxxviii) Decision variables are

- a) Controllable
- c) Parameters

- b) Uncontrollable
- d) None of these

(xxxix) To make an unbalanced assignment problem balanced, what are added with all entries as zeroes?

- a) Dummy rows
- c) Both Dummy rows and Dummy columns
- b) Dummy columns
- d) Dummy entries

(xl) The allocated cells in the transportation table are called -----

- a) Occupied cells
- c) Both Occupied cells and Empty cells
- b) Empty cells
- d) Unoccupied cells

(xli) Once the initial basic feasible solution has been computed , what is the

next step in the problem

- a) VAM
- b) Modified distribution method
- c) Optimality test
- d) None of these

(xlii) What do we apply in order to determine the optimum solution?

- a) LPP
- b) VAM
- c) MODI Method
- d) None of these

(xliii) A given Transportation Problem is said to be unbalanced, if the total supply is not equal to the total -----

- a) Optimization
- b) Demand
- c) Cost
- d) None of these

(xliv) If the total supply is less than the total demand, a dummy source (row) is included in the cost matrix with

- a) Dummy Demand
- b) Dummy Supply
- c) Zero Cost
- d) Both Dummy Supply and Dummy Demand

(xlv) For maximization in TP , the objective is to maximize the total

- a) Solution
- b) Profit Matrix
- c) Profit
- d) None of these

(xlvi) An assignment problem is considered as a particular case of a transportation problem because

- a) The number of rows equals columns
- b) All  $x_{ij} = 0$  or 1
- c) All rim conditions are 1
- d) All of these

(xlvii) A minimization problem can be converted into a maximization problem by changing the sign of coefficients in the \_\_\_\_\_.

- a) Constraints
- b) Objective Functions



c) Both Constraints and Objective Functions

d) None of these

(xlviii) In a transportation problem, we must make the number of \_\_\_\_\_ and \_\_\_\_\_ equal

a) destinations; sources

b) units supplied; units demanded

c) positive cost coefficients; negative cost coefficients

d) warehouses; suppliers

(xlix) Both transportation and assignment problems are members of a category of LP problems called \_\_\_\_\_.

a) shipping problems

b) logistics problems

c) routing problems

d) network flow problems

(l) A point that satisfies all of a problem's constraints simultaneously is a(n)

a) maximum profit point.

b) intersection of the profit line and a constraint.

c) intersection of two or more constraints.

d) corner point.

(li) LP theory states that the optimal solution to any problem will lie at

a) a corner point of the feasible region.

b) the highest point of the feasible region.

c) the lowest point in the feasible region.

d) None of these

(lii) Which of the following is not one of the assumptions of an M/M/1 model?

a) Arrivals are independent of preceding arrivals but the arrival rate does not change over time

b) Arrivals are served on a last-in, first-served basis.

c) Service times follow the negative exponential probability distribution.

d) Arrivals follow the Poisson distribution and come from an infinite population.

(liii) Game theory is concerned with

a) predicting the results of bets placed on

b) the choice of an optimal strategy in

games like roulette

conflict situations.

c) utility maximization by firms in perfectly competitive markets.

d) the migration patterns of caribou in Alaska.

(liv) Which of the following is a zero-sum game?

a) Prisoners' dilemma

b) Chess

c) A cartel member's decision regarding whether or not to cheat

d) All of these

(lv) A strategy that is best regardless of what rival players do is called

a) first-mover advantage.

b) A Nash equilibrium strategy

c) tit-for-tat.

d) a dominant strategy

(lvi) In transportation models designed in linear programming, points of demand is classified as

a) Ordination

b) transportation

c) destinations

d) origins

(lvii) In linear programming, lack of points for a solution set is said to

a) have no feasible solution

b) have a feasible solution

c) have single point method

d) have infinite point method

(lviii) In linear programming, oil companies used to implement resources available is classified as

a) Implementation modeling

b) transportation models

c) oil model

d) resources modeling

(lix) In less than or equal to constraint equations, variable which is used to balance both side of equations is classified as

a) Solving variable

b) condition variable

c) slack variable

d) positive variable

(lx) In simplex method, slack, surplus and artificial variables are restricted to be

a) multiplied

b) negative

c) non-negative

d) divided