

Question Paper

1. In operations research, the are prepared for situations.

- A. mathematical models
- B. physical models diagrammatic
- C. diagrammatic models
- D. None of the above

2. Which of the following is not the phase of OR methodology?

- A. Formulating a problem
- B. Constructing a model
- C. Establishing controls
- D. Controlling the environment

3. Operations research is the application of methods to arrive at the optimal solutions to the problems.

- A. economical
- B. scientific
- C. Both (A) and (B)
- D. artistic

4. Which technique is used in finding a solution for optimizing a given objective, such as profit maximization or cost reduction under certain constraints?

- A. Queuing Theory
- B. Waiting Line
- C. Both (A) and (B)
- D. Linear Programming

5. The operations research technique which helps in minimizing total waiting and service costs is

- A. Queuing Theory
- B. Decision Theory
- C. Both (A) and (B)
- D. None of the above

6. In graphical representation the bounded region is known as region.

- A. solution
- B. basic solution
- C. feasible solution
- D. optimal

7. Maximize $Z = 11x + 8y$ subject to $4x + 6y \leq 24$, $6x + 0y \leq 24$, $0x + 0y \leq 0$, $x \geq 0$, $y \geq 0$

- A. 44 at (4, 2)
- B. 60 at (4, 2)
- C. 62 at (4, 0)
- D. 48 at (4, 2)

8. The occurrence of degeneracy while solving a transportation problem means that :

- A. total supply equals total demand
- B. the solution so obtained is not feasible
- C. the few allocations become negative
- D. None of the above

9. The initial solution of a transportation problem can be obtained by applying any known method. However, the only condition is that :

- A. The solution be optimal
- B. The rim conditions are satisfied
- C. The solution not be degenerate
- D. All of the above

10. The solution to a transportation problem with „m rows (supplies) and „n columns (destination) is feasible if the number of positive allocations are :

- A. $m + n$
- B. $m \cdot n$
- C. $m + n - 1$
- D. $m + n + 1$

11. The total time required to complete all the jobs in a job sequencing problem is known as

- A. processing time
- B. waiting time
- C. elapsed time
- D. idle time

12. The minimum number of line covering all zeros in a reduced cost matrix of order n can be

- A. At least n
- B. At most n
- C. $n - 1$
- D. $n + 1$

13. One disadvantage of using North-West Corner Rule to find initial solution to

the transportation problem is that :

- A. It is complicated to use
- B. It does not take into account cost of transportation
- C. It leads to a degenerate initial solution
- D. All of the above

14. The unused materials are returned to stores with a material and note.

- A. Acceptance
- B. Transfer
- C. Return
- D. None of the above

15. The optimum level of inventory is popularly referred to as the

- A. Minimum stock level
- B. Re-order stock level
- C. Economic order quantity
- D. None of the above

16. Which of the following is not an inventory?

- A. Machines
- B. Raw Material
- C. Finished Products
- D. Consumable tools

17. The replacement policy that is imposed on an item irrespective of its failure is

- A. Group replacement
- B. Individual replacement
- C. Repair spare replacement
- D. Successive replacement

18. Customer behaviour in which the customer moves from one queue to another in a multiple channel situation is :

- A. balking
- B. reneging
- C. jockeying
- D. alternating

19. The right-hand side constant of a constraint in a primal problem appears in the corresponding dual as.....

- A. coefficient in the objective function

- B. a right-hand side constant of a function
- C. an input output coefficient
- D. a left-hand side constraint coefficient variable

20. If a job is having minimum processing time under both the machines, then the job is placed in :

- A. any one (first or last) position
- B. available last position
- C. available first position
- D. Both first and last position

21. In a transportation problem, the method which finds difference between two least cost for each row and column is

- A. Minimum entry method
- B. North-west corner method
- C. North-east corner method
- D. VAM method

22. In simplex method, we add in the case of constraints with sign “=”.

- A. Surplus variable
- B. Artificial variable
- C. Slack variable
- D. None of the above

23. As the order quantity increases, this cost will reduce :

- A. ordering cost
- B. insurance cost
- C. inventory carrying cost
- D. stock out cost

24. LOB stands for :

- A. Lot of Bills
- B. Lot of Batches
- C. Line of Batches
- D. Line of Business

25. The assignment problem is a special case of transportation problem in which :

- A. Number of origins are less than the number of destinations.
- B. Number of origins are greater than the number of destinations.
- C. Number of origins are greater than or equal to the number of destinations.
- D. Number of origins equals the number of destinations.

26. The large negative opportunity cost value in an unused cell in a transportation table is chosen to improve the current solution because :

- A. It represents per unit cost reduction
- B. It represents per unit cost improvement
- C. It ensure no rim requirement violation
- D. None of the above

27. If an opportunity cost value is used for an unused cell to test optimality, it should be

- A. Equal to zero
- B. Most negative number
- C. Most positive number
- D. Any value

28. Queuing theory deals with the problem of :

- A. Material handling
- B. Reducing waiting time or idle time
- C. Better utilization of man services
- D. Effective use of machines

29. is that element of the simplex table which is both in the key row and key column.

- A. Key element
- B. Pivot element
- C. Both (A) and (B)
- D. None of the above

30. Traffic intensity is computed by using the formula :

- A. $\rho = \frac{\sum a_i}{n}$
- B. $\rho = \frac{\sum a_i}{n}$
- C. $\rho = \frac{\sum a_i}{n}$
- D. $\rho = \frac{\sum a_i}{n}$

31. Matrix Minima Method to find initial feasible solution to a TP is also called

- A. NWCM
- B. LCM
- C. VAM
- D. None of the above

32. Traffic intensity in Queuing Theory is also called

- A. Service factor

- B. Arrival factor
- C. Utilisation factor
- D. None of the above

33. A customer's behaviour of leaving the queue due to impatience is called

- A. Jockeying
- B. Reneging
- C. Collusion
- D. Balking

34. Commonly assumed probability distribution of service pattern are

- A. Poisson distribution
- B. Exponential distribution
- C. Erlang distribution
- D. Both (B) and (C)

35. A LPP model does not contain :

- A. Decision
- B. Constraints
- C. Feasible solution
- D. Spreadsheet

36. In sequencing if the smallest time belong to machine-1, then that job has to be placed of the sequence.

- A. in the middle
- B. in the starting
- C. at end
- D. None of the above

37. Replacement is said to be necessary if

- A. Failure rate is increasing.
- B. Failure cost is increasing.
- C. Failure probability is increasing.
- D. Any of the above

38. In the formula of Economic Order Quantity, the alphabet „O“ stands for

- A. Ordering Level
- B. Ordering Cost
- C. Ordering and Carrying Cost
- D. None of the above

39. What is the first approach in optimization methods?

- A. Theory of bending
- B. Theory of layout
- C. Theory of elongation
- D. Theory of stress

40. Initial feasible solution to a transportation problem can be found out by

- A. VAM
- B. MODI Method
- C. Both (A) and (B)
- D. None of the above

41. It is assumed that maintenance cost mostly depends on :

- A. Calendar age
- B. Running age
- C. Manufacturing date
- D. User's age

42. The coefficient of an artificial variable in the objective function of penalty method are always assumed to be

- A. 0
- B. 1
- C. M
- D. -M

43. The assignment problem will have alternate solutions when the total opportunity cost matrix has :

- A. at least one zero in each row and column
- B. when all rows have two zeros
- C. when there is a tie between zero opportunity cost cells
- D. if two diagonal elements are zeros.

44. The average arrival rate in a single server queuing system is 10 customers per hour and average service rate is 15 customers per hour. The average time that a customer must wait before it is taken up for service shall be minutes.

- A. 6
- B. 8
- C. 10
- D. 12

45. In the optimal simplex table, $Z_j - C_j = 0$ value indicates

- A. alternative solution
- B. bounded solution
- C. infeasible solution
- D. unbounded solution

46. When $D = 18000$, holding cost = ₹ 1.20, set-up cost = ₹ 400, EOQ =

- A. 3465
- B. 3750
- C. 3500
- D. 4000

47. When the probability of failure reduces gradually, the failure mode is said to be :

- A. Regressive
- B. Retrogressive
- C. Progressive
- D. Recursive

48. When money value changes with time at 10%, then PWF for first year is :

- A. 1
- B. 0.909
- C. 0.852
- D. 0.9

49. The unit of traffic intensity is

- A. Poisson
- B. Markow
- C. Erlang
- D. Kendall

50. If the operating characteristics of a queue are dependent on time, then it is said to be :

- A. Transient state
- B. Busy state
- C. Steady state
- D. Explosive state

51. As per queue discipline is the following is not the negative behavior of customer :

- A. Balking
- B. Reneging
- C. Boarding

D. Collusion

52. The method used to solve LPP with use of artificial variables is called

- A. Dual Simplex
- B. Graphical
- C. Big-M
- D. Transportation Problem

53. Which of the followings is an assumption of Linear Programming Technique?

- A. Divisibility
- B. Additivity
- C. Proportionality
- D. All of the above

54. During an iteration while moving from one solution to the next, degeneracy may occur when :

- A. The closed path indicates a diagonal move
- B. Two or more occupied cells are on the closed path but neither of them represents a corner of the path.
- C. Two or more occupied cells on the closed path with minus sign are tied for lowest circled value
- D. Either of the above

55. The smallest quantity is chosen at the corners of the closed path with negative sign to be assigned at unused cell because :

- A. It improve the total cost
- B. It does not disturb rim conditions
- C. It ensure feasible solution
- D. All of the above

56. The occurrence of degeneracy while solving a transportation problem means that

- A. total supply equals total demand
- B. the solution so obtained is not feasible
- C. the few allocations become negative
- D. None of the above

57. In maximization problem, optimal solution occurring at corner point yields the :

- A. mean values of z
- B. highest value of z
- C. lowest value of z

D. mid values of z

58. Column in simplex initial table used to represent new basic variable is classified as

A. column variable

B. key column

C. key row

D. row variable

59. In simplex method, slack, surplus and artificial variables are restricted to be

A. multiplied

B. negative

C. non-negative

D. divided

60. In simplex method basic solution set as $(n - m)$, all variables other than basic are classified as

A. constant variable

B. non-positive variables

C. basic variables

D. non-basic variable

61. In simplex method, we add variables in the case of “=”.

A. Slack Variable

B. Surplus Variable

C. Artificial Variable

D. None of the above

62. is another method to solve a given LPP involving some artificial variable.

A. MODI method

B. Method of penalties

C. Two-phase simplex method

D. None of the above

63. In transportation models designed in linear programming, points of demand is classified as

A. ordination

B. transportation

C. destinations

D. origins

64. 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

65. If in a LPP, the solution of a variable can be made infinity large without violating the constraints, the solution is

- A. Infeasible
- B. Unbounded
- C. Alternative
- D. None of the above

66. A BFS of a LPP is said to be if at least one of the basic variable is zero.

- A. Degenerate
- B. Non-degenerate
- C. Infeasible
- D. Unbounded

67. In simplex method slack variables are assigned zero coefficients because :

- A. no contribution in objective function
- B. high contribution in objective function
- C. divisor contribution in objective function
- D. base contribution in objective function

68. Which of the following is a type of Linear Programming Problem?

- A. Manufacturing problem
- B. Diet problem
- C. Transportation problems
- D. All of the above

69. Cells in the transportation problem having positive allocation will be called

- A. cells
- B. occupied
- C. unoccupied
- D. table

70. The time required for two operations cutting and binding of 5 jobs are as follows :

- A. 2-4-1-3-5
- B. 3-4-2-1-5
- C. 1-2-3-4-5
- D. 3-5-2-4-1

71. Sequencing is a subset of :

- A. Routing
- B. Scheduling
- C. Expediting
- D. None of the above

72. are expressed in the form of inequities or equations.

- A. Constraints
- B. Objective Functions
- C. Both (A) and (B)
- D. None of the above

73. The objective functions and constraints are linear relationship between

- A. Variables
- B. Constraints
- C. Functions
- D. All of the above

74. Graphic method can be applied to solve a LPP when there are only variable.

- A. One
- B. More than one
- C. Two
- D. Three

75. In LPP, degeneracy occurs in stages.

- A. One
- B. Two
- C. Three
- D. Four

76. If there are more than one optimum solution for the decision variable the solution is

- A. Infeasible
- B. Unbounded
- C. Alternative

D. None of the above

77. An optimization model :

- A. Mathematically provides the best decision
- B. Provides decision within its limited context
- C. Helps in evaluating various alternatives constantly
- D. All of the above

78. The word “Linear” means that the relationships are represented by

- A. Diagonal lines
- B. Curved lines
- C. Straight lines
- D. Slanting lines

79. Any feasible solution which optimizes (minimizes or maximizes) the objective function of the LPP is called its

- A. Optimal solution
- B. Non-basic variables
- C. Solution
- D. Basic feasible solution

80. A set of values X_1, X_2, \dots, X_n which satisfies the constraints of the LPP is called

- A. Solution
- B. Variable
- C. Linearity
- D. None of the above

81. An objective function is maximized when it is a function.

- A. Passive
- B. Profit
- C. Cost
- D. None of the above

82. PP is exactly used in solving what kind of resource allocation problems?

- A. Production planning and scheduling
- B. Transportation
- C. Sales and advertising
- D. All of the above

83. which is a subclass of a Linear Programming Problem (LPP).

- A. Programming problem

B. Transportation problem

C. Computer problem

D. Both (A) and (B)

84. MODI method is used to obtain

A. Optimal solutions

B. Optimality test

C. Both (A) and (B)

D. Optimization

85. For solving an assignment problem, which method is used?

A. Hungarian

B. American

C. German

D. Both (A) and (B)

86. To make an unbalanced assignment problem balanced, what are added with all entries as zeroes?

A. Dummy rows

B. Dummy columns

C. Both (A) and (B)

D. Dummy entries

87. Any feasible solution to a transportation problem containing m origins and n destinations is said to be

A. Independent

B. Degenerate

C. Non-degenerate

D. Both (A) and (B)

88. A path formed by allowing horizontal and vertical lines and the entire corner cells of which are occupied is called a

A. Occupied path

B. Open path

C. Closed path

D. None of the above

89. 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 the above

90. Server mechanism in a queuing system is characterised by :

A. Server behaviour

B. Customer behaviour

C. Customer in the system

D. All of the above