1. Operation research models in which some or all variables are random in nature are called .....................models.
   (a) Physical
   (b) Symbolic
   (c) Deterministic
   (d) Probabilistic

2. Mean, median and mode are measures of ........................................
   (a) Central tendency
   (b) Dispersion
   (c) Probability
   (d) None of these

3. ....................... specifies the objective or goal of solving the LPP.
   (a) Objective function
   (b) Decision variables
   (c) Constraints
   (d) Opportunity costs

4. The type of constraints which specifies, maximum capacity of resource is .................. or equal to Constraint.
   (a) Less than
   (b) Greater than
   (c) less than or greater than
   (d) none of these

5. In linear programming ...................... represents mathematical equation of the limitations imposed by the problem.
   (a) Objective function
(b) Decision variables
(c) Redundancy
(d) Constraints

6. When the feasible region is such that the value of objective function can extend to infinity, it is called a case of ……………………….. solution.

(a) Infeasible
(b) Alternate
(c) Unbounded
(d) Unique

7. When the constraints are a mix of less than and greater than it is a problem having ……………………. constraints.

(a) Multiple
(b) Infinite
(c) Infeasible
(d) Mixed

8. The incoming variable column in the simplex algorithm is called………………

(a) Key column
(b) Incoming column
(c) Variable column
(d) important column

9. The variable added to the LHS of less than or equal to constraint to convert it into equality is called ……………………….. variable

(a) surplus
(b) artificial
(c) slack
(d) additional
10. A resource which is completely utilized is called ............. in simplex.

(a) Null resource
(b) scarce resource
(c) zero resource
(d) abundant resource

11. In simplex, a maximization problem is optimal when all delta i.e, Cj – Zj values are...........

(a) Either zero or positive
(b) either zero or negative
(c) Only positive
(d) only negative

12. To find initial feasible solution of a transportation problem the method which starts allocation from the lowest cost is called ............... method.

(a) North west corner
(b) least cost
(c) South cost method
(d) Vogel’s approximation method

13. In a transportation problem, the method of penalties is called .................. method

(a) North west corner
(b) least cost
(c) South cost method
(d) Vogel’s approximation method

14. When there is degeneracy in the transportation problem, we add an imaginary allocation called ................... in the solution.

(a) dummy
(b) penalty
(c) epsilon
(d) regret
15. If \( m + n - 1 = \) number of allocations in transportation, it means........................
   (a) no degeneracy
   (b) degenerate
   (c) optimal
   (d) unbalanced

16. If the number of rows and columns in an assignment problem are not equal than it is called problem.
   (a) prohibited
   (b) infeasible
   (c) unbounded
   (d) unbalanced

17. The method of solution of assignment problem is called........
   (a) NWCR
   (b) VAM
   (c) LCM
   (d) Hungarian

18. When a particular assignment in the given problem is not possible or restricted as a condition it is called a................................. problem.
   (a) infeasible
   (b) degenerate
   (c) unbalanced
   (d) prohibited

19. In an assignment problem, number of rows is not equal to number of columns then problem is ..............
   (a) degenerate
   (b) unbalanced
20. Forward pass calculations are done to find ............ occurrence times of events.

(a) exact  
(b) earliest  
(c) latest  
(d) approximate

21. An activity whose start or end cannot be delayed without affecting total project completion time is called.............

(a)dummy  
(b)non- critical  
(c)critical  
(d) important

22. Floats for critical activities will be always........................

(a)one  
(b)zero  
(c) highest  
(d) same as duration of the activity

23. In project crashing, the costs associated with actual activities (eg manpower, materials, machinery etc.) are called........... costs

(a)visible  
(b) measurable  
(c) direct  
(d) None of these

24. In project crashing, as we systematically crash the project, total project cost initially ............and after the optimal point, it.................

(a) increase-decreases  
(b) decreases-increases  
(c) decreases-remains same  
(d) remains same-decreases

25. The time required by each job each machine is called..............................

(a) Elapsed  
(b) idle  
(c) processing  
(d) average

26. The order in which are required for completing the jobs is called......................
27. In sequencing problem, the order of completion of jobs is called...........................
   (a) completion sequence (b) job sequence (c) processing order (d) job order

28. The total time required to complete all jobs in a job sequencing problem is known as........
   (a) idle time (b) processing time (c) elapsed time (d) processing order

29. A game having more than two players is called .................. game.
   (a) multi person (b) many person (c) n-person (d) unknown person

30. The outcome of the interaction of selected strategies of opponents in a game is called..............
    (a) income (b) profit (c) payoff (d) loss

31. A situation in a game where in the payoff matrix, maximin of row is equal to minimax of column is a called.....
    (a) Centre point (b) main point (c) saddle point (d) equal point

32. ..................are the entities whose values are to be determined from the solution of the LPP.
   (a) Objective function (b) Decision variables (c) Constraints (d) opportunity costs

33. Activity that can be performed simultaneously (at the same time) are called ........
   (a) Sequential activities
   (b) Preceding activities
   (c) Succeeding activities
   (d) Concurrent activities
34. The total completion cost is referred as the.................
   (a) Crash slope
   (b) Crash time
   (c) Crashing time
   (d) Total crash

35. It is assumed that less is the project duration more is the ................... associated with.
   (a) Profit
   (b) Cost
   (c) Sales
   (d) Revenue

36. The probability of normal curve is 50% always.
   (a) 60%
   (b) 50%
   (c) 45%
   (d) 55%

37. Optimistic time is the shortest possible time required for the completion of the activity.
   (a) Longest
   (b) Shortest
   (c) Unequal
   (d) Normal

38. A ..................... is the one in which the player selects more than one strategy with fixed probabilities before playing the game.
   (a) Mixed strategy
   (b) Pure strategy
   (c) Complete strategy
   (d) Impure strategy
39. A ........ occurs when each player selects one of his strategies.
   (a) Profit
   (b) Decision
   (c) Play
   (d) Game

40. The choice of the strategy is made by both the ................. simultaneously.
   (a) Decision maker
   (b) Manager
   (c) Competitor
   (d) Player

41. Each started on machine is to be performed up to the completion on that machine.
   (a) Time
   (b) Job
   (c) Sequence
   (d) Slot

42. Operation Research involves various ..................... to solve the problem.
   (a) Decision
   (b) Study
   (c) Technique
   (d) Application

43. Operation research techniques helps to find an ......................... by taking into account all the factors.
   (a) Ultimate solution
   (b) Alternate solution
   (c) Optimal solution
   (d) Maximise solution
44. An operation oriented planning model helps in better ................................... different divisions of a company.
(a) Controlling
(b) Planning
(c) Directing
(d) Co-ordinating

45. If any value in XB column of final simplex table is negative, then the solution is........
(a) Infeasible
(b) Feasible
(c) Bounded
(d) No solution

46. The difference between total float and head event slack is........
(a) Free float
(b) Independent float
(c) Interference float
(d) Linear float

47. An Optimal assignment requires that the maximum number of line can be drawn through squares with zero opportunity cost should be equal to the number of........
(a) rows or columns
(b) rows and columns
(c) rows + columns -1
(d) rows – columns

48. To proceed with the Modified Distribution method algorithm for solving an transportation problem, the number of dummy allocations need to be added are ...
(a) n
49. The objective of network analysis is to
(a) minimize total project duration
(b) minimize total project cost
(c) minimize production delays, interruption and conflicts
(d) maximize total project duration

50. The non-basic variables are called.....
(a) shadow cost
(b) opportunity cost
(c) slack variable
(d) surplus variable

51. ......................and ..................are techniques applied in project management.
(a) CPM & PERT
(b) Assignment Problem
(c) Transportation Problem
(d) Inventory models

52. Operation research techniques are ................................in nature.
(a) Qualitative
(b) Judgemental
(c) Approximate
(d) Quantitative

53. Objective function is expressed in terms of the.................
(a) Numbers
(b) Symbols
(c) Decision variables
(d) none of these

54 .................. are the restrictions or limitations imposed on the LPP.

   (a) Variables
   (b) Costs
   (c) Profits
   (d) Constraints

55. The region of feasible solution in LPP graphical method is called

   (a) Infeasible region
   (b) Unbounded region
   (c) Infinite region
   (d) Feasible region

56. When it is not possible to find solution in LPP, it is called as case of..................solution.

   (a) Unknown
   (b) Unbounded
   (c) Infeasible
   (d) Improper

57. In linear programming, unbounded solution means.......................... solution.

   (a) Infeasible
   (b) Degenerate
   (c) Unique
   (d) None of these

58. The outgoing variable row in the simplex algorithm is called..............

   (a) outgoing row
(b) key row
(c) interchanging row
(d) basic row

59. The intersection value of key column and key row is called.......................................element.
   (a) vital
   (b) important
   (c) key
   (d) basic

60. A resource which is partially utilized is called .................in simplex.
   (a) surplus resource
   (b) extra resource
   (c) available resource
   (d) abundant resource

61. The value of one extra unit of resource is called ............ in simplex.
   (a) unit price
   (b) extra price
   (c) retail price
   (d) shadow price

62. When the total allocations of a transportation problem match with supply and demand values, the solution is called..............
   (a) non-degenerate
   (b) degenerate
   (c) feasible
   (d) infeasible

63. When the allocation of a transportation problem satisfy the rim condition (m + n -1) the solution is called............
64. Which of the following considers difference between two least costs for each row and column while finding initial basic feasible solution in transportation problem.

(a) north west corner
(b) least cost
(c) Row minima method
(d) Vogel’s approximation method

65. When a maximization assignment problem is converted in minimization problem, the resulting matrix is called...........

(a) Cost matrix
(b) profit matrix
(c) Regret matrix
(d) Dummy matrix

66. The extra row or column which is added to balance an assignment problem is called....

(a) regret
(b) epsilon
(c) dummy
(d) extra

67. The longest path in the network diagram is called .................. path.

(a) best
(b) worst
(c) sub critical
(d) critical
68. The second longest path in the network diagram is called ......................... path.

(a) alternate  
(b) feasible  
(c) sub-critical  
(d) critical

69. Backward pass calculations are done to find ............... occurrence times of events.

(a) tentative  
(b) definite  
(c) latest  
(d) earliest

70. The two types of costs involved in project crashing are .................. and ....................... costs.

(a) direct and indirect  
(b) total and partial  
(c) visible and invisible  
(d) measurable and non-measurable

71. In project crashing, rent and overheads are treated as ..................... costs.

(a) significant  
(b) insignificant  
(c) direct  
(d) indirect

72. In project crashing, as we systematically crash the project, direct cost of project ...................... and indirect cost of project .................

(a) increase-decreases  
(b) decreases-increases  
(c) increases-remains same
73. The time between the starting of the job and completion of the last job in sequencing problems is called....................

(a) total time
(b) assignment time
(c) elapsed time
(d) idle time

74. The time during which machine remains waiting or vacant in sequencing problem is called time.

(a) Processing
(b) waiting
(c) idle
(d) free

75. The participants in a game are called............

(a) Clients
(b) members
(c) customers
(d) players

76. In a game, the alternatives or courses of actions available to each player are called............

(a) options
(b) choices
(c) actions
(d) strategies

77. The various alternatives or courses of actions available to each player in a game are called as............

(a) saddle point
(b) strategies
(c) pay-off
(d) n-player game

78. A ................ represents the limitations/restrictions imposed on the values of decision variables in the solution.
   (a) Variables
   (b) Constraints
   (c) Resources
   (d) Non-negativity

79 ......................... an activity that must be completed prior to that of another activity.
   (a) Sequential activities
   (b) Preceding activities
   (c) Succeeding activities
   (d) Concurrent activities

80. The rate at which the cost increase is called as the............... 
   (a) Crash slope
   (b) Crash time
   (c) Crashing time
   (d) Total crash

81 ....................... is the time estimate within which the activity is completed more often.
   (a) Optimal time
   (b) Optimistic time
   (c) Pessimistic time
   (d) Most likely time

82. When we combine the values of optimistic time, most likely time and pessimistic time in a statistical manner, we can arrive at the expected time of an activity.
83. The PERT analysis completion time (T) of the activity is a random variable characterized by some probability distribution.
(a) CPM
(b) Graphical
(c) LPP
(d) PERT

84. A ........ provides a complete definition of how a player will play a game.
(a) Mixed strategy
(b) Pure strategy
(c) Complete strategy
(d) Impure strategy

85. Every combination of strategies determines an outcome known as “ .................. ”.
(a) Regret
(b) Pay off
(c) Saddle point
(d) Profit Matrix

86. Quantitative basis for ........... is provided to managers by Operation Research.
(a) Decision making
(b) Problem solving
(c) Calculating
(d) Analysing
87. Operation Research provide a solution only when all the elements related to a problem can be..................
(a) Quantified
(b) Qualified
(c) Measure
(d) Understand

88. To resolve degeneracy at the initial solution, a very small quantity is allocated in
...............cell.
(a) Occupied
(b) Unoccupied
(c) no
(d) finite

89. An Assignment problem is a particular case of............... 
(a) Transportation problem
(b) Assignment problem
(c) Travelling salesman problem
(d) Replacement problem

90. The coefficient of slack/surplus variable in the objective function are always assumed to
be................
(a) 0
(b) 1
(c) M
(d) –M

91. Using.................... method, we can never have an unbounded solution.
(a) Simplex
(b) Dual simplex
(c) Big M
(d) Modi

92. An activity which does not consume neither any resource nor time is known as..........................
   (a) Predecessor activity
   (b) Successor activity
   (c) dummy activity
   (d) activity

93. The assignment problem is always ...................... matrix.
   (a) Circle
   (b) Square
   (c) Rectangle
   (d) Triangle

94. The slack variable indicates......................
   (a) Excess resource available
   (b) Shortage of resource
   (c) Nil resource
   (d) Idle resource

95. In the network, one activity may connect any ...................... nodes.
   (a) 1
   (b) 2
   (c) 3
   (d) 4

96. The Linear programming problem is a technique of finding the
   (a) optimal value
97. In a network diagram an event is denoted by ....................
   (a) arrow
   (b) Straight line
   (c) Curve
   (d) circle

98. Which of the following methods is used to verify the optimality of the current solution of the transportation problem?
   (a) Least cost method
   (b) Vogel's approximation method
   (c) Row minima method
   (d) Modified Distribution method

99. In an Assignment problem involving 5 workers and 5 jobs, total number of assignment possible are................
   (a) 5
   (b) 10
   (c) 15
   (d) 20

100. The cost of surplus variable is ..........
    (a) 0
    (b) 1
    (c) 2
    (d) -1