Multiple Choice Questions

BCA

III Sem

Data Structure and Algorithm Analysis

1. If all c(i, j)'s and r(i, j)'s are calculated, then OBST algorithm in worst case takes one of the following time.
   (a) O(n log n) (b) O(n^3) (c) O(n^2) (d) O(log n) (e) O(n^4).

   Ans : O(n^3)

2. For a 15-puzzle problem let the initial arrangement be the following one, then answer the questions 4 – 7 with the following arrangement.

10	13	15	7
9	1	4	14
12		8	6
11	2	5	3

   What is the value of 'x' used to find the reachability of the solution?
   (a) 1 (b) 0 (c) 8 (d) 10 (e) 13.

   Ans : 1

3. The upper bound on the time complexity of the nondeterministic sorting algorithm is
   (a) O(n) (b) O(n log n) (c) O(1) (d) O(log n) (e) O(n^2).

   Ans: O(n)

4. The worst case time complexity of the nondeterministic dynamic knapsack algorithm is
   (a) O(n log n) (b) O(log n) (c) O(n^2) (d) O(n) (e) O(1).

   Ans :O(n)

5. Recursive algorithms are based on
   (a) Divideand conquer approach (b) Top-down approach
   (c) Bottom-up approach (d) Hierarchical approach
   (e) Heuristic approach.

   Ans :Bottom-up approach

6. What do you call the selected keys in the quick sort method?
   (a) Outer key (b)Inner Key (c) Partition key(d) **Pivot key** (e) Recombine key.
   Ans :

7. How do you determine the cost of a spanning tree?
   (a) By the sum of the costs of the edges of the tree
   (b) By the sum of the costs of the edges and vertices of the tree
   (c) By the sum of the costs of the vertices of the tree
   (d) By the sum of the costs of the edges of the graph

(e) By the sum of thecosts of the edges and vertices of the graph.

Ans :By the sum of the costs of the edges of the tree

8. The time complexity of the normal quick sort, randomized quick sort algorithms in the worst case is
(a) $O(n^2)$, O(n log n) (b) $O(n^2)$, $O(n^2)$ (c) O(n log n), $O(n^2)$ (d) O(n log n), O(n log n) (e) O(n log n), $O(n^2 \log n)$.

Ans :$O(n^2)$, $O(n^2)$

9. Let there be an array of length 'N', and the selection sort algorithm is used to sort it, how many times a swap function is called to complete the execution?
(a) N log N times (b) log N times (c) N^2 times
(d) N-1 times (e) N times.

Ans :N-1 times

10. The Sorting methodwhich is used for external sort is
(a) Bubble sort (b) Quick sort (c) Merge sort
(d) Radix sort (e) Selection sort.

Ans :Radix sort

11. In analysis of algorithm, approximate relationship between the size of the job and the amount of work required to do is expressed by using _____
(a) Central tendency (b) Differential equation (c) Order of execution (d) Order of magnitude (e) Order of Storage.

Ans :Order of execution

12. Worst case efficiency of binary search is
(a) $\log_2 n + 1$
(b) n
(c) N^2
(d) 2^n
(e) log n.

Ans : $\log_2 n + 1$

13. For defining the best time complexity, let f (n) = log n and g (n) = √n, _____
(a)f (n) $\in \Omega(g(n))$, but g(n) $\notin \Omega$ (f(n)) **(b)** f (n) $\notin \Omega(g(n))$, but g(n) $\in \Omega$ (f(n))
(c)f (n) $\notin \Omega(g(n))$, and g(n) $\notin \Omega$ (f(n)) (d) f (n) $\in \Omega(g(n))$, and g(n) $\in \Omega$ (f(n))

Ans :f (n) $\notin \Omega(g(n))$, but g(n) $\in \Omega$ (f(n))

14. For analyzing an algorithm, which is better computing time?
(a)O (100 Log N) (b) O (N) (c)O (2^N) (d) O (N logN) (e) O (N^2).
Ans :O (100 Log N)

15. Let f, t: N→R ≥ 0, and t (n) $\in$O (f (n)) iff t(n)≤ c.f (n) where cis positive real constant andn≥ n_0, then n_0 is _____
(a) Upper bound (b)Lower bound (c) Duality value
(d) Threshold value (e) Maximum value.

Ans :Lower bound

16. Consider the usual algorithm for determining whether a sequence of parentheses is balanced. What is the maximum number of parentheses that will appear on the stack AT ANY ONE TIME when the algorithm analyzes: (()(())(()))
(a) 1 (b)2 (c)3 (d) 4

Ans :3

17. Breadth first search _____
(a) Scans each incident node along with its children.
(b) Scans all incident edges before moving to other node.
(c) Issame as backtracking
(d) Scans all the nodes in random order.

Ans :Scans all incident edges before moving to other node.

18. Which method of traversal does not use stack to hold nodes that are waiting to be processed?
(a) Dept First (b) D-search (c)Breadth first
(d) Back-tracking

Ans :Breadth first

19. The Knapsack problem where the objective function is to minimize the profit is _____
(a) Greedy (b) Dynamic 0 / 1 (c) Back tracking
(d) Branch & Bound 0/1

Ans :Branch & Bound 0/1

20. Choose the correct answer for the following statements:
I. The theory of NP–completeness provides a method of obtaining a polynomial time for NPalgorithms.
II. All NP-complete problem are NP-Hard.
(a) I is FALSE and II is TRUE (b) I is TRUE and II is FALSE
(c) Both are TRUE (d) Both are FALSE

Ans :I is FALSE and II is TRUE

21. The Hamiltonian cycles problem uses the following line of code to generate a next vertex, provided x[ ] is a global array and k^{th} vertex is under consideration:
(a) x[k] ← (x[k] + 1) mod n (b) x[k] ← (x[k]) mod (n)
(c) x[k] ← (x[k] + 1) mod (n+1) (d) x[k] ← x[k+1] mod n

Ans :x[k] ← (x[k] + 1) mod (n+1)

22. The graph colouringalgorithm's time can be bounded by _____
(a) $O(mn^m)$ (b) $O(n^m)$ (c) $O(n^m . 2^n)$ (d) $O(nm^n)$.

Ans :$O(nm^n)$.

23. For 0/1 KNAPSACK problem, the algorithm takes _____ amount of time for

memory table, and _____time to determine the optimal load, for N objects and W as the capacity of KNAPSACK.
(a) O(N+W), O(NW) (b) θ(NW),O(N+W) (c)O(N),O(NW) (d) O(NW),O(N)

Ans :(b) θ(NW),O(N+W)

24. Sorting is not possible by using which of the following methods?
(a) Insertion (b) Selection (c) Deletion (d) Exchange

Ans :Deletion

25. What is the type of the algorithm used in solving the 8 Queens problem?
(a)Backtracking (b) Dynamic (c) Branch and Bound (d) DandC

Ans :Backtracking

26. The following are the statements regarding the NP problems. Chose the **right** option from the following options:
I. All NP-complete problems are not NP-hard.
II. SomeNP-hard problems are not known to be NP-complete.

(a) Both (I) and (II) are true
(b) Both (I) and (II) are false
(c) Only (I) is true
(d) Only (II) is true

Ans :Only (II) is true

27. Let G be a graph with 'n' nodes and let 'm' be the chromatic number of the graph. Then the time taken by the backtracking algorithm to color it is
(a) O(nm)
(b) O(n+m)
(c) $O(mn^m)$
(d) $O(nm^n)$.

Ans :$O(nm^n)$.

28. The time complexity of the shortest path algorithm can be bounded by
(a) $O(n^2)$
(b) $O(n^4)$
(c) $O(n^3)$
(d) O(n)
(e) O(n log n).

Ans :$O(n^3)$

29. Read the following statements carefully and pick the **correct** option:
I. The worst time complexity of the Floyd's algorithm is $O(n^3)$. II.
The worst time complexity of the Warshall's algorithm is $O(n^3)$.
(a) (I) is false but (II) is true
(b) (I) is true but (II) is false
(c) Both (I) and (II) are true
(d) (I) is true and (II) is not true always

(e) Both (I) and (II) are false.

Ans :Both (I) and (II) are true

30. Theasymptotic notation for defining the average time complexity is
    (a) Equivalence
    (b) Symmetric
    (c) Reflexive
    (e) Both (c) and (d) above.

Ans :Equivalence

31. For the bubble sort algorithm, what is the time complexity of the best/worst case? (assume that the computation stops as soon as no more swaps in one pass)
    (a) best case: $O(n)$ worst case: $O(n*n)$
    (b) best case: $O(n)$ worst case: $O(n*\log(n))$
    (c) best case: $O(n*\log(n))$ worst case: $O(n*\log(n))$
    (d) best case: $O(n*\log(n))$ worst case: $O(n*n)$

    Ans : best case: $O(n)$ worst case: $O(n*n)$

32. For the quick sort algorithm, what is the time complexity of the best/worst case?
    (a) best case: $O(n)$ worst case: $O(n*n)$
    (b) best case: $O(n)$ worst case: $O(n*\log(n))$
    (c) best case: $O(n*\log(n))$ worst case: $O(n*\log(n))$
    (d) best case: $O(n*\log(n))$ worst case: $O(n*n)$

    Ans :best case: $O(n*\log(n))$ worst case: $O(n*n)$

33. In an arbitrary tree (not a search tree) of order M. Its size is N, and its height is K. The computation time needed to find a data item on T is
    (a) $O(K*K)$
    (b) $O(M*M)$
    (c) $O(N)$
    (d) $O(K)$

Ans : $O(N)$

34. Which of the following belongs to the algorithm paradigm?
    (a) Minimum & Maximum problem
    (b) Knapsack problem
    (c) Selection problem
    (d) Merge sort
    (e) Quick sort.

    Ans : Knapsack problem

35. If f,t: $N \rightarrow R^+$, then $t(n) \in \Omega(f(n))$, iff $f(n) \in O(t(n))$ is known as
    (a) Limit rule
    (b) Rule of inference
    (c) Duality rule
    (d) Rule of consequences

36. The time taken by NP-class sorting algorithm is
    (a) O(1)
    (b) O(log n)
    (c) $O(n^2)$
    (d) O(n)

Ans :O(n)

37. Find the odd one out from the following categories of algorithms.
    (a) TVSP
    (b) N-Queens
    (c) 15-Puzzle
    (d) Bin-Packing.

    Ans : Bin-Packing.

38. The time complexity of binary search in best, worst cases for an array of size N is
    (a) N, N^2
    (b) 1, Log N
    (c) Log N, N^2
    (d) 1, N log N

    Ans : 1, Log N

39. Which of following algorithm scans the list by swapping the entries whenever pair of adjacent keys are out of desired order?
    (a) Insertion sort
    (b) Quick sort
    (c) Shell sort
    (d) Bubble sort

    Ans : Bubble sort

40. The mathematical definition for Omega can be defined as, provided $f,g:N \rightarrow R^+$ and c is a positive constant and $n > n_0$,
    (a) $f(n) \geq c.\ g(n)\ n$
    (b) $f(n) = c.\ g(n)\ n$
    (c) $f(n) \geq c + g(n)\ n$
    (d) $f(n) = c + g(n)\ n$

    Ans : $f(n) \geq c.\ g(n)\ n$

41. The θ notation is
    (a) Symmetric
    (b) Reflexive
    (c) Transitive
    (d) (a), (b) and (c) above.

    Ans : (a), (b) and (c) above.

42 From the following choose the one which belongs to the algorithm paradigm other than . to which others from the following belongs to.

(a) Minimum & Maximum problem
(b) Knapsack problem
(c) Selection problem
(d) Merge sort

Ans : Knapsack problem

43 Pick the **correct** statement(s) from the following set of statements.

I. In the Kruskal's algorithm, for the construction of minimal spanning tree for a graph, the selected edges always form a forest.

.

II. In Prim's algorithm, for the construction of minimal spanning tree for a graph, the selected edges always form an orchard.

III. DFS, BFS algorithms always make use of a queue, and stack respectively.

(a) Only (I) above
(b) Only (II) above
(c) Only (III) above
(d) Both (I) and (III) above

Ans : Only (I) above

44. Identify the name of the sorting in which time is not proportional to n^2.

(a) Selection sort
(b) Bubble sort
(c) Qucik sort
(d) Insertion sort.

Ans : Insertion sort

45. The optimal solution to a problem is a combination of optimal solutions to its sub-problems. This is known as

(a) Principleof Duality
(b) Principle of Feasibility
(c) Principle of Optimality
(d) Principle of Dynamicity.

Ans : Principle of Optimality

46. Which of the following versions of merge sort algorithm does uses space efficiently?

(a) Contiguous version
(b) Array version
(c) Linked version
(d) Structure version
(e) Heap version.

Ans : Linked version

47. Identify the correct problem for multistage graph from the list given below.

(a) Resource allocation problem
(b) Traveling salesperson problem
(c) Producer consumer problem
(d) Barber's problem

Ans : Resource allocation problem

48. How many edges are there in a Hamiltonian cycle if the edge cost is ‘c’ and the cost of cycle is ‘cn’
(a)c (b) cn
(c)n (d) 2c

Ans :n.

49. A problem L is NP-complete iff L is NP-hard and
(a) L ≈ NP
(b) L α NP
(c) L ε NP
(d) L = NP

Ans : L ε NP

50. What would be the cost value for any answering node of a sub tree with root ‘r’ using branch-bound algorithm?
(a) Maximum
(b) Minimum
(c) Optimal
(d) Average

Ans: Minimum

51. Name the node which has been generated but none of its children nodes have been generated in state space tree of backtracking method.
(a) Dead node
(b) Live node
(c) E-Node
(d) State Node

Ans: Livenode

52. How many nodes are there in a full state space tree with n = 6?
(a) 65
(b) 64
(c) 63
(d) 32

Ans : 63

53. This algorithm scans the list by swapping the entries whenever pair of adjacent keys are out of desired order.
(a) Insertion sort.
(b) Bubble sort.
(c) Shell sort.
(d) Quick sort.

Ans: Bubble sort.

54. The θ notation is
    (a) Symmetric
    (b) Reflexive
    (c) Transitive
    (d) B & C only

    Ans: Transitive

55. From the following chose the one which belongs to the algorithm paradigm other than to which others from the following belongs to.
    (a) Minimum & Maximum problem.
    (b) Knapsack problem.
    (c) Selection problem.
    (d) Merge sort.

    Ans: Knapsack problem.

56. To calculatec(i, j)'s, w(i, j)'s and r(i, j)'s; the OBST algorithm in worst case takes the following time.
    (a) O(log n)
    (b) O (n^4)
    (c) O (n^3)
    (d) O (n log n)

    Ans: O (n^3)

57. What is the type of the algorithm used in solving the 4 Queens problem?
    (a) Greedy
    (b) Dynamic
    (c) Branch and Bound
    (d) Backtracking.

    Ans: Backtracking.

58. In Knapsack problem, the best strategy to get the optimal solution, where P_i, W_i is the Profit, Weight associated with each of the X_i^{th} object respectively is to
    (a) Arrange the values P_i/W_i in ascending order
    (b) Arrange the values P_i/X_i in ascending order
    (c) Arrange the values P_i/W_i in descending order
    (d) Arrange the values P_i/X_i in descending order

    Ans: Arrange the values P_i/X_i in descending order

59. Greedy job scheduling with deadlines algorithms' complexity is defined as
    (a) O(N)
    (b) Ω(n log n)
    (c) O (n^2 log n)
    (d) O (n log n)

    Ans: O(N)

60. The divide and conquer merge sort algorithm's time complexity can be defined as
    (a) θ (long n)
    (b) θ (n)
    (c) Ω (n log n)
    (d) θ (n log n)

    Ans: θ (n log n)

61. In analysis of algorithm, approximate relationship between the size of the job and the amount of work required to do it is expressed by using
    (a) Order of magnitude or Big - O
    (b) Central tendency
    (c) Differential equation
    (d) Polynomial equation

    Ans: Order of magnitude or Big - O

62. Worst case efficiency of binary search is
    (a) $\log_2 n + 1$
    (b) n
    (c) N^2
    (d) 2^n

    Ans: $\log_2 n + 1$

63. Worst case efficiency of which search is O(n)?
    (a) Sequential search
    (b) Binary search
    (c) Indexed search
    (d) Hashing

    Ans: Sequential search

64. Breadth first search
    (a) Scans all incident edges before moving to other vertex
    (b) Scans adjacentunvisited vertex as soon as possible
    (c) Is same as backtracking
    (d) Computes a path between two vertices of graph or equivalently

    Ans: Scans all incident edges before moving to other vertex

65. Which of the following searching methods requires that all keys must reside in internal memory?
    (a) Binary search
    (b) Sequential search
    (c) Hashing
    (d) Depth first search

    Ans: Binary search

66. Which of the following formulas in Omega notation best represent the expression

$n^2+35n+6$?

(a) $\Omega(n^3)$ (b) $\Omega(n^2)$ (c) $\Omega(n)$ (d) $\Omega(35)$

Ans: $\Omega(n^2)$

67. What term is used to describe an O(n) algorithm?

(a) Constant (b) Non Polynomial Deterministic
(c) Logarithmic (d) Linear.

Ans: Linear.

68. Express the formula (n - 2)*(n - 4) using θ notation:

(a) $\theta(n^2)$ (b) $\theta(8)$ (c) $\theta(\log n)$ (d) $\theta(n)$

Ans: $\theta(n^2)$

69. Read the following statements carefully and pick the right most option.

I. A linear algorithm to solve a problem must perform faster than a quadratic algorithm to solve the same problem.
II. An algorithm with worst case time behavior of 3n takes at least 30 operations for every input of size n=10.

(a) Both (I) and (II) are TRUE
(b) Both (I) and (II) are FALSE
(c) (I) is TRUE but (II) is FALSE
(e) (I) is FALSE and (II) is TRUE.

Ans: (I) is TRUE but (II) is FALSE

70. Which of the following are essential statement types for describing algorithms?

(a) Sequence (b) Selection (c) Repetition (d) All the above

Ans: All the above

71. When we say an algorithm has a time complexity of O (n), what does it mean?

(a) The algorithm has 'n' nested loops
(b) The computation time taken by the algorithm is proportional to n
(c) The algorithm is 'n' times slower than a standard algorithm
(d) There are 'n' number of statements in the algorithm

Ans: The computation time taken by the algorithm is proportional to n

72. Can we read a data item at any location of a list within a constant time (i.e. O(1))?

(a) Yes
(b) Yes, only if the list is implemented by pointers (i.e. linked-list)
(c) Yes, only if the list is implemented by an array
(d) No, we need O(n) computation steps no matter what kind of implementation is used

Ans: Yes, only if the list is implemented by an array

73. Sequential search has a time complexity of *O*(n), and binary search has a time complexity of *O*(log(n)). What difference will it make when the size n is 1000?

(a) You would not notice much difference because computers run very fast anyway
(b) As n is 1000, binary search is twice as fast as sequential search
(c) As n is 1000, binary search is 10 times as fast as sequential search
(d) As n is 1000, binary search is 100 times as fast as sequential search.

Ans: As n is 1000, binary search is 100 times as fast as sequential search.

74. Readthe following statements carefully, and choose the correct answer.

I. The Ω notation is Anti Symmetric.
II. The big Oh notation is Semi Equivalence.

(a) (I) is FALSE but (II) is TRUE (b) Both (I), (II) are TRUE
(c) (I) is TRUE but(II) is FALSE (d) Both (I), (II) are FALSE

Ans: Both (I), (II) are TRUE

75. Find the odd one out.

(a) Merge Sort (b)TVSP Problem (c) KnapSack Problem(d) OBST Problem

Ans:Merge Sort

76. How many minimum number of spanning trees, one can have from a given connected graph with N nodes is having different weights for the edges.

(a)N-1 (b) One (c) 1/(N+1) 2NCN (d) 2NCN

Ans: one

77. The mathematical definition for Omega can be defined as, provided f,g:N→R+ and c is a positive constant and n > n0,

(a) f(n)≥ c. g(n) n
(b) f(n) £ c. g(n) n
(c) f(n) ≥ c + g(n) n
(d) f(n) £ c + g(n) n
(e) f(n) £ g(n) n.

Ans:f(n)≥ c. g(n) n

78. The OBST algorithm in worst case takes _____ time if all c(i, j)'s and r(i, j)'s are calculated.

(a) O(log n) (b) O(n4) (c) O(n3) (d) O(n log n)

Ans: O(n3)

79. The θ notation is _____

I. Symmetric.

II. Reflexive.

III. Transitive.

(a) Only (I) above

(b) Only (II) above

(c) Only (III) above

(d) All (I), (II) and (III) above.

Ans:All (I),(II) and (III) above.

80. Breadth first search uses _____ as an auxiliary structure to hold nodes for future processing.

(a) Stack (b) Linked list (c) Graph (d) Queue.

Ans : Queue

81. From the following pick the one which does not belongs to the same paradigm to which others belongs to.

(a) Minimum & Maximum problem
(b) Knapsack problem
(c) Selection problem
(d) Merge sort

Ans:Knapsack problem

82. Primsalgorithm is based on _____ method

a. Divide and conquer method
b. Greedy method
c. Dynamic programming
d. Branch and bound

Ans. Greedy Method

83. The amount of memory needs to run to completion is known as_____

a. Space complexity
c. Worst case
b. Time complexity
d. Best case

Ans: Space complexity

84. The amount of time needs to run to completion is known as_____

a. Space complexity
c. Worst case
b. Time complexity
d. Best case

Ans: Time complexity

85. _____ is the minimum number of steps that can executed for the given parameters

a. Average case
c. Worst case
b. Time complexity
d. Best case

Ans: Best case

86. _____ is the maximum number of steps that can executed for the given parameters

a. Average case
c. Worst case
b. Time complexity
d. Best case

Ans:Worst case

87. _____ is the average number of steps that can executed for the given parameters

a. Average case
c. Worst case
b. Time complexity
d. Best case

Ans: Average Case

88. Testing of a program consists of 2 phases which are _____ and _____

a. Average case & Worst case
b. Time complexity & Space complexity
c. Validation and checking errors
d. Debugging and profiling

Ans: Debugging and profiling

89. Worst case time complexity of binary search is _____

a. O(n)
b. O(logn)

c. Θ(nlogn) d. Θ(logn)

Ans: Θ(logn)

90. Best case time complexity of binary search is _____

a. O(n) c. Θ(nlogn)

b. O(logn) d. Θ(logn)

Ans: Θ(logn)

91. Average case time complexity of binary search is _____

a. O(n) c. Θ(nlogn)

b. O(logn) d. Θ(logn)

Ans: Θ(logn)

92. Merge sort invented by _____

a. CARHOARE c. HAMILTON

b. JOHN VON NEUMANN d. STRASSEN

Ans : JOHN VON NEUMANN

93. Quick sort invented by _____

a. CARHOARE c. HAMILTON

b. JOHN VON NEUMANN d. STRASSEN

Ans : CARHOARE

94. Worst case time complexity of Quick sort is _____

a. $O(n^2 \log 7)$ c. O(nlogn)

b. $O(n^2)$ d. O(logn)

Ans : $O(n^2)$

95. Best case time complexity of Quick sort is _____

a. $O(n^2 \log n)$ c. O(nlogn)

b. O(logn) d. $O(\log n^2)$

Ans : O(nlogn)

96. Average case time complexity of Quick sort is _____

a. Θ (nlogn) b. O(logn)

c. O(nlogn) d. Θ(logn) Ans : O(nlogn)

97. Which design strategy stops theexecution when it find the solution otherwise starts the problem from top

a. Back tracking
b. Branch and Bound
c. Divide and conquer
d. Dynamic programming

Ans: Back Tracking

98. Graphical representation of algorithm is _____

a. Pseudo-code
b. Flow Chart
c. Graph Coloring
d. Dynamic programming

Ans: Flow Chart

99. In pseudo-code conventions input express as _____

a. input
b. Write
c. Read
d. Return

Ans : Write

100. In pseudo-code conventions output express as _____

a. input
b. Write
c. Read
d. Return

Ans : Read

101. Performance based criteria of algorithm , which has to do with its computing time is _____

a. Time Complexity
b. Space Complexity
c. Input
d. Finiteness

Ans : Time Complexity

102. Performance based criteria of algorithm , which has to do with its storage requirements is _____

a. Time Complexity
b. Space Complexity
c. Input
d. Finiteness

Ans :Space Complexity

103. O(1) means computing time is _____

a. Constant
b. Linear
c. Quadratic
d. Cubic

Ans : Constant

104. O(n) means computing time is _____

a. Constant
b. Linear
c. Quadratic
d. Cubic

Ans: Linear

105. $O(n^2)$ means computing time is _____

a. Constant
b. Linear
c. Quadratic
d. Cubic

Ans : Quadratic

106. $O(n^3)$ means computing time is _____

a. Exponential
b. Linear
c. Quadratic
d. Cubic

Ans :Cubic

107. $O(2^n)$ means computing time is _____

a. Constant
b. Linear
c. Quadratic
d. Exponential

Ans : Exponential

108. Application of quicksort _____

a. Graphic card
b. Tape sorting
c. Data Processing
d. Card Sorting

Ans : Graphic card

109. Application of mergesort _____

a. Graphic card
b. Networking

c. Card Sorting
d. Data Processing

Ans : Data Processing

110. The method will choosing when sub problems share sub problems

a. Divideand conquer
c. Greedy method
b. Dynamic programming
d. Back tracking

Ans : Dynamic programming

111. Time complexity of given algorithm

```
Algorithm Display (A)
{
    For I:=0 to n-1
    {
        For J:=0 to n-1
        {
            Write A;
        }
    }
}
```

a. $2n^2+4n+4$
c. $2n^2+n$
b. $2n^2+4n+2$
d. $2n^2-1$

Ans : $2n^2+4n+2$

112. The sorting , which works very well for small file is _____

a. Count sort
c. Selection sort
b. Merge sort
d. Quick sort

Ans: Selection sort

113. Merge sort is _____.

a. Externalsorting
c. Insertion sorting
b. Internal sorting
d. Exponential sorting

Ans : External sorting

114. _____ is a step-by-step procedure for calculations

a. Program
b. Greedy Method
c. Algorithm
d. Problem

Ans : Algorithm

115. Advantage of finding maximum and minimum using divide and conquer method instead of using conditional operators is _____

a. Reduce Space complexity
b. Reduce Time complexity
c. Get accurate value
d. Simple calculations

Ans :Reduce Time complexity

116. Given two non-negative functions f(n)= $5n^2+6n+1$ and g(n)=n^2 . Calculate upper bound value ,C

a. C=5
b. C=6
c. C=12
d. C=11

Ans : C=12

117. Given two non-negative functions f(n)= $6n^2+5n+1$ and g(n)=n^2 . Calculate lower bound value ,C

a. C=5
b. C=6
c. C=12
d. C=11

Ans : C=6

118. The functions f &g are non-negative functions. The function f(n)=O(g(n)) if and only if there exist positive constants c& n_0 such that _____ for all n, n≥ n_0

a. f(n)≤C*g(n)
b. f(n) ≥ C*g(n)
c. f(n) = C*g(n)
d. f(n) != C*g(n)

Ans : f(n)≤ C*g(n)

119. The functions f & g are non-negative functions. The function f(n)=Ω(g(n)) if and only if there exist positive constants c& n_0 such that _____ for all n, n≥ n_0

a. f(n) ≤ C*g(n)
b. f(n) ≥ C*g(n)
c. f(n) = C*g(n)
d. f(n) != C*g(n)

Ans : f(n)≥ C*g(n)

120. The functions f & g are non-negative functions. The function f(n)=θ(g(n)) if and only if there exist positive constants c_1,c_2 & n_0 such that _____for all n, n≥ n_0

a. C_2*g(n)≤ f(n) ≤ C_1*g(n)
c. C_2*g(n)≥ f(n) = C_1*g(n)
b. C_2*g(n)!= f(n) = C_1*g(n)
d. C_2*g(n)≤ f(n) = C_1*g(n)

Ans :C_2*g(n)≤ f(n) ≤ C_1*g(n)

121. Tight bound is denoted as _____

a. Ω
c. Θ
b. Ω
d. O

Ans : Θ

122. Upper bound is denoted as _____

a. Ω
c. Θ
b. ω
d. O

Ans : O

123. lower bound is denoted as _____

a. Ω
c. Θ
b. ω
d. O

Ans :Ω

124. The function f(n)=o(g(n)) if and only if Limit f(n)/g(n)=0n->∞

a. Little oh
b. Little omega
b. Big oh
d. Omega

Ans : Little oh

125. The functionf(n)=o(g(n)) if and only if Limit g(n)/f(n)=0 n->∞

a. Little oh
b. Little omega
b. Big oh
d. Omega

Ans : Little omega

126. Thegeneralcriteriaof algorithm;zero or more quantities are externally supplied is _____

a. Output b. Finiteness

b. Effectiveness d. Input

Ans : Input

127. The general criteria of algorithm; at least one quantity is produced _____

a. Output b. Finiteness

b. Effectiveness d. Input

Ans : Output

128. The general criteria of algorithm; Each instruction is clear and unambiguous _____

a. Output b. Definiteness

b. Effectiveness d. Input

Ans : Definiteness

129. The general criteria of algorithm; algorithm must terminates after a finite number of steps _____

a. Output b. Finiteness

b. Effectiveness d. Input

Ans : Finiteness

130. Which is not a criteria of algorithm

a. Input b. Output

b. Time complexity d. Best case

Ans : Best case

131. Which is not in general criteria of algorithm

a. Input b. Output

b. Time complexity d. Effectiveness

Ans : Time complexity

132. Time complexity of given algorithm

```
Algorithm Display(A)
{
    S:=0.0;
    For i:=0 to n-1
    {
        S:=S+A[i];
        Return S;
    }
}
```

a. $4n+4$
c. $4n^2+4$
b. $2n^2+2n+2$
d. $4n+4$

Ans : $4n+4$

133. Time complexity of given algorithm

```
AlgorithmSum(A,S)
{
    for i:=1 to n-1
    {
        for j:=2 to n-1
        {
            S:=S+i+j;
            return S;
        }
    }
}
```

a. $6n^2-14n+4$
c. $4n^2+6n+12$
b. $6n^2+14n+10$
d. $6n^2-14n+10$

Ans :$6n^2-14n+10$

134. kruskal algorithm is based on _____method

a. Divide and conquer method
b. Greedy method

c. Dynamic programming
d. Branch and bound

Ans. Greedy method

135. Prims algorithm is based on _____ method

a. Divide and conquer method
c. Dynamic programming
b. Greedy method
d. Branch and bound

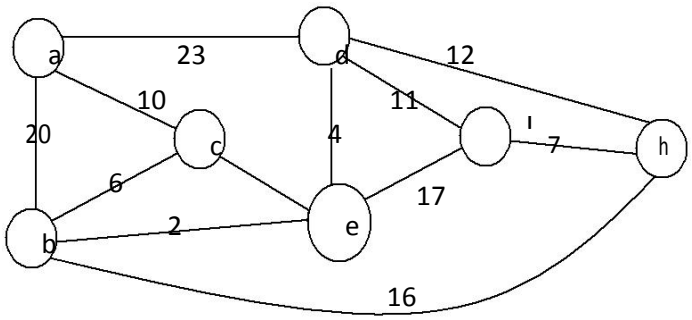
Ans. Greedy Method

136. The output of Kruskal and Prims algorithm is _____

a. Maximum spanning tree
c. Spanning tree
b. Minimum spanning tree
d. None of these

Ans. Minimum spanning tree

137. Cost of minimum spanning tree , from the following diagram is _____



a. 40
c. 41
b. 39
d. 47

Ans. 40

138. which is not feasible solution in the case of job sequence problem

item :	1	2	3	4
profit :	100	10	15	27
deadline :	2	1	2	1

a. (1,4)
c. (4,3)
b. (2,4)
b. (1,2)

Ans. (2,4)

139. which isoptimal value in the case of job sequence problem

item :	1	2	3	4	5
profit :	20	15	10	5	1
deadline :	2	2	3	3	3

a. (1,3,4) c. (4,2,3)

b. (1,2,4) d. (1,5,2)

Ans. (1,2,4)

140. which is optimal value in the case of job sequence problem

item :	1	2	3	4	5	6	7
profit :	3	5	20	18	1	6	30
deadline :	1	3	4	3	2	1	2

a. (1,5,6,4) c. (7,6,4,3)

b. (2,3,1,7) b. (1,2,3,4)

Ans. (7,6,4,3)

141. which is optimal value in the case of fractional knapsack problem, capacity of knapsack is 20

item :	1	2	3
profit :	25	24	15
weight :	18	15	10

a. 498 c. 480

b. 499 d. 485

Ans. 498

142. which is optimal value in the case of fractional knapsack problem, capacity of knapsack is 10

item :	1	2	3	4	5
profit :	12	32	40	30	50
weight :	4	8	2	6	1

a. 345 c. 384

b. 354 d. 350

Ans. 354

143. 4 -Queen problem what is the space complexity

a. O(|V|)
b. O(|E|)
c. O(|V|+|E|)
d. O($|V^2|$)

Ans.O(|V|)

144. In the case of Fibnocci heap the running time of Prim's algorithm is _____
a. O(E log V)
b. O(V log E)
c. O(log V)
d. O(E log E)

Ans. O(E log V)

145. Time complexity of 4-queen problem
a. O(|V|)
b. O(|E|)
c. O(|V|+|E|)
d. O($|V^2|$)

Ans.O(|V|+|E|)

146. If the graph is represented as an adjacency matrix then the time complexity of Kruskal's algorithm is _____
a. *O(E log V)*
b. *O(VlogE)*
c. $O(V^2)$
d. O(logE)

Ans. *O(E log V)*

147. BFS is best compared to DFS in the case of _____
a. The graph's width is large
b. The graph's depth is large
c. The graph consists of many nodes
d. The graph is complex

Ans. The graph's depth is large

148. The timecomplexity of Strassen's algorithm is _____
a. O(E log V)
b. $O(V^2)$
c. $O(n^{log7})$
d. $O(\log n^7)$

Ans. $O(n^{log7})$

149. By Strassen's equation what is wrong in the following equation

a. p1=(a+d)(e+h)
b. b.p2=(-e+g)d
c. c.p3=(a-c)(e+f)
d. d.p4=(a+b)h

Ans. p2=(-e+g)d

150. By Strassen's equation what is wrong in the following equation

a. p1=(a+d)(e+h)
c. c.p3=(a-c)(e+f)

b. b.p7=(-e+g)d
d. d.p4=(a-b)h

Ans. p4=(a-b)h

151. The advantage of selecting maxmin algorithm using divide and conquer method compared to staightmaxmin algorithm is _____

a. Less time complexity
c. High accuracy
b. Less space complexity
d. High time complexity

Ans. Less time complexity

152. The number of comparisons of elements for best case is _____ in the case of maxmin algorithm based on divide and conquer method

a. 3n/2
c. n/4
b. n/2
d. n-1

ans. 3n/2

153. The number of comparisons of elements for average case is _____ in the case of maxmin algorithm based on divide and conquer method

a. 3n/2
c. n/4
b. n/2
d. n-1

ans. 3n/2

154. The number of comparisons of elements for worst case is _____ in the case of maxmin algorithm based on divide and conquer method

a. 3n/2
c. n/4
b. n/2
d. n-1

ans. 3n/2

155. The method which stops the execution ,if it find the solution. Otherwise it start from the top

a. Branch and bound
c. Dynamic programming
b. Back tracking
d. Divide and conquer

Ans. Back tracking

156. Which is not return optimal solution from the following methods

a. Dynamic programming
c. Backtracking
b. Branch and bound
d. Greedy method

Ans. Backtracking

157. In the case ofsub problems share sub problems ,which method is suitable

a. greedy method
b. dynamic programming
c. branch and bound
d. divide and conquer

ans. Dynamic programming

158. The method which return different solutions from a single point ,which is _____

a. greedy method
b. dynamic programming
c. branch and bound
d. divide and conquer

ans. Greedy method

159. ByQuicksortalgorithm from where is first partition done in the following array

2	8	7	1	3	5	6	4

a. 5
b. 4
c. 3
d. 1

Ans. 3

160. Binpackingproblem is the application of _____

a. Knapsack
b. Back tracking
c. Branch and bound
d. Dynamic programming

Ans. Knapsack

161. job sequencing with deadline is based on _____method

a. greedy method
b. dynamic programming
c. branch and bound
d. divide and conquer

ans. Greedy method

162. fractional knapsack is based on _____method

a. greedy method
c. branch and bound

b. dynamic programming
d. divide and conquer

ans. Greedy method

163. 0/1 knapsack is based on _____method

a. greedy method
c. branch and bound
b. dynamic programming
d. divide and conquer

ans. Dynamic programming

164. The files x1,x2,x3 are 3 files of length 30,20,10 records each. What is the optimal merge pattern value?

a. 110
c. 60
b. 90
d. 50

Ans. 90

165. The optimal merge pattern is based on _____ method

a. Greedy method
b. Dynamic programming
c. Knapsack method
d. Branch and bound

Ans. Greedy method

166. Who invented the word Algorithm

a. Abu Ja'far Mohammed ibn Musa
c. Abu Mohammed Khan
b. Abu Jafar Mohammed Kasim
d. Abu Ja'far Mohammed Ali Khan

Ans. Abu Ja'far Mohammed ibn Musa

167. In Algorithm comments begin with_____

a. /*
c. /
b. */
d. //

Ans : //

168. The _____ of an algorithm is the amount of memory it needs to run to completion.

a. Space Complexity
c. Best Case
b. Time Complexity
d. Worst Case

Ans : Space Complexity

169. _____ is the process of executing a correct program on data sets and measuring the time and space it takes tocompute the results.

a. Debugging
b. Profiling
c. Combining
d. Conqure

Ans : Profiling

170. In Algorithm Specification the blockes are indicated with matching _____

a. Braces
b. Parenthesis
c. Square Brackets
d. Slashes

Ans : Braces

171. Huffmancodes are the applications of _____ with minimal weighted external path length obtained by an optimal set.

a. BST
b. MST
c. Binary tree
d. Weighted Graph

Ans : Binary tree

172. From the following which is not return optimal solution

a. Dynamic programming
b. Branch and bound
c. Backtracking
d. Greedy method

Ans. Backtracking

173. _____ is an algorithm design method that can be used when the solution to a problem can be viewed as the result of a sequence of decisions

a. Dynamic programming
b. Branch and bound
c. Backtracking
d. Greedy method

Ans : Dynamic programming

174. The name backtrack was first coined by _____

a. D.H.Lehmer
b. R.J.Walker
c. L.Baumert
d. S. Golomb

Ans : D.H.Lehmer

175. The term _____ refers to all state space search methods in which all hildren of

the –nodes are generated before any other live node can becomethe E-node.

a. Backtacking
c. Depth First Search
b. Branch and Bound
d. Breadth First Search

Ans ; Branch and Bound

176. A _____ is a round trip path along n edges of G that visits every vertex once and returns to its starting position.

a. MST
c. TSP
b. Multistage Graph
d. Hamiltonian Cycle

Ans :Hamiltonian Cycle

177. Graph Coloring is which type of algorithm design strategy

a. Backtacking
c. Greedy
b. Branch and Bound
d. Dynamic programming

Ans : Backtracking

178. Which of the following is not a limitation of binary search algorithm?

a. must use a sorted array
b. requirement of sorted array is expensive when a lot of insertion and deletions are needed
c. there must be a mechanism to access middle element directly
d. binary search algorithm is not efficient when the data elements are more than 1000.

Ans : binary search algorithm is not efficient when the data elements are more than 1000.

179. Binary Search Algorithm cannot be applied to

a. Sorted linked list
c. Sorted linear array
b. Sorted binary tree
d. Pointer array

Ans :Sorted linked list

180. Two main measures for the efficiency of an algorithm are

a. Processor and memory
c. Time and space
b. Complexity and capacity
d. Data and space

Ans : Time and Space

181.The time factor when determining the efficiency of algorithm is measured by

a. Counting microseconds
b. Counting the number of key operations
c. Counting the number of statements
d. Counting the kilobytes of algorithm

Ans : Counting the number of key operations

182. The space factor when determining the efficiency of algorithm is measured by

a. Counting the maximum memory needed by the algorithm
b. Counting the minimum memory needed by the algorithm
c. Counting the average memory needed by the algorithm
d. Counting the maximum disk space needed by the algorithm Ans: Counting the maximum memory needed by the algorithm

183. Which of the following case does not exist in complexity theory

a. Best case
b. Worst case
c. Average case
d. Null case

Ans : Null Case

184. The Worst case occur in linear search algorithm when

a. Item is somewhere in the middle of the array
b. Item is not in the array at all
c. Item is the last element in the array
d. Item is the last element in the array or is not there at all

Ans : Item is the last element in the array or is not there at all

185. The Average case occur in linear search algorithm

a. When Item is somewhere in the middle of the array
b. WhenItem is not in the array at all
c. When Item is the last element in the array
d. When Item is the last element in the array or is not there at all

Ans:When Item is somewhere in the middle of the array

186. The complexity of the average case of an algorithm is

a. Much more complicated to analyze
c. Sometimes more complicated and

than that of worst case some other times simpler than that of

b. Much more simpler to analyze than worst case
that of worst case d. None or above

Ans: Much more complicated to analyze than that of worst case

187. The complexity of linear search algorithm is

a. O(n) c. O(n2)

b. O(log n) d. O(n log n)

Ans : O(n)

188. The complexity of Binary search algorithm is

a. O(n) c. O(n2)

b. O(logn) d. O(n log n)

Ans: O(log n)

189. The complexity of Bubble sort algorithm is

a. O(n) c. $O(n^2)$

b. O(log n) d. O(n log n)

Ans : $O(n^2)$

190. The complexity of merge sort algorithm is

a. O(n) c. O(n2)

b. O(log n) d. O(n log n)

Ans : O(n log n)

191. Which of thefollowing sorting algorithm is of divide-and-conquer type?

a. Bubble sort c. Quick sort

b. Insertion sort d. All of above

Ans : Quick Sort

192. An algorithm that calls itself directly or indirectly is known as

a. Sub algorithm c. Polish notation

b. Recursion d. Traversal algorithm

Ans : Recursion

193. The running time of quick sort depends heavily on the selection of

a. No of inputs
b. Arrangement of elements in array
c. Size o elements
d. Pivot element

Ans : Pivot Element

194. In stable sorting algorithm

a. One array is used
b. In which duplicating elements are not handled.
c. More then one arrays are required.
d. Duplicating elements remain in same relative position after sorting.

Ans:Duplicating elements remain in same relative position after sorting.

195. Which sorting algorithn is faster :

a. O(n^2)
b. O(nlogn)
c. O(n+k)
d. O(n^3)

Ans :O(n+k)

196. In Quick sort algorithm,constants hidden in T(n lg n) are

a. Large
b. Medium
c. Not known
d. Small

Ans : Small

197. Quick sort is based on divide and conquer paradigm; we divide the problem on base of pivotelementand:

a. There is explicit combine process as well to conquer the solution.
b. No work is needed to combine the sub-arrays, the array is already sorted
c. Merging the subarrays
d. None of above.

Ans:There is explicit combine process as well to conquer the solution.

198. Dijkstra's algorithm :

a. Has greedy approach to find all shortest paths
b. Has both greedy and Dynamic approach to find all shortest paths
c. Has greedy approach to compute single source shortest paths to all other vertices
d. Has both greedy and dynamic approach to compute single source shortest paths to all other vertices.

Ans:Has greedy approach to compute single source shortest paths to all other vertices

199. What algorithm technique is used in the implementation of Kruskal'ssolution for theMST?
   a. Greedy Technique
   b. Divide-and-ConquerTechnique
   c. Dynamic Programming Technique
   d. The algorithm combines more than one of the above techniques

   Ans:Greedy Technique

200. Which is true statement in the following?
   a. Kruskal'salgorithm is multiple source technique for finding MST.
   b. Kruskal's algorithm is used to find minimum spanning tree of a graph, time complexity of this algorithm is O(EV)
   c. Both of above
   d. Kruskal's algorithm (choose best non-cycle edge) is better than Prim's (choose best Tree edge) when the graph has relatively few edges)

   Ans:Kruskal's algorithm (choose best non-cycle edge) is better than Prim's (choose best Tree edge) when the graph hasrelatively few edges)