Online Examinations (Even Sem/Part-I/Part-II Examinations 2020 - 2021

Course Name - –Design and Analysis of Algorithms
Course Code - BCA403

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Answer all the questions. Each question carry one mark.

9. 1. Complexity the recurrence relation T(n) = 8T(n/2) +n2

Mark only one oval.

- O (n)
- O (n2)
- O (log2 n)
- O (n3)

10. 2. Complexity of Tower of Hanoi problem is

Mark only one oval.

- O (n)
- O (n2)
- O (2n)
- None of these

11. 3. Complexity of the recurrence relation T(n) = T(n-1) +1

Mark only one oval.

- O (n2)
- O (n)
- O (1)
- O (n-1)

12. 4. Which case of Master's theorem is applicable in the recurrence relation T(n)=0.5 * T(n/2)+1/n?

Mark only one oval.

- Case 3
- Case 1
- Master's theorem is not applicable
- Case 2

13. 5. How many passes are required to sort a file of size n by bubble sort method?

Mark only one oval.

- n2
- n
- n-1
- n/2

14. 6. What is the result of the recurrences which fall under first case of Master's theorem (let the recurrence be given by T(n)=aT(n/b)+f(n) and f(n)=nc?

Mark only one oval.

- T(n) = O(nlogba)
- T(n) = O(nc log n)
- T(n) = O(f(n))
- T(n) = O(n2)

15. 7. Under what case of Master's theorem will the recurrence relation of binary search fall?

Mark only one oval.

- 1
- 2
- 3
- It cannot be solved using master's theorem

16. 8. Minimum number of moves required to solve a tower of hanoi problem with n disks is _____

Mark only one oval.

- 2n
- 2n-1
- n2
- n2-1

17. 9. Master's theorem is used for?

Mark only one oval.

- solving recurrences
- solving iterative relations
- analyzing loops
- calculating the time complexity of any code

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

Mark only one oval.

- Counting the maximum memory needed by the algorithm
- Counting the minimum memory needed by the algorithm
- Counting the average memory needed by the algorithm
- Counting the maximum disk space needed by the algorithm

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

Mark only one oval.

- Counting microseconds
- Counting the number of key operations
- Counting the number of statements
- Counting the kilobytes of algorithm

20. 12. Ω - notation provides an asymptotic

Mark only one oval.

- Upper bound
- Lower bound
- One that is sandwiched between the two bounds
- None of these

21. 13. O- notation provides an asymptotic

Mark only one oval.

- Upper bound
- Lower bound
- Light bound
- None of these

22. 14. Space complexity of matrix_multiplication (A,B,C,n)?

Mark only one oval.

- O(n2)
- O(n3)
- O(n2 log2 n)
- O(nlog2 n)

23. 15. for i = 1 to n do sum = sum +A[i]; if i = = 100 then break; endif endfor the time complexity of the above algorithm is

Mark only one oval.

- O(n - 100)
- O(n)
- O(100)
- None of these

24. 16. The Big-O notation of the expression f(n) = n log n + n2 + e log n is

Mark only one oval.

- O(n)
- O(n2)
- O (n log n)
- O (e log n)

25. 17. The Average case occur in linear search algorithm

Mark only one oval.

- When Item is somewhere in the middle of the array
- When Item is not in the array at all
- When Item is the last element in the array
- When Item is the last element in the array or is not there at all

26. 18. The operation of processing each element in the list is known as

Mark only one oval.

- Sorting
- Merging
- Inserting
- Traversal

27. 19. Which of the following approaches is adopted in Divide and Conquer algorithms?

Mark only one oval.

- Top-down
- Bottom-up
- both Top-down & Bottom-up
- None of these

28. 20. Division Pattern of Problems in Divide and Conquer approach

Mark only one oval.

- Iterative
- Recursive
- Parallel
- Random

29. 21. Run Time of Merge Sort is

Mark only one oval.

- Big oh of n log n
- Gamma of n log n
- Big theta of n log n
- Omega of n log n

30. 22. Which of the given options provides Steps of Divide and Conquer approach

Mark only one oval.

- Divide, Conquer and Combine
- Combine, Conquer and Divide
- Combine, Divide and Conquer
- Divide, Combine and Conquer

31. 23. Which of the following sorting algorithms does not have a worst case running time of O(n2) ?

Mark only one oval.

- Quick sort
- Merge sort
- Insertion sort
- Bubble sort

32. 24. What is recurrence for worst case of QuickSort and what is the time complexity in Worst case?

Mark only one oval.

- Recurrence is T(n) = T(n-2) + O(n) and time complexity is O(n^2)
- Recurrence is T(n) = T(n-1) + O(n) and time complexity is O(n^2)
- Recurrence is T(n) = 2T(n/2) + O(n) and time complexity is O(nLogn)
- Recurrence is T(n) = T(n/10) + T(9n/10) + O(n) and time complexity is O(nLogn)

33. 25. The tight bound for building a max heap is

Mark only one oval.

- O (n)
- O(log2 n)
- O (n log2 n)
- None of these

34. 26. Which of the following is not true about QuickSort?

Mark only one oval.

- in-place algorithm
- pivot position can be changed
- adaptive sorting algorithm
- can be implemented as a stable sort

35. 27. The best case behavior occurs for quick sort is, if partition splits the array of size n into _____

Mark only one oval.

- n/2 : (n/2) – 1
- n/2 : n/3
- n/4 : 3n/2
- n/4 : 3n/4

36. 28. Best case time complexity for merge sort

Mark only one oval.

- O(n)
- O(1)
- O(log n)
- O(n log n)

37. 29. What is the worst case efficiency for a path compression algorithm?

Mark only one oval.

- O(n)
- O(log n)
- O(n log n)
- O(m log n)

38. 30. What is the worst-case running time of unions done by size and path compression?

Mark only one oval.

- O(n)
- O(log n)
- O(n log n)
- O(m log n)

39. 31. In the Union/Find algorithm, the ranks of the nodes on a path will increase monotonically from?

Mark only one oval.

- leaf to root
- root to node
- root to leaf
- left subtree to right subtree

40. 32. Disjoint set data structure applicable to find

Mark only one oval.

- Minimum spanning tree
- Minimum shortest path
- Maximum spanning tree
- Maximum path

41. 33. What is the time complexity of Kruskal's algorithm?

Mark only one oval.

- O(log v)
- O(e log v)
- O(e2)
- O(v log e)

42. 34. Time Complexity of Activity Selection Problem

Mark only one oval.

- O(n)
- O(fi)
- O(n log n)
- None of the mentioned

43. 35. 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

Mark only one oval.

- (1,4)
- (4,3)
- (2,4)
- (1,2)

44. 36. Fractional knapsack algorithm select the item

Mark only one oval.

- Any value from 0 to1
- All value as 0
- All value as 1
- All value as 0.5

45. 37. Time complexity of fractional knapsack problem is _____

Mark only one oval.

- O(n log n)
- O(n)
- O(n2)
- O(nW)

46. 38. If a problem can be solved by combining optimal solutions to non-overlapping problems, the strategy is called _____

Mark only one oval.

- Dynamic programming
- Greedy
- Divide and conquer
- Recursion

47. 39. When a top-down approach of dynamic programming is applied to a problem, it usually _____

Mark only one oval.

- Decreases both the time complexity and space complexity
- Decreases the time complexity and increases the space complexity
- Increases the time complexity and decreases the space complexity
- Increases both the time complexity and space complexity

48. 40. What is the running time of the Floyd Warshall Algorithm?

Mark only one oval.

- Big-oh(V)
- Theta(V2)
- Big-Oh(VE)
- Theta(V3)

49. 41. A matrix chain having 5 matrices can be parenthesized in

Mark only one oval.

- 14 different combinations
- 15 different combinations
- 13 different combinations
- none of these

50. 42. Which of the problems cannot be solved by backtracking method?

Mark only one oval.

- n-queen problem
- subset sum problem
- Hamiltonian circuit problem
- travelling salesman problem

51. 43. What will be the chromatic number for an empty graph having n vertices?

Mark only one oval.

- 0
- 1
- 2
- n

52. 44. What is a chromatic number?

Mark only one oval.

- The maximum number of colors required for proper edge coloring of graph
- The maximum number of colors required for proper vertex coloring of graph
- The minimum number of colors required for proper vertex coloring of graph
- The minimum number of colors required for proper edge coloring of graph

53. 45. Backtracking algorithm is implemented by constructing a tree of choices called?

Mark only one oval.

- State-space tree
- State-chart tree
- Node tree
- Backtracking tree

54. 46. For N-queen problem matrix should be

Mark only one oval.

- A square matrix of order n
- A square matrix of order less than n
- A square matrix of order greater than n
- A square matrix of any order

55. 47. Space complexity of N-queen problem

Mark only one oval.

- O(n)
- O(n log n)
- O(n2)
- O(n2log n)

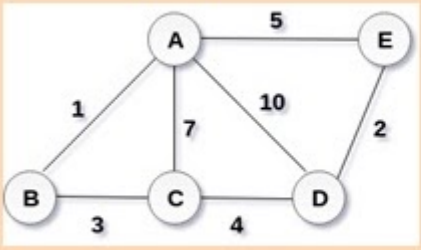
56. 48. How many fundamental solutions are there for the eight queens puzzle?

Mark only one oval.

- 92
- 10
- 11
- 12

57. 49.

Consider the given graph,



what is the weight of the minimum spacing tree using the prim's algorithm, starting from vertex a?

Mark only one oval.

- 23
- 28
- 27
- 10

58. 50. Complexity the recurrence relation T(n) = T(n-1) +log n

Mark only one oval.

- O (n2)
- O (logn2)
- O(n-logn)
- O(n log n)

59. 51. A person wants to visit some places. He starts from a vertex and then wants to visit every vertex till it finishes from one vertex, backtracks and then explore other vertex from same vertex. What algorithm he should use?

Mark only one oval.

- Depth First Search
- Breadth First Search
- Trim's algorithm
- None of the mentioned

60. 52. Greedy approach gives us

Mark only one oval.

- Best solution
- Optimal solution
- A solution which is near to optimal
- Basic feasible solution

61. 53. Which is optimal 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

Mark only one oval.

- (1,3,4)
- (4,2,3)
- (1,2,4)
- (2,1,3)

62. 54. 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

Mark only one oval.

- (1,5,6,4)
- (7,6,4,3)
- (2,3,1,7)
- (1,2,3,4)

63. 55. Consider the following statements. S1. Prim's algorithm might produce a non-minimal spanning tree. S2. Prim's algorithm can efficiently implemented using the disjoint-set data structure.

Mark only one oval.

- S1 is true but S2 is false
- Both S1 and S2 are false
- Both S1 and S2 are true
- S2 is true but S1 is false

64. 56. Which of the following is false in the case of a spanning tree of a graph G?

Mark only one oval.

- It is tree that spans G
- It is a sub graph of the G
- It includes every vertex of the G
- It can be either cyclic or acyclic

65. 57. Consider a complete graph G with 4 vertices. The graph G has ____ spanning trees.

Mark only one oval.

- 15
- 8
- 16
- 13

66. 58. Which of the following is false?

Mark only one oval.

- The spanning trees do not have any cycles
- MST have n – 1 edges if the graph has n edges
- Edge e belonging to a cut of the graph if has the weight smaller than any other edge in the same cut, then the edge e is present in all the MSTs of the graph
- Removing one edge from the spanning tree will not make the graph disconnected

67. 59. What is the objective of the knapsack problem?

Mark only one oval.

- To get maximum total value in the knapsack
- To get minimum total value in the knapsack
- To get maximum weight in the knapsack
- To get minimum weight in the knapsack

68. 60. Which of the following is/are property/properties of a dynamic programming problem?

Mark only one oval.

- Optimal substructure
- Overlapping subproblems
- Greedy approach
- Both optimal substructure and overlapping sub problems

69. 61. If an optimal solution can be created for a problem by constructing optimal solutions for its sub problems, the problem possesses _____ property.

Mark only one oval.

- Overlapping subproblems
- Optimal substructure
- Memorization
- Greedy

70. 62. In dynamic programming, the technique of storing the previously calculated values is called _____

Mark only one oval.

- Saving value property
- Storing value property
- Memorization
- Mapping

71. 63. Which of the following problems is NOT solved using dynamic programming?

Mark only one oval.

- 0/1 knapsack problem
- Matrix chain multiplication problem
- Edit distance problem
- Fractional knapsack problem

72. 64. Which of the following problems should be solved using dynamic programming?

Mark only one oval.

- Merge sort
- Binary search
- Longest common subsequence
- Quicksort

73. 65. The 0/1 Knapsack problem is an example of _____

Mark only one oval.

- Greedy algorithm
- 2D dynamic programming
- 1D dynamic programming
- Divide and conquer

74. 66. Which of the following methods can be used to solve the Knapsack problem?

Mark only one oval.

- Brute force algorithm
- Recursion
- Dynamic programming
- All of these

75. 67. You are given a knapsack that can carry a maximum weight of 60. There are 4 items with weights {20, 30, 40, 70} and values {70, 80, 90, 200}. What is the maximum value of the items you can carry using the knapsack?

Mark only one oval.

- 160
- 200
- 170
- 90

76. 68. What is the time complexity of the brute force algorithm used to solve the Knapsack problem?

Mark only one oval.

- O(n)
- O(n!)
- O(2^n)
- O(n^3)

77. 69. What is the time complexity of the above dynamic programming implementation of the Knapsack problem with n items and a maximum weight of W?

Mark only one oval.

- O(n)
- O(n + w)
- O(nW)
- O(n^2)

78. 70. What is the space complexity of the above dynamic programming implementation of the Knapsack problem?

Mark only one oval.

- O(n)
- O(n + w)
- O(nw)
- O(n^2)

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