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

Course Name - –Design and Analysis of Algorithm
Course Code - MCA204

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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 (n^2)
- O (log2 n)
- O (n^3)

10. 2.Complexity of Tower of Hanoi problem is

Mark only one oval.

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

11. 3. o (g(n)) is [Read as small oh of g (n)] is

Mark only one oval.

- asymptotically loose
- asymptotically tight
- same as Big Oh
- None of these

12. 4. The complexity of searching an element from a set of n elements using Binary search algorithm is

Mark only one oval.

- O(n log n)
- O(log n)
- O(n^2)
- O(n)

13. 5. 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

14. 6. The recurrence relation capturing the optimal time of the Tower of Hanoi problem with n discs is.

Mark only one oval.

- ◯ T(n) = 2T(n - 2) + 2
- ◯ T(n) = 2T(n -1) + n
- ◯ T(n) = 2T(n/2) + 1
- ◯ T(n) = 2T(n -1) + 1

15. 7. Minimum number of moves required to solve a tower of Hanoi problem with n disks is _____

Mark only one oval.

- ◯ 2n
- ◯ 2^n-1
- ◯ n^2
- ◯ n^2-1

16. 8. Two main measures for the efficiency of an algorithm are

Mark only one oval.

- Processor and memory
- Complexity and capacity
- Time and space
- Data and space

17. 9.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

18. 10. The concept of order Big O is important because

Mark only one oval.

- It can be used to decide the best algorithm that solves a given problem
- It determines the maximum size of a problem that can be solved in a given amount of time
- It is the lower bound of the growth rate of algorithm
- Both A and B

19. 11. O- notation provides an asymptotic

Mark only one oval.

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

20. 12.for i = 1 to n do

Mark only one oval.

- O(1)
- O(n)
- O(n - 100)
- None of these

21. 13. The time complexity of the expression f(n) = 6*2n + n7 using big-O notation is

Mark only one oval.

- O(2n)
- O(n7)
- O(n log2 n)
- O(n)

22. 14. f(n) is of the order of g(n) if there exist positive integers "a" and "b" such that?

Mark only one oval.

- f(n) <= a*g(n) for all n>=b
- f(n) <= a*g(n) for all n<=b
- g(n) <= a*f(n) for all n>=b
- None of these

23. 15. 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

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

Mark only one oval.

- Top-down
- Bottom-up
- Both Top-down and bottom-up
- none of these

26. 18. Which of the following design techniques is used in the quick-sort algorithm?

Mark only one oval.

- Dynamic programming
- Backtracking
- greedy method
- Divide and conquer

27. 19. The worst-case time complexity of Quick Sort is_____.

Mark only one oval.

- O(n^2)
- O(log n)
- O(n)
- O(n logn)

28. 20. 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

29. 21. 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

30. 22. Apply Quick sort on a given sequence 7 11 14 6 9 4 3 12. What is the sequence after first phase, pivot is first element?

Mark only one oval.

- 6 4 3 7 11 9 14 12
- 6 3 4 7 9 14 11 12
- 7 6 14 11 9 4 3 12
- 7 6 4 3 9 14 11 12

31. 23.Find the pivot element from the given input using median-of-three partitioning method.

Mark only one oval.

- 8
- 7
- 9
- 6

32. 24. Minimum time required to solve tower of hanoi puzzle with 4 disks assuming one move takes 2 seconds, will be _____

Mark only one oval.

- 15 seconds
- 30 seconds
- 16 seconds
- 32 seconds

33. 25. What is the auxiliary space complexity of merge sort?

Mark only one oval.

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

34. 26. If a problem can be broken into subproblems which are reused several times, the problem possesses _____ property.

Mark only one oval.

- Overlapping subproblems
- Optimal substructure
- Memorization
- Greedy

35. 27. Which of the following methods can be used to solve the matrix chain multiplication problem?

Mark only one oval.

- Dynamic programming
- Brute force
- Recursion
- All of the mentioned

36. 28. Consider the two matrices P and Q which are 10 x 20 and 20 x 30 matrices respectively. What is the number of multiplications required to multiply the two matrices?

Mark only one oval.

- 10 * 20
- 10 * 20 * 20 * 30
- 10 * 30
- 10 * 20 * 30

37. 29. What approach is being followed in Floyd Warshall Algorithm?

Mark only one oval.

- Greedy technique
- Dynamic Programming
- Linear Programming
- Backtracking

38. 30. What is the time complexity of the dynamic programming implementation of the matrix chain problem?

Mark only one oval.

- O(1)
- O(n)
- O(n^2)
- O(n^3)

39. 31. If an optimal solution can be created for a problem by constructing optimal solutions for its subproblems, the problem possesses _____ property.

Mark only one oval.

- Overlapping subproblems
- Optimal substructure
- Memorization
- Greedy

40. 32. Single source shortest path in a graph having negative edge can be solved by

Mark only one oval.

- by greedy method
- by divide and conquer only
- by Dynamic programming only
- by backtracking only

41. 33. 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 the 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 the space complexity

42. 34. 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(2n)
- O(n3)

43. 35. Floyd Warshall's Algorithm can be applied on _____

Mark only one oval.

- Non directed and non weighted graphs
- Non-directed graphs
- Directed graphs
- Acyclic graphs

44. 36. What is the running time of the Floyd Warshall Algorithm?

Mark only one oval.

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

45. 37. What happens when the value of k is 0 in the Floyd Warshall Algorithm?

Mark only one oval.

- 1 intermediate vertex
- 0 intermediate vertex
- N intermediate vertices
- d. N-1 intermediate vertices

46. 38. Consider the matrices P, Q and R which are 10 x 20, 20 x 30 and 30 x 40 matrices respectively. What is the minimum number of multiplications required to multiply the three matrices?

Mark only one oval.

- 18000
- 12000
- 24000
- 32000

47. 39. Consider the matrices P, Q, R and S which are 20 x 15, 15 x 30, 30 x 5 and 5 x 40 matrices respectively. What is the minimum number of multiplications required to multiply the four matrices?

Mark only one oval.

- 6050
- 7500
- 7750
- 12000

48. 40. What is the space complexity of the dynamic programming implementation of the matrix chain problem?

Mark only one oval.

- O(1)
- O(n)
- O(n2)
- O(n3)

49. 41. Bellmann ford algorithm provides solution for _____ problems.

Mark only one oval.

- All pair shortest path
- Sorting
- Network flow
- Single source shortest path

50. 42. How many times the for loop in the Bellmann Ford Algorithm gets executed?

Mark only one oval.

- V times
- V-1
- E
- E-1

51. 43. Bellmann Ford Algorithm can be applied for _____

Mark only one oval.

- Undirected and weighted graphs
- Undirected and unweighted graphs
- Directed and weighted graphs
- All directed graphs

52. 44. What is the time complexity of Dijikstra€™s algorithm?

Mark only one oval.

- O(N)
- O(N^3)
- O(N^2)
- O(log N)

53. 45. Dijkstra's Algorithm cannot be applied on _____

Mark only one oval.

- Directed and weighted graphs
- Graphs having negative weight
- Unweighted graphs
- Undirected and unweighted graphs

54. 46. In what manner is a state-space tree for a backtracking algorithm constructed?

Mark only one oval.

- Depth-first search
- Breadth-first search
- Twice around the tree
- Nearest neighbour first

55. 47. Backtracking algorithm is implemented by constructing a tree of choices called as?

Mark only one oval.

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

56. 48. 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

57. 49._____ enumerates a list of promising nodes that could be computed to give the possible solutions of a given problem.

Mark only one oval.

- Exhaustive search
- Brute force
- Backtracking
- Divide and conquer

58. 50. The problem of placing n queens in a chessboard such that no two queens attack each other is called as?

Mark only one oval.

- n-queen problem
- eight queens puzzle
- four queens puzzle
- 1-queen problem

59. 51. For how many queens was the extended version of Eight Queen Puzzle applicable for n*n squares?

Mark only one oval.

- 5
- 6
- 8
- n

60. 52. What is chromatic index?

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

61. 53. How many fundamental solutions are there for the eight-queen puzzle?

Mark only one oval.

- 92
- 10
- 11
- 12

62. 54. The problem of finding a list of integers in a given specific range that meets certain conditions is called?

Mark only one oval.

- Subset sum problem
- Constraint satisfaction problem
- Hamiltonian circuit problem
- Travelling salesman problem

63. 55. What is vertex coloring of a graph?

Mark only one oval.

- A condition where any two vertices having a common edge should not have same color
- A condition where any two vertices having a common edge should always have same color
- A condition where all vertices should have a different color
- A condition where all vertices should have same color

64. 56. Which of the following is an NP complete problem?

Mark only one oval.

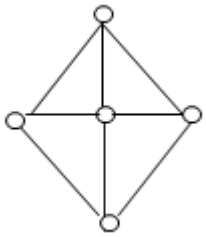
- Hamiltonian cycle
- Travelling salesman problem
- Calculating chromatic number of graphs
- Finding maximum element in an array

65. 57. In what time can the Hamiltonian path problem can be solved using dynamic programming?

Mark only one oval.

- O(N)
- O(N log N)
- O(N^2)
- O(N^2 2^N)

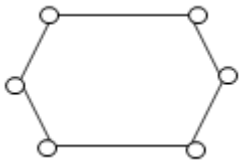
66. 58. What will be the chromatic number of the following graph?



Mark only one oval.

- 2
- 3
- 4
- 5

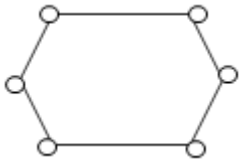
67. 59. What will be the chromatic number of the following graph?



Mark only one oval.

- 1
- 2
- 3
- 4

68. 60. Which of the following edges form minimum spanning tree on the graph using kruskal's algorithm?



Mark only one oval.

- AB, AC,BC
- AB,AC,BD
- AB,BD,DC
- None of these