

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

Course Name - --Design and Analysis of Algorithm

Course Code -PCC-CS402

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Answer all the questions. Each question carry one mark.

9. 1.Which of the following is/are property/properties of a dynamic programming problem?

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- Which of the following is/are property/properties of a dynamic programming problem?
- Overlapping sub problems
- Greedy approach
- Both optimal substructure and overlapping sub problems

10. 2. If a problem can be solved by combining optimal solutions to non-overlapping problems, the strategy is called \_\_\_\_\_

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- Dynamic programming
- Greedy
- Divide and conquer
- Recursion

11. 3. In dynamic programming, the technique of storing the previously calculated values is called \_\_\_\_\_

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

12. 4. When a top-down approach of dynamic programming is applied to a problem, it usually \_\_\_\_\_

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- 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

13. 5. Which of the following problems should be solved using dynamic programming?

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

14. 6. The 0/1 Knapsack problem is an example of \_\_\_\_\_

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

15. 7. 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?

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- 160
- 200
- 170
- 90

16. 8. Consider the two matrices P and Q which are  $10 \times 20$  and  $20 \times 30$  matrices respectively. What is the number of multiplications required to multiply the two matrices?

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- 10 X 20
- 20 X 30
- 10 X 30
- 10 X 20 X 30

17. 9. Which of the problems cannot be solved by backtracking method?

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- n-queen problem
- Subset sum problem
- Hamiltonian circuit problem
- Travelling salesman problem

18. 10. What happens when the backtracking algorithm reaches a complete solution?

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- It backtracks to the root
- It continues searching for other possible solutions
- It traverses from a different route
- Recursively traverses through the same route

19. 11. In what manner is a state-space tree for a backtracking algorithm constructed?

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

20. 12. Which one of the following is an application of the backtracking algorithm?

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- Finding the shortest path
- Finding the efficient quantity to shop
- Ludo
- Crossword

21. 13. Which of the following logical programming languages is not based on backtracking?

*Mark only one oval.*

- Icon
- Prolog
- Planner
- Fortran



22. 14 The problem of finding a subset of positive integers whose sum is equal to a given positive integer is called as?

*Mark only one oval.*

- n- queen problem
- Subset sum problem
- Knapsack problem
- Hamiltonian circuit problem

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

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- n-queen problem
- Eight queens puzzle
- Four queens puzzle
- 1-queen problem

24. 16. For how many queens was the extended version of Eight Queen Puzzle applicable for n X n squares?

*Mark only one oval.*

- 5
- 6
- 8
- n

25. 17. How many solutions are there for 8 queens on 8 X 8 board?

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12

91

92

93

26. 18. How many fundamental solutions are there for the eight queen puzzle?

*Mark only one oval.*

92

10

11

12

27. 19. Of the following given options, which one of the following does not provides an optimal solution for 8-queens problem?

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5,3,8,4,7,1,6,2

1,6,3,8,3,2,4,7

4,1,5,8,6,3,7,2

6,2,7,1,4,8,5,3

28. 20. How many possible solutions occur for a 10-queen problem?

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850

742

842

724

29. 21. Of the following given options, which one of the following is a correct option that provides an optimal solution for 4-queens problem?

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3,1,4,2

2,3,1,4

4,3,2,1

4,2,3,1

30. 22. Which of the following methods can be used to solve n-queen's problem?

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Greedy algorithm

Divide and conquer

Iterative improvement

Backtracking

31. 23. In n-queen problem, how many values of n does not provide an optimal solution?

*Mark only one oval.*

- 1  
 2  
 3  
 4

32. 24. In how many directions do queens attack each other?

*Mark only one oval.*

- 1  
 2  
 3  
 4

33. 25. Given items as {value,weight} pairs  $\{\{60,20\},\{50,25\},\{20,5\}\}$ . The capacity of knapsack=40. Find the maximum value output assuming items to be divisible and non-divisible respectively.

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- 100, 80  
 110, 70  
 130, 110  
 110, 80

34. 26. The main time taking step in fractional knapsack problem is \_\_\_\_\_

*Mark only one oval.*

- Breaking items into fraction
- Adding items into knapsack
- Sorting
- Looping through sorted items

35. 27. Given items as {value,weight} pairs  $\{(40,20),\{30,10\},\{20,5\}\}$ . The capacity of knapsack=20. Find the maximum value output assuming items to be divisible.

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- 60
- 80
- 100
- 40

36. 28. What is the objective of the knapsack problem? \_\_\_\_\_

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- 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

37. 29. Fractional knapsack problem is also known as \_\_\_\_\_

*Mark only one oval.*

- 0/1 knapsack problem
- Continuous knapsack problem
- Divisible knapsack problem
- Non continuous knapsack problem

38. 30. Which bit is reserved as a parity bit in an ASCII set?

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- First
- Seventh
- Eighth
- Tenth

39. 31. What is the running time of the Huffman encoding algorithm?

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- $O(C)$
- $O(\log C)$
- $O(C \log C)$
- $O(N \log C)$

40. 32. Recurrence equation formed for the tower of hanoi problem is given by

\_\_\_\_\_

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- $T(n) = 2T(n-1)+n$
- $T(n) = 2T(n/2)+c$
- $T(n) = 2T(n-1)+c$
- $T(n) = 2T(n/2)+n$

41. 33. Recursive solution of tower of hanoi problem is an example of which of the following algorithm?

*Mark only one oval.*

- Dynamic programming
- Backtracking
- Greedy algorithm
- Divide and conquer

42. 34. Under what case of Master's theorem will the recurrence relation of merge sort fall?

*Mark only one oval.*

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

43. 35. What is the condition for proper coloring of a graph?

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- two vertices having a common edge should not have same color
- two vertices having a common edge should always have same color
- all vertices should have a different color
- all vertices should have same color

44. 36. The number of colors used by a proper coloring graph is called?

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- k coloring graph
- x coloring graph
- m coloring graph
- n coloring graph

45. 37. What will be the chromatic number for an empty graph having  $n$  vertices?

\_\_\_\_\_.

*Mark only one oval.*

- 0
- 1
- 2
- $n$



46. 38. What will be the chromatic number for a line graph having  $n$  vertices?

*Mark only one oval.*

0

1

2

$n$

47. 39. Which algorithm is used to solve a minimum cut algorithm?

*Mark only one oval.*

Gale-Shapley algorithm

Ford-Fulkerson algorithm

Stoer-Wagner algorithm

Prim's algorithm

48. 40. \_\_\_\_\_ separates a particular pair of vertices in a graph.

*Mark only one oval.*

line

arc

cut

flow

49. 41. \_\_\_\_\_ is a data structure used to collect a system of cuts for solving min-cut problem

*Mark only one oval.*

- Gomory-Hu tree  
 Gomory-Hu graph  
 Dancing tree  
 AA tree

50. 42. Which algorithm is used to solve a maximum flow problem?

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- Prim's algorithm  
 Kruskal's algorithm  
 Dijkstra's algorithm  
 Ford-Fulkerson algorithm

51. 43. The first step in the naïve greedy algorithm is?

*Mark only one oval.*

- Analyzing the zero flow  
 calculating the maximum flow using trial and error  
 adding flows with higher values  
 reversing flow if required

52. 44. A simple acyclic path between source and sink which pass through only positive weighted edges is called?

*Mark only one oval.*

- Augmenting path
- critical path
- residual path
- maximum path

53. 45. Dijkstra's Algorithm is used to solve \_\_\_\_\_ problems.

*Mark only one oval.*

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

54. 46. Which of the following is the most commonly used data structure for implementing Dijkstra's Algorithm?

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- Max priority queue
- Stack
- Circular queue
- Min priority queue

55. 47. How many priority queue operations are involved in Dijkstra's Algorithm?

*Mark only one oval.*

- 1
- 2
- 3
- 4

56. 48. The maximum number of times the decrease key operation performed in Dijkstra's algorithm will be equal to \_\_\_\_\_

*Mark only one oval.*

- Total number of vertices
- Total number of edges
- Number of vertices - 1
- Number of edges - 1

57. 49. What is running time of Dijkstra's algorithm using Binary min-heap method?

*Mark only one oval.*

- $O(V)$
- $O(V \log V)$
- $O(E)$
- $O(E \log V)$

58. 50. Bellman-Ford algorithm provides solution for \_\_\_\_\_ problems.

*Mark only one oval.*

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

59. 51. What is the basic principle behind Bellman-Ford Algorithm?

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- Interpolation
- Extrapolation
- Regression
- Relaxation

60. 52. Bellman-Ford Algorithm is an example for \_\_\_\_\_

*Mark only one oval.*

- Dynamic Programming
- Greedy Algorithms
- Linear Programming
- Branch and Bound

61. 53.Floyd Warshall's Algorithm can be applied on \_\_\_\_\_

*Mark only one oval.*

- Undirected and unweighted graphs
- Undirected graphs
- Directed graphs
- Acyclic graphs

62. 54. Floyd Warshall Algorithm can be used for finding \_\_\_\_\_

*Mark only one oval.*

- Single source shortest path
- Topological sort
- Minimum spanning tree
- Transitive closure

63. 55.What procedure is being followed in Floyd Warshall Algorithm?

*Mark only one oval.*

- Top down
- Bottom up
- Big bang
- Sandwich

64. 56. The travelling salesman problem can be solved using \_\_\_\_\_

*Mark only one oval.*

- A spanning tree
- A minimum spanning tree
- Bellman – Ford algorithm
- DFS traversal

65. 57. Kruskal's algorithm is used to \_\_\_\_\_

*Mark only one oval.*

- find minimum spanning tree
- find single source shortest path
- find all pair shortest path algorithm
- traverse the graph

66. 58. Time Complexity of DFS is? (V – number of vertices, E – number of edges)

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- $O(V + E)$
- $O(V)$
- $O(E)$
- None of the mentioned

67. 59. 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?

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

68. 60. Branch and bound is a \_\_\_\_\_

*Mark only one oval.*

- Problem solving technique
- Data structure
- Sorting algorithm
- Type of tree

69. 61. What will be the number of passes to sort the elements using insertion sort? 14, 12, 16, 6, 3, 10

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- 6
- 5
- 7
- 1



70. 62. What is an in-place sorting algorithm?

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- It needs  $O(1)$  or  $O(\log n)$  memory to create auxiliary locations
- The input is already sorted and in-place
- It requires additional storage
- None of these

71. 63. What is an external sorting algorithm?

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- Algorithm that uses tape or disk during the sort
- Algorithm that uses main memory during the sort
- Algorithm that involves swapping
- Algorithm that are considered 'in place'

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

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$O(n)$

$O(n!)$

$O(2^n)$

Option 3

None of these

73. 65. Time complexity of fractional knapsack problem is \_\_\_\_\_

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$O(n \log n)$

$O(n)$

$O(nW)$

None of these

74. 66. How many bits are needed for standard encoding if the size of the character set is X?

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- log X
- X+1
- 2X
- None of these

75. 67. When dynamic programming is applied to a problem, it takes far less time as compared to other methods that don't take advantage of overlapping sub problems.

*Mark only one oval.*

- True
- False
- All of these
- None of these

76. 68. Branch and bound is a \_\_\_\_\_

*Mark only one oval.*

- Problem solving technique
- Data structure
- Sorting algorithm
- Type of tree

77. 69. What is the running time of an insertion sort algorithm if the input is pre-sorted?

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- $O(N)$
- $O(N \log N)$
- $O(M \log N)$
- None of these

78. 70. How many passes does an insertion sort algorithm consist of?

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- $N-1$
- $N$
- $N+1$
- None of these

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