

# Online Assessment (Even Sem/Part-I/Part-II Examinations 2019 - 2020)

Course Name - Advanced Algorithm

Course Code - PCC-MCS201\_PCC-MCS201(BL)

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

10. 2.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

11. 3. Recurrence equation formed for the tower of hanoi problem is given by

\_\_\_\_\_

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

12. 4. Recursive solution of tower of hanoi problem is an example of which of the following algorithm?

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

13. 5. 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?

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

14. 6. Consider the brute force implementation in which we find all the possible ways of multiplying the given set of  $n$  matrices. What is the time complexity of this implementation?

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

15. 7. What is the space complexity of the above dynamic programming implementation of the matrix chain problem?

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

16. 8. Dijkstra's Algorithm is used to solve \_\_\_\_\_ problems.

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- All pair shortest path
- Single source shortest path
- Network flow
- Sorting
- Other: \_\_\_\_\_

17. 9. Dijkstra's Algorithm cannot be applied on \_\_\_\_\_

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

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

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

19. 11. The Bellmann Ford algorithm returns \_\_\_\_\_ value.

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- Boolean
- Integer
- String
- Double

20. 12. How many solution/solutions are available for a graph having negative weight cycle?

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- One solution
- Two solutions
- No solution
- Infinite solutions

21. 13. What is the running time of Bellmann Ford Algorithm?

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- $O(V)$
- $O(V^2)$
- $O(E \log V)$
- $O(VE)$

22. 14. graph is said to have a negative weight cycle when?

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- The graph has 1 negative weighted edge
- The graph has a cycle
- The total weight of the graph is negative
- The graph has 1 or more negative weighted edges



23. 15. Which of the following is false in the case of a spanning tree of a graph  $G$ ?

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

24. 16. The travelling salesman problem can be solved using \_\_\_\_\_

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

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

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- 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

26. 18. 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

27. 19. 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

28. 20. Branch and bound is a \_\_\_\_\_

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- problem solving technique
- data structure
- sorting algorithm
- type of tree

29. 21. A graph with chromatic number less than or equal to  $k$  is called?

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- K chromatic
- K colorable
- K chromatic colorable
- K colorable chromatic

30. 22. \_\_\_\_\_ separates a particular pair of vertices in a graph.

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- line
- Arc
- cut
- flow

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

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

32. 24. What does Maximum flow problem involve?

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- finding a flow between source and sink that is maximum
- finding a flow between source and sink that is minimum
- finding the shortest path between source and sink
- computing a minimum spanning tree

33. 25. 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

34. 26. Does Ford- Fulkerson algorithm use the idea of?

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- Naïve greedy algorithm approach
- Residual graphs
- Minimum cut
- Minimum spanning tree

35. 27. The first step in the naïve greedy algorithm is?

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

36. 28. Under what condition can a vertex combine and distribute flow in any manner?

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- It may violate edge capacities
- It should maintain flow conservation
- The vertex should be a source vertex
- The vertex should be a sink vertex

37. 29. A simple acyclic path between source and sink that passes through only positive weighted edges is called?

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- Augmenting path
- Critical path
- Residual path
- Maximum path

38. 30. Who is the formulator of the Maximum flow problem?

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- Lester R. Ford and Delbert R. Fulkerson
- T.E. Harris and F.S. Ross
- Y.A. Dinitz
- Kruskal

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