(6 pages)

Reg. No. : ....

Code No. : 6435   Sub. Code : ZCSM 11

M.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2022.

First Semester

Computer Science — Core

DESIGN AND ANALYSIS OF ALGORITHMS

(For those who joined in July 2021 onwards)

Time : Three hours   Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Heap is a

   (a) Tree structure

   (b) Complete binary tree

   (c) Binary tree

   (d) Search tree

2. _____ of an algorithm is the amount of time required for it to execute.

   (a) Time complexity

   (b) Space complexity

   (c) Compiling time

   (d) Best case

3. What is the worst case time complexity of the Quick sort?

   (a) $O(n \log n)$ (b) $O(n)$

   (c) $O(n^3)$ (d) $O(n^2)$

4. Strassen's matrix multiplication algorithm follows _____ technique.

   (a) Greedy technique

   (b) Dynamic Programming

   (c) Divide and Conquer

   (d) Backtracking

5. Kruskal's algorithm is a

   (a) Divide and conquer algorithm

   (b) Dynamic programming algorithm

   (c) Greedy algorithm

   (d) Approximation algorithm

6. The travelling salesman problem can be solved using

   (a) A spanning tree

   (b) A minimum spanning tree

   (c) Bellman – Ford algorithm

   (d) DFS traversal

7. The Data structure used in standard implementation of Breadth First Search is

   (a) Stack   (b) Queue

   (c) Linked List   (d) Tree

8. What is the traversal strategy used in the binary tree?

   (a) depth-first traversal

   (b) breadth-first traversal

   (c) random traversal

   (d) priority traversal

9. How many steps are required to prove that a decision problem is NP complete?

   (a) 1   (b) 2

   (c) 3   (d) 4

10. Which data structure is most suitable for implementing best first branch and bound strategy?

    (a) stack   (b) queue

    (c) priority queue   (d) linked list

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Identify the criteria that must satisfy all algorithms.

    Or

    (b) Discuss about Space Complexity.

12. (a) Develop the algorithm Control abstraction for divide-and-conquer.

    Or

    (b) Explain about finding the maximum and minimum.

13. (a) Analyze Prim's Algorithm.

    Or

    (b) Illustrate knapsack problem.

14. (a) Evaluate the algorithm Preorder and postorder traversals.

Or

(b) Justify graph coloring.

15. (a) Construct the Job Shop Scheduling.

Or

(b) Construct the Directed Hamiltonian Cycle.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Summarize about Priority Queues.

Or

(b) Illustrate about Graphs.

17. (a) Explain about Binary Search.

Or

(b) Briefly explain about Quick Sort.

18. (a) Organize the High-level description of job sequencing algorithm.

Or

(b) Analyze optimal binary search trees.

19. (a) Evaluate the techniques for graphs.

Or

(b) Justify the recursive backtracking algorithm.

20. (a) Express 0/1 knapsack problem.

Or

(b) Generalize FIFO Branch-and-Bound solution.

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