SP - 100

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Seat No.	

T.Y. B.Tech. (Computer Science and Engineering)
(Semester - V) (CBCS) Examination, December - 2023
COMPUTER ALGORITHMS
Sub. Code : 80797

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Day and Date : Monday, 4 - 12 - 2023 **Total Marks : 70**

Time : 10.30 a.m. to 1.00 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Assume suitable data wherever necessary.**
3) **Figures to the right indicates full marks.**

Q1) Solve MCQs. (2 Marks Each)

a) Which of the following is incorrect? **[14]**

Algorithms can be represented:

i) as pseudo codes ii) as syntax

iii) as programs iv) as flowcharts

b) Which of the following algorithms can be used to most efficiently determine the presence of a cycle in a given graph?

i) Depth First Search

ii) Breadth First Search

iii) Prim's Minimum Spanning Tree Algorithm

iv) Kruskal' Minimum Spanning Tree Algorithm

c) Traversal of a graph is different from tree because

i) There can be a loop in graph so we must maintain a visited flag for every vertex

ii) DFS of a graph uses stack, but inorder traversal of a tree is recursive

iii) BFS of a graph uses queue, but a time efficient BFS of a tree is recursive

iv) All of the above

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d) Let X be a problem that belongs to the class NP. Then which one of the following is TRUE?

i) There is no polynomial time algorithm for X

ii) If X can be solved deterministically in polynomial time, then P=NP

iii) If X is NP-hard, then it is NP-complete

iv) X may be undecidable

e) Which of the following models is more powerful than COMMON CRCW PRAM?

i) PRIORITY CRCW ii) COLLISION

iii) CREW iv) EREW

f) Running time of quick sort depends on selection of

i) No of inputs

ii) Size of elements

iii) Arrangements of elements in array

iv) Pivot element

g) Which of the following statements is true?

i) Recursion is always better than iteration

ii) Recursion uses more memory compared to iteration

iii) Recursion uses less memory compared to iteration

iv) Iteration is always better and simpler than recursion

Q2) Solve any 2 of the following (7 Marks Each) **[14]**

a) Explain general method of divide and conquer using example.

b) Explain with example Big-oh, Big-omega and Theta, Also plot a graph for few functions.

c) Describe reliability design problem with suitable example.

Q3) Solve any 2 of the following (7 Marks Each) **[14]**

a) Write a difference between Prim's and Kruskal's algorithm to find minimum cost spanning tree?

b) Explain dynamic programming solution to 0/1 knapsack problem.

c) Illustrate greedy method in general with example.

Q4) Solve any 2 of the following (7 Marks Each) **[14]**

a) Write an explain algorithm for Breadth first search & traversal.

b) Explain with suitable example the terms- live node, E-node, dead node and bounding function with respect to backtracking.

c) Write an algorithm & Explain Prefix computation problem with suitable example.

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Q5) Solve any 2 of the following (7 Marks Each) **[14]**

a) Illustrate the relationship between P. NP, NP-Complete. NP-Hard problems with neat diagram

b) Write a note on Broadcasting in MESH.

c) Draw and define biconnected graph and explain how can be a non biconnected graph converted into a biconnected graph.

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