SB- 86

Total No. of Pages : 3

Seat No.	

T.Y.B.Tech.(Computer Science and Engineering) (Part-III) (Semester - V) (CBCS) Examination, January - 2023

COMPUTER ALGORITHMS

Sub. Code: 80797

Day and Date: Saturday, 21 - 01 - 2023 **Total Marks : 70**

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

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

Q1) Solve MCQs. (2 Marks Each) **[14]**

a) Consider the problem of computing min-max in an unsorted array where min and max are minimum and maximum elements of array. Algorithm A1 can compute min-max in a1 comparisons without divide and conquer. Algorithm A2 can compute min-max in a2 comparisons by scanning the array linearly.What could be the relation between a1 and a2 considering the worst case scenarios?

i) a1< a2 ii) a1 > a2

iii) a1 = a2 iv) Depends on the input

b) What is the time complexity of Huffman Coding?

i) O(N) ii) O(Nlog N)

iii) O(N(log N)^2) iv) O(N^2)

c) We use dynamic programming approach when

i) We need an optimal solution

ii) The solution has optimal substructure

iii) The given problem can be reduced to the 3-SAT problem

iv) It’s faster than Greedy

P.T.O.

d) The inorder and preorder traversal of a binary tree are d b e a f c g and a b d e c f g, respectively. The postorder traversal of the binary tree is:

i) d e b f g c a ii) e d b g f c a

iii) e d b f g c a iv) d e f g b c a

e) Let S be an NP-complete problem and Q and R be two other problems not known to be in NP. Q is polynomial time reducible to S and S is polynomial-time reducible to R. Which one of the following statements is true?

i) R is NP-complete ii) R is NP-hard

iii) Q is NP-complete iv) Q is NP-hard

f) Which is not a constraints enforced on PRAM model

i) EREW ii) ERCW

iii) CRCW iv) None

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

i) Depth Frist Search

ii) Breadth First Search

iii) Prim's Minimum Spanning Tree Algorithm

iv) Kruskal' Minimum Spanning Tree Algorithm

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

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

b) Compare Prim's and Kruskal's algorithm to find minimum cost spanning tree (MST)

c) Generate the sets S^i, $0 \leq i \leq 4$, when $(w_1, w_2, w_3, w_4) = (10,15,6,9,)$ and $(p_1,p_2,p_3,p_4) = (2, 5, 8, 1)$.

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

a) Solve job sequencing problem with deadlines using greedy approach for following instance n=7. (p1,p2,....,p7) = (50, 15, 18, 16, 8, 25, 60)

(d1,d2,...,d7) = (1, 3, 4, 3, 2, 1, 2)

b) What is Difference between priori and posteriori analysis

c) Explain dynamic programming solution to 0/1 knapsack problem

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

a) Explain techniques for binary tree traversal.

b) What is backtracking? Explain sum of subset problem and algorithm with suitabel example.

c) List and explain Variants of PRAM

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

a) Discuss Algorithm and conditions of 8 Queens problem

b) List and explain NP-Hard graph problems

c) Write an algorithm for prefix computation on mesh.