

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2023

B.Tech - V Semester (BI)

COURSE CODE(CREDITS): 18B11BI511 (03)

MAX. MARKS: 35

COURSE NAME: Design And Analysis of Algorithms

COURSE INSTRUCTOR: Dr. Tiratha Raj Singh

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory. (b) Marks are indicated against each question in square brackets. (c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving algorithmic problems.

Q.1. Consider 5 items along with their respective weights and values. Solve this problem using fractional approach:

$I = \langle I_1, I_2, I_3, I_4, I_5 \rangle$; $w = \langle 5, 10, 20, 30, 40 \rangle$; $v = \langle 30, 20, 100, 90, 160 \rangle$

The Knapsack has capacity weight = 60.

[4] (CO: 4)

Q.2. What are various ways of traversing graphs? Explain BFS and DFS approaches with an example of both the approaches.

[1+4] (CO: 3)

Q.3. Explain the following terms for algorithms analysis:

[2*4 = 8] (CO:1,4)

(a) Substitution method (b) Asymptotic notations

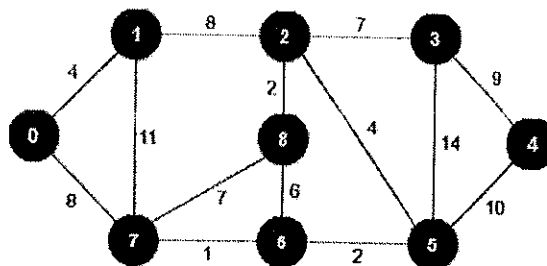
(c) Dijkstra's algorithm (d) Cost adjacency matrix

Q.4. What is recurrence relation? Explain it by comparing the running time of selection sort and merge sort algorithms.

[1+1] (CO: 2)

Q.5. What is a spanning tree? Discuss its types through BFS and DFS approaches. Solve the MST problem using Kruskal's algorithm.

[1+1+3] (CO: 5)



Q.6. What is Knapsack problem. What are its types? Solve the given problem having weight capacity $w = 3$ and number of items are three such that, $S=3$, $w_i = \langle 1, 2, 3 \rangle$ and $v_i = \langle 2, 3, 4 \rangle$.
[1+2] (CO: 4)

Q.7. A quadratic algorithm with processing time $T(n) = C \cdot n \cdot \ln(n)$ spends $T(N)$ seconds for processing N data items. How much time will be spent for processing $n = 10,000$ data items, assuming that $N = 1000$ and $T(N) = 10$ ms?
[3] (CO: 2)

Q.8. Solve the Travelling salesperson problem using Greedy approach. What will be the complexity of Greedy approach here?
[4+1] (CO: 5)

