

BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - IV Computer Science & Engineering AI & ML : WINTER: 2025
SUBJECT: ALGORITHMS ANALYSIS & DESIGN

Day : Thursday
Date : 27/11/2025

W-23948-2025

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B.

1. All questions are **COMPULSORY**.
2. Figures to the right indicate **FULL** marks.
3. Neat diagrams must be drawn **WHEREVER** necessary.
4. Assume suitable data, if necessary.

Q.1 Explain recurrences and various methods to solve recurrences? (10)

OR

Define Branch and Bound. Explain 15 Puzzle problem. (10)

Q.2 Write and explain binary search algorithm. (10)

OR

Write algorithm for quick sort and sort the following elements (10)
[40,11,4,72,17,2,49].

Q.3 Explain Dijkstra's Single source shortest path algorithm. Explain how it is (10)
different from Bellman Ford algorithm. Explain 15-puzzle problem using LC
search technique.

OR

Differentiate between Prims and Kuskals algorithm. Explain Dynamic (10)
programming with example.

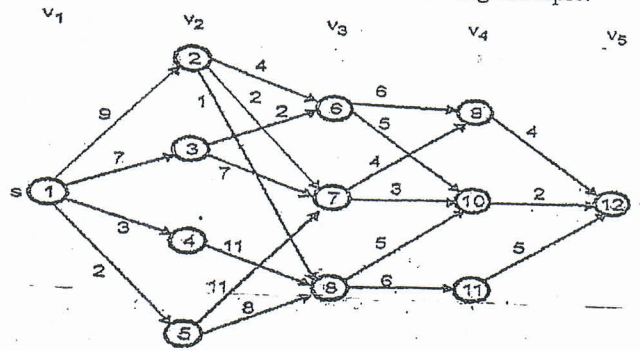
Q.4 Write algorithm for greedy knapsack and obtain the solution to following (10)
knapsack problem where $n=7$, $m=15$, $(p_1, p_2, \dots, p_7) = (10, 5, 15, 7, 6, 18, 3)$,
 $(w_1, w_2, \dots, w_7) = (2, 3, 5, 7, 1, 4, 1)$.

P.T.O.

OR

Write multistage graph algorithm and solve following example.

(10)



Q.5 Rewrite and Compare Rabin Karp and Knuth Morris Pratt Algorithms. Give the pseudo code for the KMP string matching algorithm. (10)

OR

Write algorithm for 0/1 knapsack problem using dynamic programming. Also solve the following example. $N=4$, $M=21$ $(p_1, p_2, p_3, p_4)=(2, 5, 8, 1)$ $(w_1, w_2, w_3, w_4)=(10, 15, 6, 9)$. (10)

Q.6 Write a short note on following: (10)
i) Steps for NP Completeness proofs.
ii) P, NP and NPC classes.

OR

Prove that Vertex Cover problem is NP Complete. (10)

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