BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-IV Computer Science & Engineering AI & ML : SUMMER : 2025
SUBJECT: DESIGN & ANALYSIS OF ALGORITHMS

Day : Monday | Time : 10:00 AM-01:00 PM
Date : 02/06/2025 | S-29281-2025 | Max. Marks : 60

N.B.
1) All questions are **COMPULSORY**.
2) Figures to the **RIGHT** indicate **FULL** marks.
3) Assume suitable data **WHEREVER** necessary.
4) Draw neat diagrams **WHEREVER** necessary.

Q. 1 Write short note on: **(10)**
- **a)** Asymptotic Notation
- **b)** Growth Function

OR

Q. 1 Solve the following recurrence relation using Master's Theorem. **(10)**
- i) $T(n) = 2T(2n/3) + n^2$
- ii) $T(n) = 3\,T(n/4) + n\log n$
- iii) $T(n) = 5\,T(n/4) + n^2$

Q. 2 Sort the following number using Merge Sort and find its worst case, average and best case complexity. A = {12, 4, 56, 12, 45, 8, 9, 0, 12, 17}. **(10)**

OR

Q. 2 Write a Min-Max function to find maximum and minimum value from given set of values using divide and conquer strategy. **(10)**
A = {12, 15, 18, 22, 30, 40, 45, 55, 13, 1, 5}.

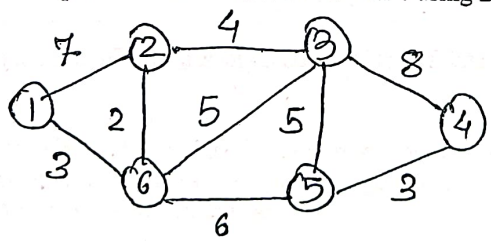
Q. 3 **a)** Find the optimal solution for the fractional knapsack problem making use of greedy approach. Consider- **(05)**

n = 5
w = 60 kg
(w1, w2, w3, w4, w5) = (5, 10, 15, 22, 25)
(b1, b2, b3, b4, b5) = (30, 40, 45, 77, 90)

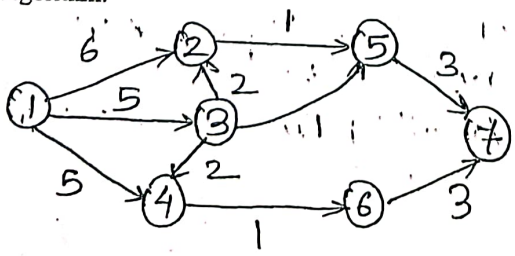
b) State and explain job sequencing with deadline with example. **(05)**

OR

Q. 3 To find shortest path between vertex 1 to vertex 4 using Dijkstra's algorithm. **(10)**



Q. 4 Solve the shortest path from source 1 to 7 for the following graph using Floyd Warshall algorithm. **(10)**



P.T.O.

OR

Q. 4 Solve the following 0/1 Knapsack problem using dynamic programming algorithm with given capacity W=5 weight and profit are as follows:(2,12),(1,10),(3,20),(2,15) **(10)**

Q. 5 Explain Rabin Karp and Naive string matching algorithm. **(10)**

OR

Q. 5 Explain Spurious hits in Rabin Karp string matching algorithm. Working modulo q = 13 how many spurious hits does Rabin Karp matcher encounter in text T = 2359023141526739921 when looking for pattern P = 31415. **(10)**

Q. 6 Write note on N queen's problem. **(10)**

OR

Q. 6 Solve following sum of subset problem using backtracking W = {1, 2, 3, 4, 5, 2} M = 8. Find all the possible subset of 'W' that sum to 'M'. **(10)**

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