PRIYADARSHINI COLLEGE OF ENGINEERING, NAGPUR
DEPARTMENT OF COMPUTER TECHNOLOGY
ACADEMIC SESSION: 2022-23 (ODD SEMESTER)

ASSIGNMENT-1

Subject	:	Design and Analysis of Algorithms (BECT304T)	**Semester**	:	V - A and B
Subject Teacher	:	Prof. C. R. Pote | Prof. P. U. Tembhare	**Assignment No.**	:	1
Unit	:	I, II and III	**Date of Display**	:	01-09-2022

Course Outcomes:

After completing the course, students will be able to :

CO1 : Argue the correctness of algorithms using inductive proofs and Analyze worst-case running times of algorithms using asymptotic analysis.

CO2 : Explain and apply Divide-and-Conquer and Greedy algorithmic design paradigms.

CO3 : Explain and apply Dynamic-Programming algorithmic design paradigms.

Sr. No.	Que. No.	Questions	Mapping with CO	BT Level
1	1.	What is an algorithm? Explain in detail about various characteristics of an algorithm.	CO1	II
2	2. a)	Solve the following Inhomogeneous recurrence relation by the method of characteristic equation $t_n = \begin{cases} 1 & \text{if } n=0 \\ 4t_{n-1} - 2^n & \text{otherwise} \end{cases}$	CO1	II
	2. b)	Solve the following recurrence relation $T(n) = 3T(n/4) + \Theta(n^2)$ using Recursion Tree Method.	CO1	II
3	3.	Illustrate stepwise execution of Quick sort on following input array: A = < 13, 19, 7, 5, 12, 9 > Also find recurrence relation for the algorithm and analyze it's time complexity.	CO2	III
4	4.	Illustrate stepwise execution of Heap sort on following input array: A = <5, 13, 2, 25, 7, 17, 20, 8,4> Also find recurrence relation for the algorithm and find its time complexity.	CO2	II
5	5.	What is minimum spanning tree? Write Prim's algorithm for finding minimum cost spanning tree. Also give stepwise illustration of this algorithm using suitable example.	CO3	I
6	6.	Consider 5 Items along with their respective weights and values as follows:	CO3	II

Item	1	2	3	4	5	6	7
Value	10	5	15	7	6	18	3
Weight	2	3	5	7	1	4	1

Capacity of Knapsack W= 15. Solve this fractional knapsack problem using Greedy strategy.

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