JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- 2023
B.Tech - V Semester (BI)

COURSE CODE(CREDITS): 18B11BI511 (03)

MAX. MARKS: 25

COURSE NAME: Design And Analysis of Algorithms

COURSE INSTRUCTOR: Dr. Tiratha Raj Singh

MAX. TIME: 1 Hour 30 minutes

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. What are various methods available for solving the recurrence relations. Demonstrate recursion tree method with an example.

[4] (CO-2)

Q.2. Consider the recurrence $T_n = 2T_{n-1} + 1$, where n>=1, with initial condition $T_0 = 0$. Obtain the solution using substitution method.

[4] (CO-2)

Q.3. Demonstrate the growth of functions for asymptotic notations for upper bound :

(a) $f(n) = 7n+5$ (b) $f(n) = 10n^2+7$ (c) $f(n) = 3n^3+4n$ (d) $f(n) = 27n^2+16n$

[1*4 = 4] (CO-1,2)

Q.4. Solve the LCS problem for the given DNA sequences S_1 and S_2 as: S_1 = ATAGCATGA and S_2 = TACTA. Discuss all the computational steps and parameters for the same problem along with filling the matrix.

[5] (CO-3)

Q.5. Time complexity of two algorithms is as : Algo1= $C_1n^3 + C_2n^2$; Algo2: C_3n^2. If we consider $C_1 = 1$, $C_2 = 2$ and $C_3 = 100$ then for which values of n following conditions will be satisfied? Condition a: $C_1n^3 + C_2n^2 <= C_3n^2$; Condition b. $C_1n^3 + C_2n^2 >= C_3n^2$.

[3] (CO-1,2)

Q.6. What is Knapsack problem. Solve it for the given dataset using greedy approach?

[5] (CO-4)

P_i (Rs.)	50	30	32	27	
W_i (Kg)	5	6	4	3	W = 11