

# NATIONAL INSTITUTE OF TECHNOLOGY DURGAPUR

## Even Semester End-term Examination, 2021-22

Course Code: CSO441

Course Name: DATA STRUCTURES AND ALGORITHMS

Full Marks: 30

Time: 90 Minutes

Date of Exam: 29/04/2022

Question Paper No.: NITDGP/CSO441/1

Instructions: Answer all the questions.

Materials to be supplied: N.A.

Question No.	Body of the Question	Marks	Mapped CO
1	Write an algorithm for Selection sort and clearly explain the different steps of the algorithm with a suitable example. Find out the best case and worst case time complexities of this sorting technique.	4 + 2 + 2 = 8	CO3
2	Write an algorithm to delete the last node from a singly linked list without using AVAIL list concept. Modify the deletion algorithm using AVAIL list concept.	3 + 2 = 5	CO3
3	Define the following with example: (i) Binary tree (ii) strictly binary tree (iii) Complete binary tree (iv) Tree	1.5 x 4 = 6	CO1 and CO4
4	Construct the original binary tree which satisfies following both traversal sequences (show each intermediate steps):  Postorder: B E D C A  Inorder: B A C E D	3	CO4
5	Write the algorithms to perform the following data structure operations on stack using array: (i) PUSH (ii) PEEK [Extract the information from top of the stack] (iii) PEEP [Extract the ith information from top of the stack] (iv) DISPLY [Display all the elements stored in a stack]	2 x 4 = 8	CO1 and CO2

## Course Outcomes

- CO1: Understanding the fundamental concepts of data, data types and abstract data types.  
 CO2: Implementation of different abstract data types using different data structures.  
 CO3: Design and development of algorithms for real-life applications.  
 CO4: Apply different types of data structures to implement different algorithms.