CENTRAL INSTITUTE OF TECHNOLOGY KOKRAJHAR
(Deemed to be University)
KOKRAJHAR :: BTR :: ASSAM :: 783370

END – SEMESTER EXAMINATION
DIPLOMA

Session: Jan-June, 2023 Semester: IV Time: 3Hrs. Full Marks: 100

Course Code: **DCSE401** Course Title: **Data Structure using C**

Question 1 is compulsory answer any 3 from the rest!

1 [A] Fill in the blanks 2 x 10 = 20

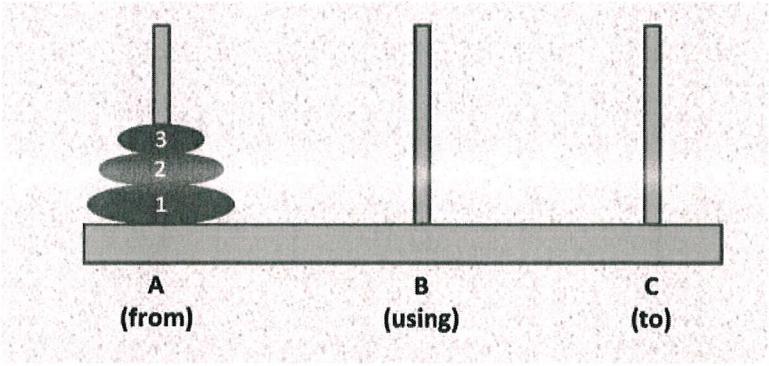
i. Data structure is used for _____ and _____ in an efficient way.
ii. LIFO is the working principle of _____.
iii. The tail node is connected to the head node in _____.
iv. A graph consists of _____ and _____.
v. The maximum difference in depth of subtree is _____ in Binary Search Tree.
vi. Queue works in _____ manner.
vii. Tower of Hanoi can be implemented in _____.
viii. _____ is a technique for arranging in ascending and descending order.
ix. The complexity of quick sort algorithm is _____.
x. The working of Inorder operation is _____, _____ and _____.

[B] Write the definitions. 2 x 10 = 20

i. Define a Linked List?
ii. Differentiate between singly and doubly linked list.
iii. Write the hierarchies of Data Structure.
iv. How does the Linked List is better than Arrays in memory management?
v. What is the procedure for Inorder, Preorder and Postorder of a Tree?
vi. Which is bettering sorting algorithm among Bubble Sort, Quick Sort and Merge Sort and why?
vii. What is a balanced Binary Search Tree?
viii. What is the difference between Selection Sort and Insertion Sort?
ix. What is a N-ary tree?
x. Which data structure is good for relational data?

2 a. Explain a Queue with an Example? Mention how a deletion and insertion operations are performed in a Queue? 10 + 10 = 20

b. Explain a Stack with an Example? For the following task your goal is to move all the plates from tower A to C. Show how it can be done by the use of Stack.



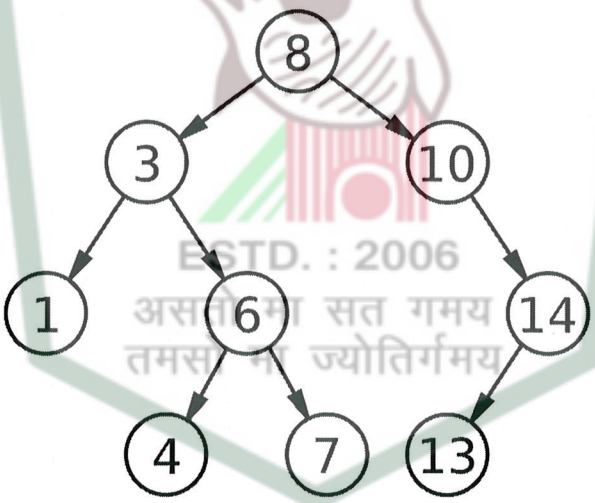
3 a. Mention any four sorting algorithms? Explain Quick Sort algorithm for the following data 22, 11, 88, 99, 66, 33, 44, 55, 77 — 10 + 10 = 20

b. Explain the same data with Selection Sort algorithm or Insertion sort algorithm?

4 a. What is an AVL Tree? Write all the operations for making a balanced tree in AVL Tree. — 10 + 10 = 20

b. What is the difference between a Binary Tree and Binary Search Tree? Mention any four different types of a BST?

5 a. Write the Inorder, Preorder and Postorder traversal for the following Tree. — 10 + 5 + 5 = 20



b. Which data structure is best suited for implementing a Music Playlist and how?

c. Which data structure is best suited for implementing a Tower of Hanoi and how?

6 Write short notes [any four] — 4 x 5 = 20

a. Time Complexity
b. Red Black Tree
c. Merge Sort
d. Graph
e. Non Linear Data Structure
f. Circular Linked List