

Enrolment No. /Seat No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
M.SC(IT)- INTEGRATED– SEMESTER II- EXAMINATION –SUMMER-2024

Subject Code: 1320503

Date: 14/05/2024

Subject Name: Data structure

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make Suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of simple calculators and non-programmable scientific calculators are permitted.

- Q.1 (a) Is stack linear data structure or nonlinear? Justify 03
(b) What is the infix of this prefix “*-A/BC-/AKL” Write steps for converting prefix to infix. 04
(c) Is Bubble Sort suitable for large datasets? Explain the operation of Bubble sort on following elements 07
13, 32,26,35,10.

- Q.2 (a) Define in-degree and out-degree in Binary Tree. 03
(b) Suppose the data elements are 45, 15, 79, 90, 10, 55, 12, 20, 50. Explain the steps of creating Binary Search Tree. 04
(c) What is the advantage of linked list over Array? Explain the operation of Insertion of a new node in the beginning of the list, and at the end of the list in sorted singly linked list. 07

OR

- (c) What is the need of doubly linked list? Explain Basic operations on Doubly linked list : Insertion of a new node in the beginning of the list and at the end of the list. 07
- Q.3 (a) Write Recursive function for Factorial. How does it use Stack? 03
(b) Explain Inorder traversal with suitable example. 04
(c) Explain the PUSH and POP operation of stack. 07

OR

- Q.3 (a) Write an algorithm to find maximum out of given N(N can be given by User) numbers.Show the key features of Algorithm. 03
(b) Explain Linear Probing. 04
(c) Explain how to insert an element in circular queue? 07
- Q.4 (a) Which binary tree is considered copy of given binary tree? 03
(b) What is the application and limitation of simple queue? 04
(c) Consider the Digit Folding Method for hash value computation, Suppose for example the size of the hash table is 100, then how many digits each part would contain? Explain the method with key value 12345. 07

OR

- Q.4 (a) Which two binary trees are considered similar binary trees? 03
(b) Write the steps to convert General tree to Binary Tree. 04
(c) Explain Mid Square Method. Assume that hash table has 100 memory locations. Assuming the key value 60, how many digits are needed to map 100 memory locations if Mid Square Method is used. Write advantage and disadvantage of this method. 07
- Q.5 (a) Explain dynamic memory allocation. 03
(b) Write the steps involved in Radix sort. 04
(c) Explain how Strings are stored in memory? Explain how given the string “Data Structure Data operations”, how to find the sting “Data” and Copy the string to another string after reversing the string. 07
- OR**
- Q.5 (a) Why collision occurs in Hash Calculation? 03
(b) Write the steps involved in Insertion sort. 04
(c) How top 10 students’ “Data structure” subject marks(out of 100) can be stored in Array? Explain Linear Search and Binary Search to list students who have got marks greater than 90. 07