

**GUJARAT TECHNOLOGICAL UNIVERSITY****MCA Integrated- SEMESTER- III EXAMINATION – WINTER 2019****Subject Code: 4430602****Date: 28/11/2019****Subject Name: Data Structures****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.

- Q.1 (a) Do As Directed 07**
1. Define Data Structure.
  2. Define the asymptotic notation Big-Oh (O)
  3. What is Queue Overflow Fetal Error?
  4. What is the prerequisite of binary search?
  5. Insertion and deletion are easy in linked list as compare to array. State true or false.
  6. Which of the following traversal of binary search tree gives data in sorted order?  
(A) Pre-Order (B) Post-Order (C) In-Order (D) All of these
  7. The merge sort algorithm closely follows the \_\_\_\_\_ approach.  
(divide-and-conquer, incremental)
- (b) Attempt the following**
1. Explain the term ‘Analysis of Algorithm’? **03**
  2. What is the difference between Static memory allocation and dynamic memory allocation? When each of them is used? Explain with example. **04**
- Q.2 (a) Describe briefly Singly Linked List and a typical Node Structure used for it. What will be a Node Structure for a linked-list representation of a polynomial in three variables? Write an algorithm to Insert a Node at the end of a Singly Linked List. 07**
- (b) What is circular linked list? Write an algorithm to insert and delete an element from the circularly linked list. 07**
- OR**
- (b) Write an algorithm to add two one variable polynomials. 07**
- Q.3 (a) What are the operations performed on stack? Write algorithm to insert and delete element from stack. 07**
- (b) Define Queue and Circular Queue. How Circular Queue differs from Queue? Write an algorithm for insertion of new element into Circular Queue. 07**
- OR**
- Q.3 (a) Write an algorithm to convert a parenthesized infix expression, given in the form of a string, into its equivalent postfix expression. 07**
- (b) What is hashing function? Explain the following hashing methods 07**
- a. The Folding Method
  - b. The Division Method
  - c. The Midsquare Method
- Q.4 (a) Construct a binary search tree by inserting following elements in given order and delete any two nodes having two children. 07**  
10,5,8,2,6,7,20,15,12,14,25,22,21
- (b) Find Postorder : 07**  
Preorder : A B D G C E H I F

Inorder : D G B A H E I C F

**OR**

**Q.4 (a)** Define Height Balance Tree (HBT). Explain how to keep the HBT balanced while inserting a node in a balanced HBT. Consider all the possible cases. **07**

**(b)** 1. Write a short note on KWIC indexing. **03**

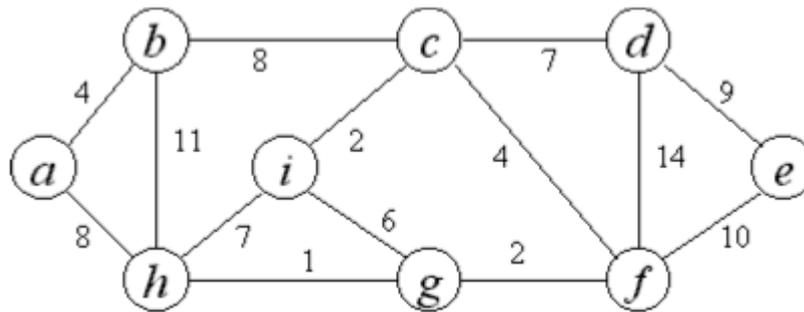
2. Explain primitive and non – primitive data structures. **04**

**Q.5 (a)** Define Graph. Show various representations for undirected, directed and weighted Graph. And also differentiate DFS and BFS using example. **07**

**(b)** Write a detailed algorithm for Partition-Exchange Sort and also write dry run for the given unsorted data set: 42,23,74,11,65,58,94,36,99,87 **07**

**OR**

**Q.5 (a)** What is minimal spanning tree? Find out MST of following graph using Prim's Algorithm. **07**



**(b)** Explain Dijkstra's algorithm in detail. **07**

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