

Code No: 123BP**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech II Year I Semester Examinations, April/May - 2023****DATA STRUCTURES****(Common to CSE, IT)****Time: 3 Hours****Max. Marks: 75**

- Note:** i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A**(25 Marks)**

- 1.a) Describe the role of space complexity and time complexity in measuring the performance of a program. [2]
- b) Differentiate between recursive and iterative algorithms. [3]
- c) List the applications of stack. [2]
- d) Differentiate Stack and Queue. [3]
- e) Define a full binary tree and complete binary tree. [2]
- f) List the applications of Trees. [3]
- g) Define Hashing. [2]
- h) State different types of collision resolving techniques. [3]
- i) Compare binary tree and binary search tree. [2]
- j) Write the properties of B-Trees. [3]

PART - B**(50 Marks)**

2. Discuss various the asymptotic notations used for best case, average case and worst case analysis of algorithms. [10]

OR

3. Write a program to insert an element in between two nodes in a double linked list. [10]

- 4.a) Explain the procedure to evaluate postfix expression.
- b) Convert the following expression $A + (B * C) - ((D * E + F) / G)$ into postfix form. [5+5]

OR

5. Implement a Circular queue of integer of user specified size and write the functions for initialize(), enqueue() and deque(). [10]

- 6.a) Discuss representation of binary tree.
- b) Explain DFS graphs traversal algorithms with suitable example. [5+5]

OR

- 7.a) Explain with an example how to delete an element from maxheap.
- b) Construct max heap for 150, 80, 40, 30, 10, 70, 110, 100, 20, 90, 60, 50, 120, 140, 130. [5+5]

- 8.a) Explain Binary search with example.
b) Explain the different hashing functions with an example. [5+5]

OR

- 9.a) State and explain radix sort with an example.
b) Apply heap sort on list of elements 14, 12, 9, 8,7,10,18,20,30. [5+5]

- 10.a) Explain the insertion operation on AVL trees.
b) Insert the following sequence of elements into an AVL tree, starting with an empty space: 10, 20, 15, 25, 30, 16, 18, 19 and delete 30 in the AVL tree that you got. [5+5]

OR

- 11.a) Explain Splay trees with example.
b) Construct a B-tree of order 3 with the following elements
25,10,20,30,80,40,50,60,82,70,90,85,93. [5+5]

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