

R18

Code No: 153AK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, December – 2024/ January - 2025

DATA STRUCTURES

**(Common to CSE, IT, ECM, CSIT, ITE, CE(SE), CSE(CS), CSE(AI&ML), CSE(DS),
CSE(IOT), CSE(N), AI&DS, AI&ML)**

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) Define a single linked list. [2]
- b) List the applications of queues. [3]
- c) How is deletion carried out in dictionaries? [2]
- d) Explain the concept of separate chaining. [3]
- e) Define AVL trees. [2]
- f) What is the significance of maintaining the balance in search trees? [3]
- g) What is the purpose of graph traversal? [2]
- h) What is the model for external sorting? [3]
- i) Define standard tries. [2]
- j) Explain the role of the "good suffix rule" in the Boyer-Moore algorithm. [3]

PART – B

(50 Marks)

- 2.a) Differentiate between stack and queue.
 - b) Implement a queue data structure using single linked list. [5+5]
- OR**
3. Compare and contrast the array and linked representations of stacks, highlighting their pros and cons. [10]
- 4.a) Explain how search and insertion is done in skip lists.
 - b) Differentiate between rehashing, extendible hashing. [5+5]
- OR**
5. Explain about the various hash collision resolution techniques with an example. [10]
- 6.a) Illustrate deletion operation on binary search tree.
 - b) Differentiate between splay tree and red-black tree. [5+5]
- OR**
7. Construct a Red-Black tree with the following elements 40, 16, 36, 54, 18, 7, 48, 5. Delete element 18 and add element 66. [10]
- 8.a) Explain the adjacency list method for graph implementation.
 - b) Write an algorithm for heap sort. [5+5]

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OR

9. Write an algorithm to implement a depth-first search with an example. [10]

10. Illustrate the Brute force algorithm. [10]

OR

11. Describe the Knuth-Morris-Pratt algorithm, focusing on the role of the "failure function" and how it contributes to improving the efficiency of pattern matching. [10]

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