Code No: 157EK **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, February - 2025
DATA STRUCTURES
(Common to CE, ME, ECE)

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)	Write about List ADT?	[2]
b)	Write the logic for deleting a node from the end of a given singly linked list.	[3]
c)	What is a dictionary?	[2]
d)	What is Extendible hashing? Explain.	[3]
e)	What is a Splay tree?	[2]
f)	Discuss about Red-Black tree insertion operation.	[3]
g)	What is external sorting? Give an example?	[2]
h)	Write the steps in Merge sort?	[3]
i)	Write the applications of DFS algorithm.	[2]
j)	What is a compressed trie? What is the difference between suffix tries and compressed tries class?	[3]

PART – B
(50 Marks)

2. Discuss about the stack applications. Evaluate the arithmetic expression:
$2 \uparrow 3 + 5 * 2 \uparrow 2 - 12 / 6$ using stack. [10]

OR

3. Write about Array representation of Queue in detail. Discuss about Queue operations. [10]

4. Explain the step-by-step process of creating a skip list by inserting the following keys in the empty skip list. And delete key 9.
a) 7 with level 1.
b) 30 with level 1.
c) 21 with level 4.
d) 9 with level 3.
e) 5 with level 2. [10]

OR

5. Consider a hash table with 10 slots. The hash function is h(k) = k mod 10. The collisions are resolved by chaining. The following 10 keys are inserted in the order: 6, 29, 19, 16, 26, 33, 13, 18, 11. Find the maximum and minimum chain lengths in the hash table? [10]

6. Draw and explain the Binary Search Tree after each element insertion while constructing it for the following data: 50, 32, 78, 99, 17, 57, 18, 25, 49. And also write the steps in searching a key 49 and deleting 99. [10]

OR

7.a) Write an algorithm to insert and delete a node from an AVL Tree.
b) Write the advantages and disadvantages of AVL trees. [7+3]

8. How Does the BFS algorithm work? Write BFS algorithm and explain it with an example graph. [10]

OR

9.a) What are Min heap and Max heap?
b) Construct a Max Heap for the given data: 35 33 42 10 14 19 27 44 26 31. [3+7]

10.a) Discuss Brute force pattern matching method.
b) Write about 2 Graph representations. [6+4]

OR

11.a) How to count number of distinct substrings of a given string using Suffix Trie? Explain with an example.
b) How to construct a String from another String using Suffix Trie. [5+5]

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