Code No: 153AK **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year I Semester Examinations, September/October - 2023
DATA STRUCTURES
(Common to CSE, IT, ECM, CSBS, CSIT, ITE, CE(SE), CSE(CS), CSE(AI&ML), CSE(DS), CSE(IOT), CSE(N), AI&DS, AI&ML, CSD)

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 Queue? Write a Queue ADT?	[2]
b)	Find the value of the prefix expression: *+2-2 1/-4 2+-5 3 1.	[3]
c)	What is the need of Dictionaries?	[2]
d)	Write the applications of Hashing?	[3]
e)	Write Red-Black Tree properties?	[2]
f)	How do you insert a given Element in a Binary Search Tree?	[3]
g)	Which data structure is used for BFS Graph Traversal Method?	[2]
h)	What techniques are used in merge sort? What is the best case of merge sort?	[3]
i)	What are tries used for?	[2]
j)	What are the advantages and disadvantages of the Knuth-Morris-Pratt algorithm algorithm?	[3]

PART – B

(50 Marks)

2. List out the applications of Linked List? Write a C code to create a Singly Linked List and to delete an element (a) at the beginning (b) in the middle and (c) at the end. [10]

OR

3. What is a Stack? Write about its operations? Explain how the postfix expression is evaluated using Stack? Write the C code for it? [10]

4.a) Explain various Hashing methods with suitable examples.
b) Insert the following sequence of keys in the hash table {4371, 1323, 6173, 4199, 4344, 9679, 1989}. The Hash table fixed size is 10 and a hash function $H(k) = k \bmod m$, where k is the key and m is the size of the hash table, Use Quadratic probing technique for collision resolution. [4+6]

OR

5. What is a Skip List? Write a C code for creating a Skip List and also for inserting a new node, for deleting a node and for searching for a given key? [10]

6. Show the result of inserting the values 2, 1, 4, 5, 9, 3, 6, 7 into an empty splay tree. Show the tree at the end of each insertion. Show each rotation? [10]

OR

7. Construct an AVL Tree for the following sequence of numbers- 50 , 20 , 60 , 10 , 8 , 15, 32 , 46 , 11 , 48. Write each step? [10]

8. Construct the binary Min Heap that results from inserting 20, 14, 16, 34, 7, 42, 7, 8, 11 in that order into an initially empty binary heap. Write each step? Draw the final binary heap that results from doing 2 deletions of mins? [10]

OR

9.a) Explain various Graph representations with suitable examples?
b) Write DFS algorithm? Explain each step with an example? [5+5]

10. Write Boyer –Moore algorithm? Explain with an example? [10]

OR

11. What are different types of tries? Explain all with examples? [10]

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