R18 Code No: 153AK JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD B.Tech II Year I Semester Examinations, August/September - 2022 **DATA STRUCTURES** (Common to CSE, IT, ECM, CSBS, CSIT, ITE, CSE(SE), CSE(CS), CSE(AIML), CSE(DS), CSE(IOT), CSE(N))

Time: 3 Hours

Max.Marks:75

Answer any five questions All questions carry equal marks

- 1.a) The following numbers 10, 20, 50, 30, 90, 60 (Top) are present in a stack of size 10. Perform the following operations in sequence. pop(), push(30), push(40), pop(), push (60), pop(), pop(), pop() What is the peek element at last? Draw and explain it. [8+7]
 - Implement a queue data structure using Single Linked list. b)
- The Professor Lilly is very strict in class room. She never gives the attendance to those 2.a) who are coming last in her class. Write a function to help Professor to delete the last Occurrence of a student from the list.
- Implement a stack data structure using Single Linked list. [8+7] b)
- Explain how Insertion, Deletion and Search is done in skip lists with example. 3.a)
- What is the expected number of probes for both successful and unsuccessful searches b) in a linear probing table with load factor 0.25? [7+8]
- Given the input (4371, 1823, 6173, 4199, 4344, 9679, 19891), a fixed table size of 10, 4.a) and a hash function $H(x) = X \mod 10$, show the resulting quadratic probing hash table.
- Outline Double Hashing with an example. **b**) [8+7] In an initial AVL tree insert the following keys: DEC, JAN, APR, MAR, JUL, 5.a) AUG, OCT, FEB, NOV. Draw AVL tree after every insertion and apply rotations
- where ever necessary. Briefly discuss about different cases of imbalance that might be caused by a red-black b) tree insertion and corresponding methods to rebalance the tree. [7+8]
- 6.a) Construct Splay tree with the following node values: 18, 10, 5, 28, 13, 25, 42,3,56,2,68,1,90. And perform normal splaying at nodes 1 and at node 90.
 - Explain insertion operation with following numbers into Red Black tree b) 45, 10, 8, 9, 34, 35, 12, 60, 90. [7+8]
- Assume a list containing 4500 records is to be sorted using a computer with internal 7.a) memory capable of sorting at most 750 records at a time and input list is maintained on a disk that has block length of 250 records. For this scenario explain how external sorting may be performed to accomplish the task.
 - Compare BFS and DFS with suitable examples. b) [8+7]

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- 8.a) Solve the Boyer-Moore algorithm for the following Example: Text: ABCABCDABABCDABCDABDE Pattern: ABCDABD
- Solve the Knuth Morris-Pratt algorithm for the following Example: **b**) Text: HEREISASIMPLEEXAMPLE Pattern: EXAMPLE

[8+7]

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