Course Code : CST 320 **CXDW/RW – 18 / 5509**

Sixth Semester B. E. (Computer Science and Engineering) Examination

ADVANCED DATA STRUCTURES

Time : 3 Hours] [Max. Marks : 60

Instructions to Candidates :—

(1) All questions carry equal marks.
(2) Assume suitable data wherever necessary.
(3) Due credit will be given to neatness and adequate answers.

1. (a) Compare Open Hashing and Closed Hashing based on their advantages and disadvantages.
Consider insertion of keys 10, 22, 31, 4, 15, 28, 17, 88, 59 into a hash table of length m = 11 using quadratic probing with hash function $h_1(k)$ = k mod m. Illustrate the result of inserting keys. 6(CO1)

(b) What is extendible hashing ? Notify why it is required and which data structure to be used for implementing it ? 4(CO1)

2. (a) Write a pseudo code for implementing insertion operation in RB tree. Consider suitable example and trace the algorithm written. Also, state the time complexity of the same. 6(CO2)

(b) Comment on "Top Down Insertion is more efficient as compared to bottom up insertion with respect to RB Tree". 4(CO2)

3. Solve any **Two** :

(a) Discuss Top Down Insertion and Bottom Up Insertion in B–Tree with suitable example. 5(CO2)

(b) How does a B tree differ from a B+ Tree ? Show the results of inserting the keys 59, 11, 51, 88, 56, 67, 26, 73, 84, 48, 99, 35, 81, 92, 25 in order into an empty B+ –tree with order as 4. 5(CO2)

(c) With suitable example, elucidate Amortized Analysis of Splaying operations in Splay Tree. 5(CO2)

4. (a) Write algorithm to identify the occurrence of given pattern in the specified text by calculating prefix function.

Apply the same algorithm on given text to match the pattern. Also find out total number of comparisons and shifts required to carry out the matching process.

Text : **ALGORITHM**

Pattern : **RITHM** 5(CO3)

(b) Write pseudocode to implement to identify longest common subsequences. Trace the algorithm on given sequences and determine common sequences.

X = ABCBDAB

Y = BDCABA 5(CO3)

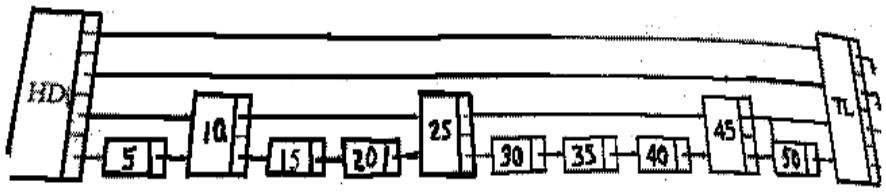
5. (a) Write an algorithm for 2–D range search. Discuss various applications for range searching. 5(CO4)

(b) What is Quad Tree ? Construct Quad Tree for the following points.

A(40,45), B(15,70), C(70,10), D(69,50), E(55,80), F(80,90) 5(CO4)

6. (a) Write the routines for updating the given skip list. Also, comment on analysis time complexity of the same. 5(CO4)

(b) What is Deterministic skip list ? Discuss insertion and deletion procedures. Apply the same on following Deterministic skip list to insert 27.



Show intermediate skip lists which are generated during insertion of 27 in the list. 5(CO4)