

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION-2022

M.Tech-I Semester (CS)

COURSE CODE (CREDITS): 22M11CII11 (3)

MAX. MARKS: 25

COURSE NAME: ADVANCED DATA STRUCTURES

COURSE INSTRUCTORS: Dr. Avani Vyas

MAX. TIME: 1 Hour 30 Min

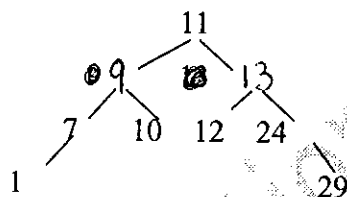
*Note: All questions are compulsory. Marks are indicated against each question in square brackets.*

Q1. Discuss difference between the internal node structure of a B tree and B+ tree. (2 marks)

Q2. Find the maximum number of keys possible in a B tree of the order 4 and height 3. (2 marks)

Q3. Given a Splay tree below, (2 marks)

- Draw the final tree after search(9) operation is executed.
- Draw the final tree when search(10) operation is executed on the tree obtained after above (a) step.



Q4. Derive the time complexity for successful search in a hash table. (3 marks)

Q5. What is the value of load factor for the following collision resolution techniques? Explain your answer. (4 marks)

- Collision resolution by chaining.
- Collision resolution by linear probing

Q6. What do you understand by the following terms: (4 marks)

- 2-3-4 tree
- Black height of a red black tree
- Primary clustering in linear probing
- Minimum degree of the B-tree

Q7. Enter the values 9, 19, 29, 39, 49, 59, 69 into the hash table. Resolve collisions using quadratic probing function  $h(k,i)=(h'(k)+c_1 i + c_2 i^2) \bmod m$  where  $h'(k)=k \bmod m$ .

(4 marks)

Q8. The following key values are inserted into a B+ tree in which the order of the internal nodes is 4, and that of the leaf nodes is 3, in the sequence given below. The order of the internal nodes is the maximum number of tree pointers in each node, and the order of leaf nodes is the maximum number of data items that can be stored in it. The B+-tree is initially empty.

3, 10, 12, 14, 29, 38, 45, 55, 60, 68

Find the maximum number of times leaf nodes would get split up as a result of these insertions.

(4 marks)

12 Examination December 2022