Tribhuvan University

Faculty of Humanities & Social Sciences

OFFICE OF THE DEAN

2021

Bachelor in Computer Applications
Course Title: Data Structures & Algorithms
Code No: CACS201
Semester: III

Full Marks: 60
Pass Marks: 24
Time: 3 hours
Batch: 2020

Candidates are required to answer the questions in their own words as far as possible.

Group B

Attempt any SIX questions. **[6×5 = 30]**

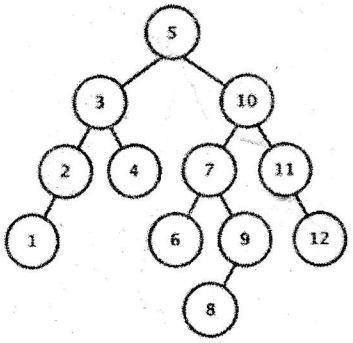
2. What is abstract data type? convert a$b*c-d+e/f/(g+h) into postfix expression using stack. [1+4]
3. What is linked list? Describe types of linked list. Write an algorithm to insert and delete node from beginning of doubly linked list. [1+4]
4. Describe Prim's algorithm to solve MST problem with suitable illustration. [5]
5. What is the limitation of linear queue over circular queue? Write an algorithm to insert and delete node in circular queue. [1+4]
6. What is hashing? Describe the types of collision resolution techniques with suitable example. [1+4]
7. Define divide and conquer algorithm. What is binary search? Write an algorithm to search an item using binary search with suitable illustration. [1+1+3]
8. What is minimax algorithm? Create Huffman Tree and calculate Huffman code for the following characters along with their frequencies using Huffman algorithm. [1+4]

Characters	A	E	I	O	U	S	T
Frequencies	10	15	12	3	4	13	1

Group C

Attempt any TWO questions. **[2×10 = 20]**

9. What is stack? List the application of the stack. Write an algorithm to perform PUSH and POP operation in stack. Describe linked list implementation of stack operations. [1+2+3+4]
10. What is external sorting? Explain heap sort algorithm and trace it to sort the data: 82, 90, 10, 12, 15, 77, 55, 23, 25, 32
11. Differentiate between BST and AVL tree. Given the following AVL Tree:



(a) Draw the resulting BST after 5 is removed, but before any rebalancing takes place. Label each node in the resulting tree with its balance factor. Replace a node with both children using an appropriate value from the node's left child.

b) Now rebalance the tree that results from (a). Draw a new tree for each rotation that occurs when rebalancing the AVL Tree. [2+4+4]