

Tribhuwan University
Institute of Science and Technology
2070

Bachelor Level / third-semester / Science

Computer Science and Information Technology(CSC206)

(Data Structures and Algorithms)

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Full marks: 60

Pass marks: 24

Time: 3 hours

Section (A)

Attempt any two questions:(2x10=20)

1. Trace out Infix to Postfix conversion algorithm with given Infix expression.

A + (((B-C) * (D-E) + F)/G) \$ (H-I)

Evaluate the postfix expression acquired from above for the given values:

A = 6, B = 2, C = 4, D = 3, E = 8, F = 2, G = 3, H = 5, I = 1.

2. Explain the structure of Doubly Linked List (DLL). Differentiate the difference between DLL and Doubly Circular Linked List (DCLL). Explain the procedures to insert a node in DLL at the beginning and at the last.

3. Define Binary Search Tree (BST). Write an algorithm to insert a node in non-empty BST. Construct BST from the data:

10, 20, 30, 25, 27, 7, 4, 23, 26, 21.

Section B

Attempt any eight questions: (5x8=40)

4. Write C function to insert an item circular queue in array implementation. Write assumptions, you need.

5. What is an algorithm? What is to analyze in algorithm? Define Big Oh notation for time complexity measurement of algorithm.

6. State TOH problem. Explain a recursive algorithm to solve the problem.

7. Trace selection – sort algorithm for the following data:

42, 23, 74, 11, 65, 58, 94, 86

8. What is Hashing? What collision means? State collision resolution techniques. Explain one of them in brief.

9. What is weighted graph? Explain Depth-first traversal of a graph.

10. Create a Huffman tree for the following set of data:

Characters	a	b	c	d	e	f
Probability	48	13	11	16	07	05
Encode	0	101	100	111	1101	1100

11. What is dynamic memory allocation? How it is achieved for declaring two dimensional array? Explain.

a) Binary Searching

b) Quick sort

13. Write short notes on (any two):

a) Queue in circular linked list

b) ADT

c) MST (Minimum Cost Spanning Tree) of a graph.