Bachelor Level/ First Year/ Second Semester/ Science   Full Marks60
Computer Science and Information Technology (CSc. 154)   PassMark:24
(Data Structure and Algorithm)

Time: 3 hours.

Section A

Attempt any TWO questions: (10x2=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 Type (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 C = 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:
        142, 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 low dimensional array? Explain.

12. Explain efficiency of
   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.

IOST, TU