

**International Islamic University Chittagong (IIUC)**  
 Department of Electronic and Telecommunications Engineering  
**Final Examination**

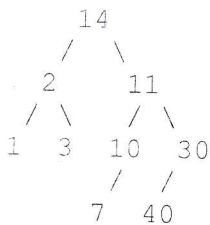
Program: B.Sc. (Engg)  
 Course Code: ETE-2423  
 Time: 2 hour 30 minutes

Semester: Autumn 2018  
 Course Title: Data Structure and Algorithm  
 Full Marks: 50

**[Group A]**

*[Answer any two sets of questions]*

- 1.a) Write a C program to multiply two sparse matrices. 5  
 b) Write a C program which inserts and deletes the elements from a circular doubly linked list. 5
- 2.a) What is tree data structure? Show a complete binary tree. 2+2  
 b) Here is a small binary tree: 6



Write the order of the nodes visited in:

- A. An in-order traversal:  
 B. A pre-order traversal:  
 C. A post-order traversal:
- 3.a) Distinguish between trees and graphs. 2  
 b) Draw the directed graph that corresponds to this adjacency matrix: 4
- |   |       |       |       |       |  |
|---|-------|-------|-------|-------|--|
|   | 0     | 1     | 2     | 3     |  |
| 0 | true  | false | true  | false |  |
| 1 | true  | false | false | false |  |
| 2 | false | false | false | true  |  |
| 3 | true  | false | true  | false |  |
- c) What is adjacency matrix of a graph? Give an example. 4

**[Group B]**

*[Answer any three sets of questions]*

- 4.a) What are the best, average and worst case complexity of the following searching algorithms? 3  
 i) Linear search and ii) Binary search.  
 b) Write an algorithm for a search algorithm that follows divide and conquer strategy. 5  
 c) If data size is 100000, find best case complexity of binary search algorithm. 2
- 5.a) What is the worst case condition of bubble sort algorithm? 2  
 b) Write pseudo code of bubble sort algorithm. 5  
 c) Show the steps to sort the following string using bubble sort algorithm. 3  
 "BANGLADESH"
- 6.a) What is a spanning tree? 2  
 b) Suppose a graph G is maintained in memory in the form 8  
 GRAPH(NODE,NEXT,ADJ.START,DEST,LINK)

Write a procedure which finds the indegree INDEG and the outdegree OUTDEG of each node of G.

7.a) Write an algorithm of implementing matrix addition.

b) Suppose A and B are two 4X4 matrices. Write an algorithm for multiplying this two matrices and store the result into a third matrix C.