# University of Sargodha

## BS 3rd Term Examination 2019

**Subject: Computer Science** **Paper: Data Structure & Algorithms (CMP-3113)**

**Time Allowed: 2:30 Hours** **Maximum Marks: 80**

**Note: Objective part is compulsory. Attempt any four questions from subjective part.**

### Objective Part (Compulsory)

**Q.1.** Write short answers of the following in 2-3 lines each on your answer sheet. (16*2)

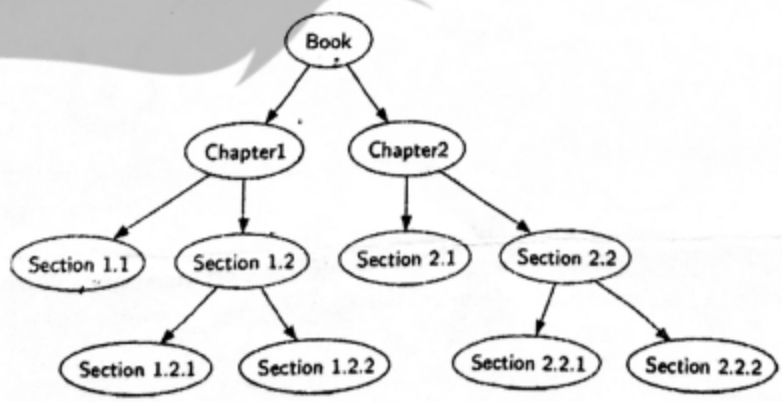
I. Define Data Structure?
II. What is a cycle in a graph?
III. What is ADT? List its benefits?
IV. Write the different categories of strings?
V. What are pointers?
VI. How do you understand hash tables?
VII. Define acyclic graph with an example?
VIII. What is circular queue? Why we use it?
IX. How to find total number of nodes?
X. What is complete binary search tree?
XI. What are tree traversals? How many traversals of binary tree are possible?
XII. When we should not use sequential search?
XIII. What are different methods to represent a graph?
XIV. What is recursion?
XV. What is adjacency list?
XVI. Define full binary tree?

### Subjective Part (4*12)

**Q.2.** Convert the following infix to postfix expression using stack method

A * B(C/D*E(F+G)+H-I*J/K)

**Q.3.** Write a program to insert or delete item from a circular queue.
**Q.4.** What is the time complexity? Discuss time complexity of any two sorting algorithms.
**Q.5.** Apply tree traversals on the following binary tree




**Q.6.** Given an array A={12, 11, 13, 5, 6}. Sort it out using a technique illustrated in insertion sort.
**Q.7.** Write a program to insert a value at specified location in a link list.