

PARUL UNIVERSITY
FACULTY OF IT & COMPUTER SCIENCE
MCA Summer 2018 – 19 Examination

Semester: 2

Subject Code: 05201151

Subject Name: Data Structures

Date: 15/04/2019

Time: 02:00pm to 04:30pm

Total Marks: 60

Instructions:

1. All four questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Answer the followings.**A. Write answers in short (All questions are compulsory)****(05)**

1. Define Stack.
2. Convert given infix expression $((1+2)*3-(4-5)^{(6+7)})$ into prefix and postfix expressions.
3. Define Data Structure.
4. Define Complete Binary Tree.
5. What is space complexity?

B. Do as directed. (Each of 01 marks) (All questions are compulsory)**(10)**

- 1 Which of the following data structure is not linear data structure?
 a) Array b) Linked List c) Both of above d) None of above
- 2 Which of the following data structure is non-linear type?
 a) Strings b) Lists c) Stacks d) Tree
- 3 Which of the following is not the required condition for binary search algorithm?
 a) The list must be sorted b) There should be the direct access to the middle element in any sub-list
 c) There must be mechanism to delete and/or insert elements in list d) None of Above
- 4 A doubly linked list facilitates list traversal
 a) Single Direction b) Any Direction c) Circular Direction d) All
- 5 In Linked Lists there are no NULL Links in:
 a) Singly Linked List b) Doubly Linked List c) Circular Linked List d) None
- 6 _____ is a step-by-step procedure for calculation
 a) Data Structure b) Abstract Data Type c) Primitive Data Type d) Algorithm
- 7 In which notation operator comes after operand?
 a) Infix b) Prefix c) Postfix d) None
- 8 The condition $Top = -1$ indicates that
 a) Stack is empty b) Stack is full c) Stack has one element d) None of these
- 9 The number of elements in array $Array[1:u]$ is given by
 a) $(1 - u)$ b) (u) c) $(u - 1 + 1)$ d) $(u - 1 - 1)$
- 10 Which are the applications of array?
 a) Sparse matrix b) Ordered list c) Both a & b d) none

Q.2 Answer the followings. (3 Mark Questions.) (Any five)**(15)**

1. What is Queue? Discuss main operations of Queue.
2. List different types of Data Structures.
3. Discuss about algorithm with its properties

4. What is sorting? List sorting algorithms.
5. Elaborate Graph Data Structure.
6. Explain any one of the Sorting Algorithm with detail.

Q.3 Answer the following. (Any three) (15)

1. Write a short note on linked list data structure .
2. Explain BFS and DFS with its rules.
3. Explain Binary search and write either Binary Search Algorithm or Binary Search Program..
4. Explain circular queue in detail.

Q.4 Answer the following.

A. Define Stack. List Stack Operations and explain any one of the operations on Stack. (05)

B Answer the following questions. (10)

- 1) Write an algorithm for insertion of new node at the last position of the Linked List
- 2) Define Tree Traversal and list types of Traversal and explain any one Tree Traversal

OR

B Answer the following questions. (10)

- 1) Discuss Tree Data Structure with suitable example.
- 2) Explain Merge sort with program