Seat No:_____ **Enrollment No:_____**

PARUL UNIVERSITY

FACULTY OF IT & COMPUTER SCIENCE

BCA, Winter 2016-17 Examination

Semester: 2 **Date: 03/01/2017**
Subject Code: 05101152 **Time: 10:00 am to 1:00 pm**
Subject Name: Data Structures **Total Marks: 60**

Instructions:
1. Attempt all questions from each section.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Write section-A, section B on separate answer sheets.

SECTION-A

Q.1 Do as directed. **(10)**

1. To estimate complexity of an algorithm which of the following function can be used?
   (a) Big-Oh Notation (b) Big Omega Notation (c) Big Theta Notation (d) All of above
2. Array is _____ type of data structure.
   (a) Linear (b) Homogeneous (c) Non-Homogeneous (d) Both (a) & (b)
3. If top = –1 then the stack is _____.
   (a) full (b) empty (c) static (d) dynamic
4. The memory address of the first element of an array is called _____.
   (a) floor address (b) foundation address (c) first address (d) base address
5. A doubly linked list can traverse in _____ direction.
   (a) one (b) two (c) three (d) four
6. Write any two operations on Data Structure.
7. Write any two applications of Stack.
8. Show the node structure to represent single variable polynomial using single link list.
9. What is dequeue?
10. Define: Stack Overflow & Stack Underflow

Q.2 Do as directed.

(a) What is stack? Write an algorithm for PUSH and POP operations. **(05)**

(b) Write short note on Algorithm analysis. **(05)**

OR

(b) What is Data Structure? List out types of data structure & operations that can be performed on it. **(05)**

Q.3 Do as directed.

(a) Write algorithms for simple queue insert and delete with examples which shows the tracing of each operation on simple queue. **(06)**

(b) Give difference between simple queue and circular queue in terms of their structure. **(04)**

OR

Q.3 Do as directed.

(a) Write algorithm to convert infix expression to postfix expression. Covert the following infix expression into postfix expression using algorithm step. **(07)**
A + (B * C – (D / E ^ F) * G) * H

(b) Evaluate given postfix expression using algorithm steps. **(03)**
5, 1, 2, +, 4, ×, +, 3, −

SECTION-B

Q.1 Do as directed. **(10)**

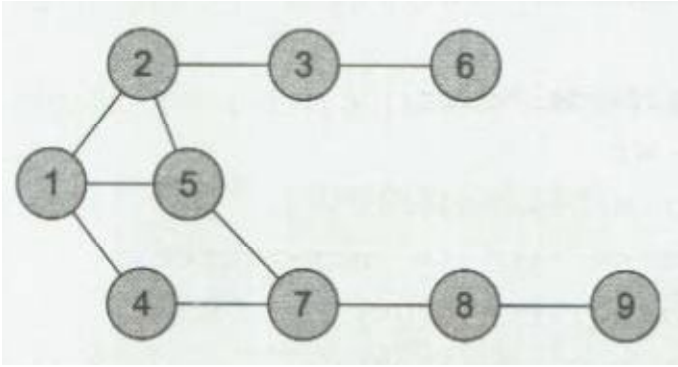
1. Which traversal algorithm technique lists the nodes of binary search tree in ascending order?
   (a) Post order (b) Preorder (c) In order
2. Which of the following sorting method uses divided and conquer technique?
   (a) Merge (b) Bubble (c) Quick (d) Insertion
3. Node without children called _____.
   (a) Leaf Node (b) Root Node (c) Branch (d) Inner Node
4. The data structure required for Breadth First Traversal on a graph is
   (a) Queue (b) Stack (c) Array (d) Tree

5. Give requirement for performing Binary search on a list.
6. Define Vertex.
7. Define Path.
8. Define Self loop.
9. Define Binary tree.
10. Define Outdegree.

Q.2 Do as directed.

(a) Write short note on Linked list. **(05)**

(b) Give difference between BFS and DFS. For the following graph give the result for Depth first search (DFS). Show every step. **(05)**



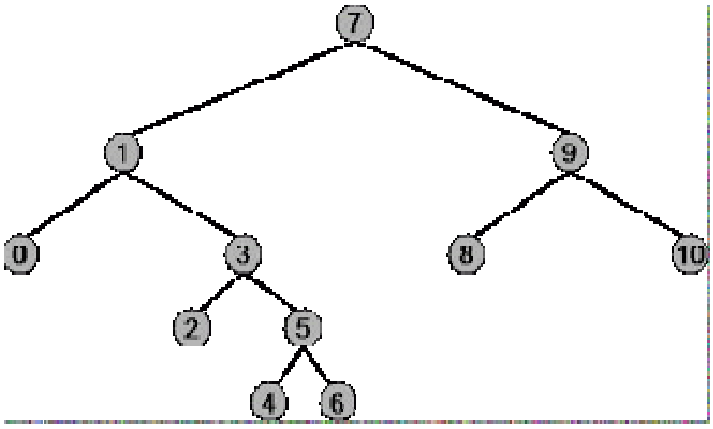
OR

(b) Write Binary Search algorithm. Is Binary search technique more efficient than Linear search? Why? **(05)**

Q.3 Do as directed.

(a) Write algorithm of Selection sort. Sort the below given list using selection sort. **(07)**
99 22 55 77 44 88

(b) Perform traversal of below given tree using all three techniques of tree traversal. **(03)**



OR

Q.3 Do as directed.

(a) Build a Lexically Ordered tree from the below given list of nodes. **(07)**
13, 3, 4, 12, 14, 10, 5, 1, 8, 2, 7, 9, 11, 6, 18

(b) What do you mean by Height balanced tree? **(03)**