PARUL UNIVERSITY
FACULTY OF IT & COMPUTER SCIENCE
MCA, Summer 2017-18 Examination

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Semester: 2	**Date: 17-05-2018**
Subject Code: 05201151	**Time: 10:30AM to 01:00PM**
Subject Name: Data Structures	**Total Marks: 60**

Instructions:
1. All 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 short notes. (05)
    1. Define primitive data structure.
    2. Give real world example of queue.
    3. When stack is said to be underflow?
    4. Define linear search.
    5. What is postorder traversal?

  B. Multiple choice type questions/ Give the sentence true or false. (Each of 01 marks) (10)
    1. An one-dimensional array array[1:5] contains _____ elements.
      a. 5   b. 4   c. 1   d. 6
    2. A data structure where elements can be added or removed at only one end is _____
      a. Linked lists   b. Stacks   c. Queues   d. Deque
    3. In a Doubly Linked List every internal node contains _____links.
      a.1   b. 2   c.3   d. 4
    4. A linked list in which last node contain the link of the first node is called.
      a. Singly linked list   b. Doubly linked list   c. Circular linked list   d. All
    5. The Breadth First Search algorithm has been implemented using the queue data structure. One possible order of visiting the nodes of the following graph is
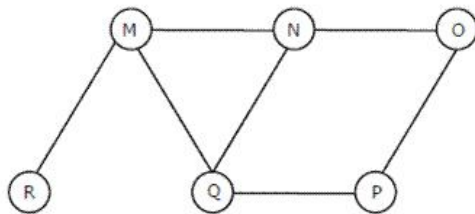
      a. MNOPQR   b. NQMPOR   c. QMNPRO   d. QMNPOR
    6. When new data are to be inserted into a data structure, but there is no available space; this situation is usually called
      a. underflow   b. overflow   c. housefull   d. saturated
    7. Which of the following ways can be used to represent a graph?
      a. Adjacency List   b. Adjacency Matrix   c. both a & b   d. None of the mentioned
    8. The term "push" and "pop" is related to the
      a. array   b. lists   c. stacks   d. all of above
    9. Which of the following data structure is linear type?
      a. Queue b. Tree   c. Graph   d. All
    10. If several elements are competing for the same bucket in the hash table, what is it called?
      a. Diffusion   b. Replication   c. Collision   d. None of the mentioned

Q.2   Answer the followings. (2 or 3 Mark Questions.) (Three Q- 2 marks & Two Q-3 marks.) (15)
    1. Give examples of Linear and Non-Linear Data Structures. (02)
    2. Give some applications of stack. (02)
    3. Explain Advantages and Disadvantages of Linked List. (02)
    4. Convert the infix (a+b)*(c+d)/f into postfix & prefix expression (03)
    5. What is an array? Which operations can be performed on Array? Explain with example. (03)
    6. Write short note on insertion sort. (03)

Q.3   **Answer the following. (Any three)**   (15)
1. Explain insertion operation for circular queue with algorithm.
2. Explain Graph Terminologies-Definition, Undirected Graph, Directed Graph, Complete Graph, Weighted Graph.
3. Create a B Tree of order 5 using following elements- 2 13 9 3 26 6 15 29 18 8 53 17 49 69 4 27 30 54 56 46
4. Draw diagram to show different stages during the building of AVL tree for the following sequence of keys: A, Z, B,Y, C, X, D, U, E. In each case show the balanced factor of all the nodes and name the type of rotation used for balancing.

Q.4   **Answer the following.**
A. Explain Insert operation with algorithm in Linked List.   (05)
B. Explain Merge Sort Algorithm with example.   (10)

<div align="center">**OR**</div>

B. Explain Simple Queue, Circular Queue, Priority Queue and Double ended Queue.   (10)