

MCA–06/PGDCA–06/M. Sc. (IT)–06**Data Structure Through C Language**

First Year, Examination, 2017

Time : 3 Hours**Max. Marks : 80**

Note : This paper is of **eighty (80)** marks containing **three (03)** Sections A, B and C. Learners are required to attempt the questions contained in these Sections according to the detailed instructions given therein.

Section–A**(Long Answer Type Questions)**

Note : Section ‘A’ contains four (04) long answer type questions of nineteen (19) marks each. Learners are required to answer *two* (02) questions only.

1. (a) Describe the various types of Data Structures with their examples.
(b) What is an algorithm ? Differentiate between time and space complexity.
2. Explain inorder, preorder and postorder tree traversal with the help of an example.
3. (a) Explain queue, circular queue, deque and priority queue with examples.
(b) What is Circular Linked List ? Write an algorithm for insertion of a new node into the first position in a circular linked list.

4. (a) Construct a binary tree to represent the following infix expression :

$$(a + b) + (c + d) - e$$

- (b) What are the graph traversal schemes ? Explain.

Section-B

(Short Answer Type Questions)

Note : Section 'B' contains eight (08) short answer type questions of eight (08) marks each. Learners are required to answer *four* (04) questions only.

1. What is Data Structure ? Explain linear and non-linear data structure.
2. Write an algorithm for the implementation of Quick Sort.
3. State the different approaches to design an algorithm and describe any *one* in brief.
4. Write a C program to implement non-recursive implementation of Binary Search.
5. Write in brief about the POLISH Notation.
6. Write the Push and POP functions in C simulating Push and Pop operations of STACK implemented using an array of integers.
7. Write a C program to perform Binary search on 10 elements.
8. Write a C Program to show Bubble sort on 10 elements.

Section-C

(Objective Type Questions)

Note : Section 'C' contains ten (10) objective type questions of one (1) mark each. All the questions of this Section are compulsory.

Answer the following questions.

1. Which of the following is not the type of queue ?
 - (a) Ordinary queue

- (b) Single ended queue
 - (c) Circular queue
 - (d) Priority queue
2. The property of binary tree is :
- (a) The first subset is called left subtree
 - (b) The second subtree is called right subtree
 - (c) The root cannot contain NULL
 - (d) The right subtree can be empty
3. State true *or* false :
- (i) The degree of root node is always zero.
 - (ii) Nodes that are not root and not leaf are called as internal nodes.
- (a) True, True
 - (b) True, False
 - (c) False, True
 - (d) False, False
4. Any node in the path from the root to the node is called :
- (a) Successor node
 - (b) Ancestor node
 - (c) Internal node
 - (d) None of the above
5. State true *or* false :
- (i) A node is a parent if it has successor nodes.
 - (ii) A node is child node if out degree is one.
- (a) True, True
 - (b) True, False
 - (c) False, True
 - (d) False, False

6. is not an operation performed on linear list.
- (i) Insertion
 - (ii) Deletion
 - (iii) Retrieval
 - (iv) Traversal
- (a) Only (i), (ii) and (iii)
(b) Only (i) and (ii)
(c) All of the above
(d) None of the above
7. Which is/are the application(s) of stack ?
- (a) Function calls
 - (b) Large number arithmetic
 - (c) Evaluation of arithmetic expressions
 - (d) All of the above
8. A is an acyclic digraph, which has only one node with indegree 0 and other nodes have indegree 1.
- (a) Directed tree
 - (b) Undirected tree
 - (c) Dis-joint tree
 - (d) Direction oriented tree
9. is a directed tree in which outdegree of each node is less than or equal to two.
- (a) Unary tree
 - (b) Binary tree
 - (c) Trinary tree
 - (d) Both (b) and (c)
10. State true *or* false :
- (i) An empty tree is also a binary tree.
 - (ii) In strictly binary tree, the out-degree of every node is either 0 or 2.
- (a) True, False
 - (b) False, True
 - (c) True, True
 - (d) False, False