

Roll No. ....

## **MCA–06/PGDCA–06/M. Sc(IT)–06**

### **Data Structure Through C Language**

Master of Computer Applications/P. G. Diploma in  
Computer Applications/Master of Science in  
Information Technology  
(MCA–11/16, PGDCA–11/16, M. Sc(IT)–12/16)  
Second Semester, Examination, 2017

**Time : 3 Hours**

**Max. Marks : 70**

**Note :** This paper is of **seventy (70)** marks containing **three (03)** sections A, B and C. 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 fifteen (15) marks each. Learners are required to answer *two* (02) questions only.

1. (a) How a structure can be initialized ? Explain with an example.  
(b) Explain dynamic memory allocation functions used in C.
2. (a) Explain analysis of algorithm. What do you mean by complexity of algorithm ?  
(b) Describe stack and write algorithms for push and pop operations.

3. (a) Explain the merge sort methods with an example.  
(b) Convert the following to prefix and postfix :  
$$(A + B \wedge D)/E - F/G$$
4. (a) What do you mean by binary search tree ?  
Explain with an example.  
(b) Explain shortest path algorithm with reference to graph.

### Section-B

#### (Short Answer Type Questions)

**Note :** Section 'B' contains eight (08) short answer type questions of five (5) marks each. Learners are required to answer *six* (06) questions only. Answer to short answer-type questions must be restricted to 250 words approx.

1. Explain 'Pointer to structure' and 'Pointer in structure' with an example.
2. What is the difference between linear and non-linear data structure ?
3. How stack is useful in Recursion ? Explain with an example.
4. Write a 'C' program to check whether a given number is prime or not.
5. Give the merits and demerits of linear queue and circular queue.
6. Write an algorithm to insert an element in a circular queue.
7. Explain B-Tree giving an example.
8. Differentiate directed and undirected graph.

### 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.

1. The memory address of the first element of an array is called :
  - (a) Floor address
  - (b) Foundation address
  - (c) Base address
  - (d) First address
2. Which of the following data structure store the non-homogeneous data elements ?
  - (a) Arrays
  - (b) Records
  - (c) Pointers
  - (d) None of the above
3. Which of the following data structures are indexed structures ?
  - (a) Linear array
  - (b) Linked lists
  - (c) Both of the above
  - (d) None of the above
4. The situation when in a linked list  $START = NULL$  is :
  - (a) Overflow
  - (b) Underflow
  - (c) Houseful
  - (d) Saturated

5. Binary search algorithm cannot be applied to :
  - (a) Sorted linked list
  - (b) Sorted binary trees
  - (c) Sorted linear array
  - (d) Pointer array
6. Which of the following name does not relate to stacks ?
  - (a) FIFO lists
  - (b) LIFO lists
  - (c) Piles
  - (d) Push-down lists
7. The complexity of binary search algorithm is :
  - (a)  $n$
  - (b)  $n \log_n$
  - (c)  $\log_n$
  - (d)  $n^2$
8. Postfix expression of  $((A + (B - C) * D))$  is
  - (a)  $ABC + D * -$
  - (b)  $ABCD + - *$
  - (c)  $ABC - D * +$
  - (d) None of the above
9. .... is a directed tree in which out degree 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. When in order traversing a tree resulted EACKFHDBG; the pre order traversal would return :
  - (a) FAEKCDBHG
  - (b) FAEKCDHGB
  - (c) EAFKHDCBG
  - (d) FEAKDCHBG