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MBF-003-1032001 Seat No. _____

B. C. A. (Sem. II) (CBCS) (W.I.F. 2016) Examination

March / April - 2018

CS - 07 : Data Structure using C Language

(New Course)

Faculty Code : 003

Subject Code : 1032001

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

1 (A) Attempt the following : **4**

(1) A systematic way of accessing and organizing data is known as _____

(2) An _____ is a step by step sequence of instruction to solve the computational problem in a finite amount of time in an English language.

(3) The amount of memory required to run and completion of an algorithm or program is known as _____ complexity.

(4) When a pointer variable is declared, an _____ must be placed in front of the variable name.

(B) Answer in brief : (Any **One** out of Two) **2**

(1) Explain Big-Oh Notation

(2) Write a C program to accept 5 numbers from users in an array and display it.

(C) Answer in detail : (Any **One** out of Two) **3**

(1) Explain any three storage classes available in C with example.

(2) Differentiate between Static and Dynamic Data Structure.

(D) Write a note on : (Any **One** out of Two) **5**

(1) Write a C program which demonstrates the use of Call by Value & Call by Reference

(2) Write a C program to swap values using pointer without using function.

2 (A) Attempt the following : **4**

(1) _____ sort is also known as "Comparison Sort" because it compares two continually adjacent elements from the list.

(2) _____ sort uses recursion for implementation.

(3) In a Graph, the number of edges incident onto the vertex is known as the _____ of the vertex.

(4) Write the full form of BFS.

(B) Answer in brief : (Any **One** out of Two) **2**

(1) Distinguish between DFS and BFS.

(2) Write algorithm of Binary Search technique.

(C) Answer in detail : (Any **One** out of Two) **3**

(1) Define a graph. Explain Depth First Search of traversing.

(2) Write a C program which implements the use of Bucket Sorting.

(D) Write a note on : (Any **One** out of Two) **5**

(1) Explain minimal spanning tree.

(2) Write a C program which implements the insertion sort using Array.

3 (A) Attempt the following : **4**

(1) A/an _____ is a container of ordered collection of elements into which new data items may be added and from which data items may be deleted at only one end.

(2) If $top = -1$, then the stack is _____.

(3) In queue, insertion happens on _____ end and deletion happens on _____ end.

(4) What is the full form of RPN? It is also known as _____.

(B) Answer in brief : (Any **One** out of Two) **2**

(1) Write two differences of homogeneous and Non-homogeneous data types.

(2) Write any two applications of stack.

(C) Answer in detail : (Any **One** out of Two) **3**

(1) Convert the infix notation : $A + \left[(B - C)^{*} D \right] / E$ into postfix notation.

(2) Write an algorithm to delete element in double ended queue.

(D) Write a note on : (Any **One** out of Two) **5**

(1) Write algorithm steps to push and pop elements from stack.

(2) Write a C program which implements Queue using array and structure.

4 (A) Attempt the following : **4**

(1) There is no beginning and no end in a _____ linked list.

(2) Consider the following definition in c programming language and state whether ptr=(NODE*)malloc (sizeof(NODE)); is the c code to create new node is true or false.

```
struct node
{
int info;
struct node * next;
}
typedef struct node NODE;
NODE *ptr;
```

(3) A variant of the linked list in which none of the node contains NULL pointer is _____

(4) Write the full form of TOS.

(B) Answer in brief : (Any **One** out of Two) **2**

(1) Differentiate: Singly Linked List V/s Doubly Linked List

(2) State the advantages of linked list over array.

(C) Answer in detail : (Any **One** out of Two) **3**

(1) Write an algorithm to manipulate following operations on doubly linked list : Create, Delete Specific (by value), Display.

(2) Write an algorithm to manipulate following operations on circular linked list: Create, Display Insert First, Delete Last and Sort.

(D) Write a note on : (Any **One** out of Two) **5**

(1) Write a menu driven singly linked list program in C which performs the entire linked list operations.

(2) Write a menu driven circular doubly linked list program in C which performs the entire linked list operations.

5 (A) Attempt the following : **4**

(1) _____ type of traversal of binary search tree outputs the value in sorted order.

(2) In _____ traversal, the root node is visited list.

(3) If a node having two children is to be deleted from binary search tree, it is replaced by its _____ node.

(4) A binary search tree is generated by inserting in order the following integers :
50, 15, 62, 5, 20, 58, 91, 3, 8, 37, 60, 24
The number of the node in the left sub-tree and right sub-tree of the root, respectively, is (_____, _____)

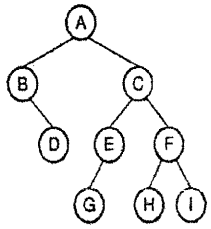
(B) Answer in brief : (Any **One** out of Two) **2**

(1) A _____ is a tree which has nodes either empty or not more than two child nodes, each of which may be a leaf node.

(2) Differentiate for Binary tree: Sequential Representation using Arrays V/s Linked List Representation

(C) Answer in detail : (Any **One** out of Two) **3**

(1) Consider the given Binary Search Tree:
Write the Pre-order, In-order and Post-order traversal for the tree.



(2) Explain the basic terminologies of a binary tree.

(D) Write a note on : (Any **One** out of Two) **5**

(1) Write a C program which implements the traversals of a binary tree.

(2) Given a sequence of numbers:
11, 6, 8, 19, 4, 10, 5, 17, 43, 49, 31
Draw a binary search tree by inserting the above numbers from left to right.