

**AMIETE – ET/CS/IT (Current & New Scheme)**

Time: 3 Hours

**June 2016**

Max. Marks: 100

*PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.*

**NOTE: There are 9 Questions in all.**

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions, selecting at least TWO questions from each part, each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

**Q.1 Choose the correct or the best alternative in the following: (2×10)**

- a. A \_\_\_\_\_ unsigned int can have only nonnegative values in the range 0–65535.
- (A) four byte (B) three-byte  
(C) one byte (D) two-byte
- b. \_\_\_\_\_ an \_\_\_\_\_ pointer could cause a fatal execution-time error, or it could accidentally modify important data and allow the program to run to completion, possibly with incorrect results.
- (A) Dereferencing, initialized (B) Dereferencing, uninitialized  
(C) Referencing, initialized (D) Referencing, uninitialized
- c. The conditional operator known as \_\_\_\_\_ takes three operands and is closely related to the if...else statement that forms a conditional expression.
- (A) binary operator (B) ternary operator  
(C) multi operator (D) quad operator
- d. For the \_\_\_\_\_ to eventually terminate, each time the function calls itself with a slightly simpler version of the original problem, this sequence of smaller and smaller problems must eventually converge on the base case.
- (A) iteration (B) sequence function  
(C) recursion (D) optimize function
- e. \_\_\_\_\_ is a compound data type which enables the same piece of memory to be defined as two or more different types of variables and the compiler automatically allocates enough storage to hold the \_\_\_\_\_ member of that data type.
- (A) union, largest (B) structure, largest  
(C) union, smallest (D) structure, smallest

- f. The list in which every node has a successor and the last element is succeeded by the first element is known as \_\_\_\_\_.
- (A) spiral linked list                      (B) dynamic linked list  
(C) circular linked list                    (D) double linked list
- g. Compilers often use \_\_\_\_\_ to perform syntax analysis of language statements.
- (A) Stacks                                      (B) Queues  
(C) List                                         (D) All of these
- h. The order in which we insert the nodes determine the shape of the tree. If the node are inserted in order (or reverse order), the tree will be \_\_\_\_\_.
- (A) skewed                                    (B) balanced  
(C) complete                                 (D) dynamic
- i. \_\_\_\_\_ will never classify an edge as forward, i.e., there are no edges  $(u,v)$  with  $\text{degree}(v) > \text{degree}(u)+1$ .
- (A) DFS                                        (B) BFS  
(C) TFS                                        (D) None of these
- j. A graph can be a completely connected graph, if
- (A) for every pair of distinct vertices  $(v_i, v_j)$  there is no path from  $v_i$  to  $v_j$ .  
(B) for every pair of distinct vertices  $(v_i, v_j)$  there exists no edges  
(C) for every pair of distinct vertices  $(v_i, v_j)$  there exists few edges  
(D) for every pair of distinct vertices  $(v_i, v_j)$ , there exists an edge

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**PART (A)**

**Answer at least any TWO Questions. Each question carries 16 marks.**

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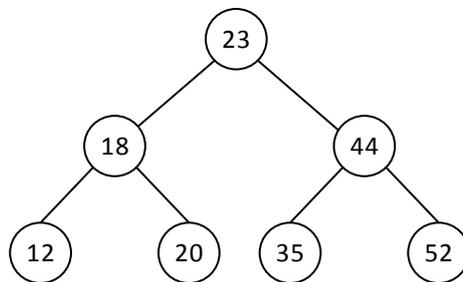
- Q.2** a. Explain various data types in C programming language. (5)
- b. Explain type conversion and forced conversion. Mention their respective rules for conversion. (4+4)
- c. Mention various types of operators used in C programming language. (3)
- Q.3** a. Explain switch statement and give an illustration. (5)
- b. Explain the applications of break and continue statements used in control structures. (2+2)
- c. Explain pointers. Give an example with illustration. (3+4)

- Q.4** a. Explain pointer arrays and give an illustration. (6)  
 b. Give an example to initialize three-dimensional array. (4)  
 c. Define recursion. Explain stack overheads in recursion (2+4)
- Q.5** a. Define strings. Explain fixed length and variable length string representation. (2+5)  
 b. Explain Unions. Give the syntax. (4)  
 c. Write a C program to illustrate Structure Pointers. (5)

**PART (B)**

**Answer at least any TWO Questions. Each question carries 16 marks.**

- Q.6** a. Explain the functioning of Bubble Sort algorithm and compare it with Quick Sort. (4+4)  
 b. What is static contiguous list? Write a C program to add two given matrices using arrays. (8)
- Q.7** a. Explain the array implementation of stacks using push and pop functions. (6)  
 b. How do circular linked lists can be formed, explain with the help of a C program. (6)  
 c. Write a C program to reverse a list of items using stacks. (4)
- Q.8** a. Write a program to count the number of nodes in a binary search tree. (8)  
 b. What is meant by order of traversal of binary tree? Write the postorder and inorder traversal of the following binary tree : (2+6)



- Q.9** a. Describe the method of MST using Prim's algorithm. Mention the application of minimum-cost spanning tree. (3+3)  
 b. Explain Breadth First Search and give its significance. (3+3)  
 c. Explain how a graph can be represented using the adjacency-list and adjacency matrix for an un-directed graph with an example. (4)