

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

Time: 3 Hours

**DECEMBER 2015**

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. The format identifier ‘%i’ is used for \_\_\_\_\_ data type.
- (A) char (B) int  
(C) float (D) double
- b. Which of the following cannot be used as LHS of the expression in for (exp1;exp2; exp3) ?
- (A) Variable (B) Function  
(C) typedef (D) macros
- c. What is the scope of a function?
- (A) Whole source file in which it is defined  
(B) From the point of declaration to the end of the file in which it is defined  
(C) Any source file in a program  
(D) From the point of declaration to the end of the file being compiled
- d. Comment on the following statement:  
int (\*a)[7];
- (A) An array “a” of pointers (B) A pointer “a” to an array  
(C) A ragged array (D) a is pointer of pointer
- e. Which of the following are themselves a collection of different data types?
- (A) string (B) structures  
(C) char (D) function
- f. Binary search algorithm cannot be applied to
- (A) sorted linked list (B) sorted binary trees  
(C) sorted linear array (D) unordered list

- g. Which of the following name does not relate to stacks?
- (A) FIFO lists (B) LIFO list  
(C) Piles (D) Push-down lists
- h. The term "push" and "pop" is related to the
- (A) array (B) lists  
(C) stacks (D) queue
- i. The complexity of Bubble sort algorithm is
- (A)  $O(n)$  (B)  $O(\log n)$   
(C)  $O(n^2)$  (D)  $O(n \log n)$
- j. Which of the following data structure is linear data structure?
- (A) Trees (B) Graphs  
(C) Arrays (D) List

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**PART (A)**

**Answer at least TWO Questions from this part. Each question carries 16 marks.**

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- Q.2** a. Given the value of  $C1 = 4$  and  $C2 = 6$ . What will be the value of  $C3$  for each of the following expression?
- (i)  $C3 = C1 \& C2$  (ii)  $C1 \ll 2$   
(iii)  $C1 \wedge C2$  (iv)  $C1 | C2$  (4)
- b. Write a C language program to find whether a given number is palindrome or not. (6)
- c. What is data type? Explain any four data types used in C language. (6)
- Q.3** a. Differentiate between relational and logical operators used in C. (4)
- b. Compare and contrast the following:
- (i) *While* and *For* loop  
(ii) *Break* and *Continue* statement  
Use suitable examples. (8)
- c. What are escape sequences? What is effect of following Escape sequences?  
 $\backslash a, \backslash b, \backslash r, \backslash f$  (4)
- Q.4** a. What are the differences between `malloc()` and `calloc()`? (4)
- b. Write a recursive function to calculate factorial of a number. (4)
- c. Write a C language program to read two matrices and add them. (8)

- Q.5** a. What is a file? Identify & explain the various types of operations that can be performed on sequential files. (6)
- b. What is a pre-processor directive in C programming language? (4)
- c. Write a program to store information of 10 students using structure. (6)

**PART (B)**

Answer at least TWO Questions from this part. Each question carries 16 marks.

- Q.6** a. What data structures is used to perform recursion and why? (4)
- b. Differentiate between the data structures, a queue and a stack. (4)
- c. Write the algorithm for sorting a list of numbers using bubble sort. (8)
- Q.7** a. Write an algorithm to find the Smallest Element in the Array. (8)
- b. For a graph, define the following:  
 (i) Degree of a vertex (ii) Simple path  
 (iii) Completely connected graph (iv) Maximum number of edges (8)
- Q.8** a. Write a program in C to allocate memory dynamically for strings, and store their addresses in array of pointers to strings. (8)
- b. Write C function to  
 (i) Create a linked list  
 (ii) Delete an element from a linked list (8)
- Q.9** a. Write an algorithm in C to search for an element in a list of elements using Binary Search. (8)
- b. Traverse the following tree in  
 (i) Inorder  
 (ii) Preorder  
 (iii) Postorder  
 and give the output. (8)

