

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

Time: 3 Hours

**June 2018**

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. Which operator has the lowest priority?  
 (A) ++ (B) %  
 (C) + (D) ||
- b. Data type assigns \_\_\_\_\_ to a variable.  
 (A) Property (B) Value  
 (C) Reference (D) None of these
- c. What is the output of the following code snippet?  

```
printf("%X %x %ci %x",11,10,'s',12);
```

 (A) Error (B) Bas94c  
 (C) basc (D) None of these
- d. Switch cannot contain which of the following keywords?  
 (A) Break (B) Continue  
 (C) Return (D) None of these
- e. An array in C language should have which of the following data type for its subscript?  
 (A) int (B) float  
 (C) long (D) char
- f. What is the output of the following program?  

```
void main(){char string[]="Hello World";display(string);}
void display(char *string){printf("%s",string);}
```

 (A) Hello World (B) hello world  
 (C) No string is displayed (D) Compiler Error
- g. In quick sort, to obtain the key's proper position it should be traversed in\_\_\_\_\_  
 (A) Forward Direction (B) Reverse Direction  
 (C) Both the Directions (D) Any one Direction

- h. The data structure used in function call, returning and recursion is  
 (A) Stack (B) Queue  
 (C) Circular Queue (D) All of these
- i. For a complete binary tree, the  $i^{\text{th}}$  node's parent will be found at \_\_\_\_\_ position, left child at \_\_\_\_\_ position and right child at \_\_\_\_\_ position.  
 (A)  $2i^{\text{th}}$ ,  $i/2^{\text{th}}$ ,  $2i + 1^{\text{th}}$  (B)  $i/2^{\text{th}}$ ,  $2i + 1^{\text{th}}$ ,  $2i^{\text{th}}$   
 (C)  $i/2^{\text{th}}$ ,  $2i^{\text{th}}$ ,  $2i+1^{\text{th}}$  (D)  $2i^{\text{th}}$ ,  $2i+1^{\text{th}}$ ,  $i/2^{\text{th}}$
- j. A graph traversed by visiting the nodes in the \_\_\_\_\_ direction is called as Depth-First traversal  
 (A) Deeper (B) Adjacent  
 (C) Reverse (D) Arbitrary

**PART (A)**

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

- Q.2** a. Give the size of integer, character, float and long double data types in bytes? What are the values that could be given to each of the listed data types? What are the different format specifiers used for each of these data types? (10)
- b. Write a short note on: (1.5 x 4)  
 (i) Ternary Operator (ii) Increment operator  
 (iii) Bitwise Operator (iv) Conditional Operator
- Q.3** a. Given the marks of a student, write a C program to calculate and display the grade of the student. The grades may be S if the mark is between 91 and 100, A if the mark is in between 81 and 90, B if in between 75 and 80, C if in between 65 and 74, D if between 55 and 64, E if between 50 and 54 and fail if less than 50. Use appropriate control structures in the program. (6)
- b. Write a C program to find the largest of three given numbers. Input should be obtained from the user (6)
- c. Write a program to print the Fibonacci series. (4)
- Q.4** a. Write a C program to access an array using Pointers. (4)
- b. Write a C program to find the factorial of a given number using Recursion. (4)
- c. Explain, how the concept of Stack is used in function call. Provide necessary example programs and diagrams? (8)
- Q.5** a. Is String an array of characters? Justify your answer with necessary details. Provide necessary example programs and the required explanations. (6)

- b. Write a C program using structures to process the details of a class containing 50 students. Following details of the students should be obtained from the user, processed and displayed.
1. Name of the student
  2. Department of the student
  3. Address of the student
  4. Marks obtained by the student (6)
- c. Display the details of part (b) in the increasing order of marks. (4)
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**PART (B)**

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

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- Q.6** a. Write a C program to find the Transpose of a matrix. (10)
- b. Using Bubble Sorting algorithm sort the given set of numbers. Provide the trace of each step. 23, 5, 4, 9, 1. (6)
- Q.7** a. Write a c program to implement a stack and its operations using an array. (10)
- b. Explain the applications of doubly linked lists to memory management. (6)
- Q.8** a. Explain the deletion of a node in a Binary Search Tree with suitable diagrams (16)  
(Need not write any program)
- Q.9** a. Write a C program to compute the in-degree and out-degree of a node in a graph. Make necessary assumptions for required data. (12)
- b. Draw a graph with six nodes interconnected. Provide the corresponding array representation of the graph and explain briefly (4)