

AMIETE – ET/CS/IT (Current Scheme)

Time: 3 Hours

June 2019

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. Literal means

- (A) A string (B) A string constant
(C) A character (D) An alphabet

b. The Breadth First search uses which of the following data structure to hold the nodes?

- (A) Stack (B) Queue
(C) Tree (D) None of these

c. Output of the following program fragment is

```
x = 5;
y = x++;
printf(“%d%d”, x, y);
```

(A) 5, 6 (B) 5, 5
(C) 6, 5 (D) 6, 6

d. Consider the following program

```
main ( )
{ float a = 0.5, b = 0.7;
if (b < 0.8)
if (a < 0.5) printf (“ABCD”);
else printf (“PQR”);
else printf (“JKLF”);
}
```

The output is

- (A) ABCD (B) PQR
(C) JKLF (D) None of these

e. The following program fragment

```
int *a;
*a = 7;
```

(A) Assigns 7 to a (B) Results in compilation error
(C) Assigns address of a as 7 (D) Segmentation fault

- f. A pointer variable can be
 (A) Passed to a function as argument (B) Changed within function
 (C) Returned by a function (D) Assigned an integer value
- g. A self-contained block of statements that perform a coherent task of some kind is called a
 (A) Monitor (B) Function
 (C) Program (D) Structure
- h. The loop in which the statements within the loop are executed at least once is called
 (A) Do-while (B) While
 (C) For (D) Goto
- i. The binary tree with n nodes can have maximum
 (A) n-1 branches (B) n branches
 (C) n/2 branches (D) $\log_2 n$ branches
- j. Which of the following searching techniques is appropriate only for arrays in a particular order
 (A) Linear Search (B) Binary Search
 (C) Hashing (D) Tree Search

PART (A)

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

- Q.2** a. Write C statements to read the values of three variables of the type int, float and string and print them if correct data is entered otherwise print "error in input" (4)
- b. Distinguish between the following:
 (i) Syntactic error and semantic error (2)
 (ii) Run time error and logical error (2)
 (iii) Compiler and Interpreter (2)
- c. Write a C function that returns 1 if the argument is a prime number and returns 0 otherwise. (6)
- Q.3** a. Explain memory representation of an array. (4)
- b. How is the address of an element calculated in an n- dimensional array arranged in row major order. (4)
- c. Explain call by reference in parameter passing using a suitable example. (8)
- Q.4** a. Write a switch statement that will examine the value of an integer variable flag and print the following messages: (6)
 It is hot weather; if flag has value 1
 It is a stormy weather; if flag has value 2
 It is sticky weather; if flag has value 3
 It is a pleasant weather; otherwise

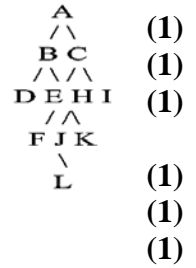
- b. (i) What is a function? (2)
(ii) List out the advantages & disadvantages of using functions in C. (2)
(iii) When passing parameters to functions, explain the difference between pass-by value and pass-by reference. (2)
- c. Design an algorithm that accepts a positive integer and reverses the order of its digits. (4)
- Q.5** a. Write a program to extract a portion of a character string and print the extracted string. Assume that “m” characters are extracted. Starting with the “n” th character. (8)
- b. i. What is the difference between a structure and union? (4)
ii. Write a C function for searching an element in an array of size N. Assume that elements in array are stored in ascending order. (4)

PART (B)

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

- Q.6** a. i. Define a two dimensional array. (2)
ii. What are the applications of an array? (2)
iii. Write a program for 2-D Matrix Multiplication using arrays. (2)
- b. i. Explain Stack with its example. (2)
ii. Define the various operation performed on Stack. (1)
iii. Explain application of Stack. (1)
iv. Write a pseudo code for implementing stack using linked list. (2)
- c. Convert following infix expression to postfix expression:
i. $((a+b)/d-((e-f)+g))$ (2)
ii. $12/3*6+6-6+8/2$ (2)
- Q.7** a. Define circular linked list. (2)
What are the advantages and disadvantage of circular linked list? (2)
What is the node structure for circular linked list? (3)
What is the difference between circular linked list and linear linked list? (2)
- b. Evaluate the postfix expression using stack. (3)
 $5\ 1\ 2\ 3\ 2\ \wedge\ *\ / -$
- c. Write pseudo code to add node at the end in single linked list. (4)
- Q.8** a. Create a binary tree using inorder and preorder traversal (5)
Inorder: D B H E A I F J C G, Preorder: A B D E H C F I J G
- b. Write down complexity of insertion sort. In which situation bubble sort should be used? (5)

- c. Consider the following tree:
- i. How many leaves does it have?
 - ii. How many of the nodes have at least one sibling?
 - iii. What is the value stored in the parent node of the node containing 30?
 - iv. How many descendants does the root have?
 - v. What is the depth of the tree?
 - vi. How many children does the root have?



- Q.9**
- a. Write a C program for DFS traversal. (4)
 Explain the same with the help of an example. (3)
 What is the difference between DFS and BFS. (2)
 - b. Give difference between recursion and iteration with suitable example. (2)
 - c. What is a spanning Tree and what is minimum cost spanning Tree. (5)
 Explain using example.