Code: AE52/AC52/AT52   Subject: C & DATA STRUCTURES

AMIETE – ET/CS/IT

Time: 3 Hours   **DECEMBER 2014**   **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 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. What is the output of the following program?
```
#include <stdio.h>
int main(){
        int c=08;
        printf("%d",c);
        return 0;
}
```

   (A) 8
   (B) 0
   (C) Compile Time Error
   (D) None of these

b. A character variable can store x characters at a time, x is

   (A) 1 character
   (B) 8 character
   (C) 256 character
   (D) None of these

c. What is the mean of type casting?

   (A) Conversion of variables
   (B) Conversion of the Data item
   (C) fixed the value of Data item
   (D) None of these

d. What is the output of the following program?
```
main()
{
static int var= 5;
printf("%d ",var--);
if(var)
main();
}
```

   (A) 1 2 3 4 5   **(B)** 5 3 4 2 1
   (C) 5 4 3 2 1   **(D)** 1 2 3 4 4

e. What is the output of the following program?
```
main()
{
        char string[]="Hello World";
        display(string);
}
void display(char *string)
{
        printf("%s",string);
}
```

   (A) "Hello World"
   (B) Compiler Error : Type mismatch in redeclaration of function display
   (C) Hello World
   (D) None of these

f. If the sequence of operations - push(1), push(2), pop, push(1), push(2), pop, pop, pop, push(2), pop are performed on a stack, the sequence of popped out values are?

   (A) 2, 2, 1, 1, 2   **(B)** 2, 2, 1, 2, 2
   (C) 2, 1, 2, 2, 1   **(D)** 2, 1, 2, 2, 2

g. A machine took 200 sec to sort 200 names, using bubble sort. In 800 sec, it can approximately sort?

   (A) 800 names   **(B)** 400 names
   (C) 750 names   **(D)** 500 names

h. Which of the following operations is performed more efficiently by doubly linked list than by singly linked list?

   (A) Traversing a list to process each node
   (B) Searching of an unsorted list for a given item
   (C) Inverting a node after the node with given location
   (D) Deleting a node whose location in given

i.   A characteristic of the data that binary search uses but the linear search ignores is the_____.

(A) Order of the elements of the list   (B) Length of the list
(C) Maximum value in list   (D) Type of elements of the list

j.   What is the postfix form of the following prefix *+ab–cd

(A) ab+cd–*   (B) abc+*–
(C) ab+*cd–   (D) ab-*cd+

PART (A)
Answer at least any TWO Questions. Each question carries 16 marks.

Q.2   a.   Explain the difference between Type Conversion and Typecasting with the help of examples.   **(5)**

b.   Explain in brief the following: **(6)**

(i)   Ternary Operator
(ii) Modulus Operator

c.   Write a program to find the maximum among five given numbers.   **(5)**

Q.3   a.   Differentiate between the following concepts in C language: **(9)**

(i)   break and continue statement
(ii)   while and do while constructs
(iii) switch statement and if-else statement

b.   Write a program that reads a number and a single digit. It determines whether the number contains the digit or not.   **(7)**

Q.4   a.   Describe array of pointers. Illustrate with proper example.   **(6)**

b.   Write a program that dynamically allocates an array of integers. A list of integers is read from keyboard and stores in the array. The program determines the smallest in the list and prints its location in the list.   **(10)**

Q.5   a.   What is the difference between strings and character array?   **(4)**

b.   Define union with examples.   **(4)**

c.   What is a File pointer? Write a program to copy the contents of one file into another.   **(8)**

PART (B)
Answer at least TWO Questions. Each question carries 16 marks.

Q.6 a. Input a two dimensional array of order m × n. Write an algorithm which should output this Array and another two dimensional array of order (m+1) × (n+1), in which the elements of (m+1) row should be the sum of elements of m rows and element of (n+1) column should be the sum of n columns.   **(8)**

  b. A list is ordered from smaller to largest when a sort is called. Which sorting algorithm would take the shortest time to execute? Justify.   **(8)**

Q.7 a. Compare the stack and queue data structure. What is the difference between FIFO and LIFO? Give any three applications of stacks and queues each in System programming.   **(8)**

  b. Write a C function to merge two sorted linked lists into new sorted list.   **(8)**

Q.8 a. Draw binary tree which denotes the following algebraic expression   **(8)**
  [a+(b-c)]×[(d-e)/(f+g-h)]
  Change it into prefix expression using TRAVERSAL method.

  b. Write an algorithm/ C program to delete a node from binary search tree.   **(8)**

Q.9 a. Define the following terms: **(9)**

  (i)   Connected graph
  (ii) Path
  (iii) Directed Acyclic Graph

  b. What is topological sorting of a graph? Give an example to illustrate topological sort.   **(7)**