ROLL NO. _____

Code: AC05/AT05 **Subject: PROG. & PROBLEM SOLVING TH… 'C'**

AMIETE – CS/IT (OLD SCHEME)

Time: 3 Hours **OCTOBER 2012** **Max. Marks: 10…**

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. 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 global variables by default belong to

(A) the register type **(B)** the static type
(C) the auto type **(D)** the extern type

b. What will be the output of the following program?

```
# include <stdio.h>

int main() {

        int i=5 ,j;

       j=++i+++i+++i;

       printf("%d    %d" ,i ,j);

       return 0;

}
```

(A) 7 21 **(B)** 8 21
(C) 7 24 **(D)** 8 24

c. What will be the output of the following C code?

```
# include <stdio.h>
int main() {
int  check =2
switch ( check)  {
        case 1: printf ("  Car");
        case 2 : printf ("  Aeroplane");
        case 3 : printf ("  Train");
        default : printf ("  Auto");
        }
return 0;
}
```

(A) Aeroplane **(B)** Auto
(C) Aeroplane Train Auto **(D)** Aeroplane Train

d. What will be the output of the following program?

```
# include <stdio.h>
    int main() {
    int i=1;
    i=2+2*i++;
    printf("%d ",i);
    return 0;
    }
```

(A) 4 **(B)** 5
(C) 6 **(D)** 7

e. What will be output of following C code?

```
#include <stdio.h>
int main(){
int  x = 011;
for (int i =0; i<x; i+=3) {
        printf("Start");
        continue;
        printf("End");
        }
return 0;
}
```

(A) Start End Start End Start End **(B)** Start Start Start
(C) Start End Start **(D)** Start Start Start Start

f. Following are complexity of sorting algorithms. Which algorithm will you prefer?

(A) O(n) **(B)** $O(n^2)$
(C) O(n log n) **(D)** O(log n)

g. Which of the following is not a keyword in C?

(A) goto **(B)** constant
(C) continue **(D)** All of these are C keywords

h. What is the value of the expression a - b / 3 + c * 2 - 1, given a = 9, b = 12 and c = 3?

(A) 10 **(B)** 3
(C) - 4 **(D)** 2

i. Which of the following is not a preprocessor statement in C?

(A) # ifdef **(B)** # ifndef
(C) #elseif **(D)** # endif

j. What is the value assigned to address by the following statements, when inp... is NEW YORK?
char address [10];
scanf("%s", address);

(A) NEW YORK **(B)** NEWYORK
(C) NEW **(D)** YORK

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Describe the function of the following software: **(10)**
(i) assembler (ii) compiler
(iii) interpreter (iv) linker
(v) loader

b. Explain top–down approach of program design with an example. What are its advantages? **(6)**

Q.3 a. How is upper bound time complexity of an algorithm measured? Give an example. **(4)**

b. Write an algorithm to find whether a given year is a leap year or not. **(6)**

c. What is a recursive function? What are its basic properties? Write a function which finds the sum of first n integers; where n is the argument to the function. **(6)**

Q.4 a. Write any four format codes that are used in scanf statement. Write a scanf statement to read age(int) , sex(char), grade (float), and name (string). **(4)**

b. Give the syntax of 'for' statement and describe the control flow in that statement. Write a for statement to print the multiplication table of 2, 3 and 4. **(6)**

c. Write a program to find the largest element and its position in an array. **(6)**

Q.5 a. Explain call by value and call by reference approach of passing arguments to a function. Write a simple function to swap two values and illustrate call by value and call by approach. **(6)**

b. Differentiate structure and union by giving suitable examples. **(4)**

c. Explain with example, the syntax and usage of the following in C program.
(i) Nested Structure Definition
(ii) Array of structures **(6)**

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Q.6 a. Give the meaning of the following declarations:

(i) char *c; (ii) int *fptr();
(iii) float *aptr[20]; (iv) int (*ptrf)(int);
(v) float (*ptra)[10]; (vi) int y = *p1 + *p2;
(vii) int larger(int *, int *); (viii) char *p = (char *) &x; **(4)**

b. Write a function to copy a string to another, without using library function. **(6)**

c. Explain with an example program the following operations on a file-open, read and close. **(6)**

Q.7 a. Write a C program that accept name and marks scored by students in five subjects. Use functions
(i) ADD to add records with student names and marks to a file
(ii) CALCULATE to read the records from the file, calculate the result and display. **(10)**

b. Write a C function to insert an element into a sorted linked list. Assume each node has an integer value and a pointer to the next element. **(6)**

Q.8 a. Define macros for finding:
(i) Sum (ii) Max of two values. **(6)**

b. What are the guidelines for construction of statements and guidelines for input/ output formats during coding? **(6)**

c. Write an algorithm to reverse the digits of an integer. **(4)**

Q.9 a. What is dynamic memory allocation? How does it help in building complex programs? What is the task of following memory allocation functions?
(i) malloc (ii) calloc
(iii) free (iv) realloc **(8)**

b. Differentiate the use of break and continue statements with an example. **(4)**

c. Indicate how the output is displayed with the following statements? **(4)**
printf("%6d",12345);
printf("%4d",12345);
printf("%-6",12345);
printf("%06d",12345);