**Code: AC05 / AT05** **Subject: PROGRAMMING & PROBLEM SOLVING THROUGH 'C'**

**Time: 3 Hours** **DECEMBER 2010** **Max. Marks: 100**

**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 half an hour 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.
```
char *myFunc (char *ptr)
{
        ptr += 3;
        return (ptr);
}
int main ()
{
     char *x, *y;
      x = "HELLO";
      y = myFunc (x);
      printf ("y = %s \n", y);
      return 0;
}
```

(**A**) HELLO (**B**) ELLO
(**C**) LLO (**D**) LO

b. The code will have output:
```
void main()
{
          int realarray[2] = {1,2};
          int *array = &realarray [-1];
          int i;
          for
          (i=0;i<2; i++)
         {
             printf("%d",*array);
             array ++;
          }
}
```
(**A**) Error (**B**) Garbage Value
(**C**) 0 1 (**D**) 1 2

c. The output of the following code will be:

```
  void main ()
{
     int d = 5;
     printf ("%f", d);
}
```

**(A)** 5.0 **(B)** 5
**(C)** undefined **(D)** will generate a compiler error

d.

```
void main ()
{
   char *s ="\12345\n";
   printf("%d",sizeof(s));
}
```

**(A)** 6 **(B)** 5
**(C)** Error **(D)** None

e.

```
int f();
void main ()
{
     f(1);
     f(1,2);
     f(1,2,3);
  }
  f(int i,int j, int k)
  {
       printf("%d %d %d",i,j,k);
   }
```

What are the number of syntax error in the above?

**(A)** 3 **(B)** 4
**(C)** None **(D)** 5

f.

```
int main()
{
     static i=3;
     printf("%d",i--);
     return i>0 ? main():0;
 }
```

**(A)** 3 2 1 **(B)** 3 3 3
**(C)** 3 0 0 **(D)** 2 1 0

g. The output of the below program is:

```
    main ()
     {
          int i=0;
          for (i=0;i<20;i++)
         {
            switch(i)
            {
                case 0:i+ =5;
                case 1:i+ =2;
                case 5:i+ =5;
                default i+ =4;
                break;
            }
               printf("%d",i);
         }
      }
```

**(A)** 0,5,9,13,17 **(B)** 12,17,22
**(C)** 16,21 **(D)** syntax error

h.
```
main ()
{
    int x =20,y =35;
    x = y++ + x++;
    y = ++y + ++x;
    printf("%d %d\n",x,y);
 }
```

**(A)** 20 35 **(B)** 57 94
**(C)** 56 93 **(D)** 35 20

i.
```
# define TRUE 0
some code
while(TRUE)
{
some code
}
```

**(A)** will not enter the loop **(B)** infinite loop
**(C)** syntax error **(D)** none

j. The following variable is available in file 1.c
static int average_float;

**(A)** all function in file 1.c can access the variables
**(B)** becomes a local variable
**(C)** does not occupy any memory
**(D)** none of above

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

**Q.2** a. Given two correct programs, what parameters are used to select one of the programs to solve the task. Explain it with an example and notations used for comparison. **(6)**

b. Write an algorithm to generate a third sorted array from given two sorted arrays. **(8)**

c. Explain the term recursion with the help of an example. (2

**Q.3** a. Design an array where the elements can be inserted or deleted only at the end i.e. last element inserted be deleted first. **(8)**

b. What do you understand by testing the program? What is meant by "basic path testing" and "black box testing" with example? **(8)**

**Q.4** a. Explain any two file operations and two bit wise operators with example. **(8)**

b. Write a program to perform the summation of the series: **(8)**
1/2! + 3/4! + 5/6! +…
For above program write a recursive function to calculate factorial of the number.

**Q.5** a. What is a linked list? What are the advantages and disadvantages of using a linked list? Explain in brief the different types of linked list. **(8)**

b. Write a C function to insert a node at a specified position in a linked list. **(8)**

**Q.6** a. Differentiate between automatic variable, static variable and dynamic variable. **(6)**

b. Write a program that prints its input one word per line from one line to another. The names of the file are given on command line. Program should also check that correct numbers of arguments are supplied to the program **(10)**

**Q.7** a. Write a program to find the sum of two matrices using function and pointers. **(10)**

b. What is the difference between while and do-while construct. Explain the case where do-while can be used. **(6)**

**Q.8** a. Explain the difference between structure and union. Explain with the help of an example their memory allocation. Also explain how their members are accessed. **(6)**

b. Write a function reverse(s) that reverses the character string s. Use it to write a program that reverses its input a line at a time. **(10)**

**Q.9** a. What are pre-processor directives? Explain the working of any macro pre-processor. **(4)**

b. Write a program for student to input marks and will output the grade obtained by him / her in the range of "pass class", "fail", "first class", second class", "distinction". Use ternary if condition structure for the program. Assume the range for each grade. **(4)**

c. Write a program that prints x with the n number of bits inverted. Bits inversion began at position p (i.e., 1 changed into 0 and vice versa), leaving the others unchanged. **(8)**