**RAJATRATA UNIVERSITY OF SRI LANKA**
**FACULTY OF APPLIED SCIENCES, MIHINTALE**

**B.Sc.(General ) Degree Examination**
**First Year-Semester I-September 2013**
**COM 1401 - Programming Concepts with C**

Answer 5 **Questions only**                                   **Time : 3 Hours.**

1.

   i. What is the deference between a local and global variable in C? (Consider variable scope, storage and initialization.)       (3Marks)

   ii. Describe the fundamental data types in C language.       (4Marks)

   iii. What would be the correct variable type in which to store the following information?

      height of a person,

      number of fingers in a hand,

      distance from  Earth to Sun,       (2Marks)

   iv. What are the properties of a static variable in a C?

      What would be the output of the following code segment?

```
#include <stdio.h>
void displayno();

int main()
{
        displayno();
        displayno();
        displayno();
        return 0;
}

void displayno();
{
        static int a=0;
        printf("%d",a);
        a++;
}
```
                                              (5 Marks)

v.  What would be the output of the following code segments?

```
#include<stdio.h>
(a) int main( )
    {
            int a = 5, b, c;
            b = a++ + ++a + a++;
            c = ++a + a++ + a-- ;
            printf("\n a = %d, b = %d, c = %d", a, b, c);
            return 0;
    }
```
(3Marks)

```
(b)
    #include<stdio.h>
    int main( )
    {
        int i=fun(10);
        printf("%d",--i);
        return 0;
    } .

    int fun(int i)
    {
            return (i++);
    }
```
(3Marks)

2.

i. Explain the break and continue statements using suitable example.    (3Marks)

ii.Find and explain the output of the following:

```
int main( )
{
        int x = 'i';
        switch (x) {
        case 'i' : put c('i');
        case 'j' : put c('j');
        case 'k' : put c('k'); break;
        case 'l' : put c('l');
        default : put c('a'); }
        return 0;
}
```
(3 Marks)

iii. Describe the nested loop control structures supported by C Programming language
     using suitable examples.                                           (4 Marks)

iv. Write a C program to print the following:

```
*
2    2
*    *    *
4    4    4    4
*    *    *    *    *
```
(10 Marks)

3.

i. Describe at least 3 of the followings using suitable examples:

    a. Pointers in C.

    b. Pointer arithmetic.

    c. Dynamic Memory Allocation.

    d. Call by value and call by reference with suitable examples.

    e. Any 3 of string handling function in C.        (6 Marks)

ii. Explain macro in C language

    Find the errors in the following macro definitions

    a. #define RANGE  a> 10 && a<40       (1 Marks)

    b. #define AREA   (x)    (22/7*x*x) ;       (1 Marks)

iii. Find and explain the output of the following code segment:

```
#define SQUARE(X)  X*X
void main( )
{
   int a = 11, b;
   b = SQUARE (a + 2);
   printf("b=%d", b);
}
```
                                                       (3 Marks)

iv. Write a C program that accepts 10 integer numbers in an array and one constant from the user and then displays total of numbers greater than the constant from the contents of the array.        (9 Marks)

Sample data

Inputs:

| 3 | 5 | 6 | 2 | 7 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|

Constant =5

Output(total) 26

5.

i. Describe the structures in C language.        (3 Marks)

ii. Define a structure **account** with elements **account no, account type, name and balance**. Write a C program that will accept data of 20 customers and print names of customers having a balance greater than Rs.5000.        (10 Marks)

    (Hint  **account no**: integer type,
             **account type** : char,
             **name**: string type,
             **balance**: float type)

iii. Write a function to print names of all customers stored in the array declared in above section ii. whose account type is S (savings ). (7 Marks)

6.
   i. Briefly describe the file opening mode in C. (3 Marks)
   ii. Write a program to store every character typed at the keyboard into a file. The program terminated as soon as the character '.' is hit from the keyboard. (7 Marks)
   iii. Write a function to read the above file and to display all the contents of the file. (5 Marks)
   iv. Write another function to count the number of vowel characters in the above file. (5 Marks)