University of Ruhuna- Faculty of Technology
Bachelor of Engineering Technology Degree
Level 1 (Semester 2) Examination, December 2017

Course Unit: TMS1223- Computer Programming Techniques   Time Allowed: 2 hours

Answer all four (04) questions

This question paper contains **04 pages**.

(1)

a. Describe the four (04) steps in problem solving phases.

b. Write short notes on the following topics
- i) Identifier
- ii) Compiler
- iii) Syntax Errors

c. Which of the following can be used as legal identifiers in C?

    i) Tax_rate   ii)Num3   iii)Number of times   iv) 2distances

d. Write down the value of x after each of the following C statements are executed.

    i)   x = 2%2+2*2-2/2;

    ii)   x = 7+3*6/2-1;

e.   i)   What is computer programming?

      ii)   Draw a flow chart to enter two (02) numbers from the keyboard and display the larger number.

f. Write a C program which converts Fahrenheit to Celsius.
Fahrenheit value is taken from keyboard.

Formula to calculate Celsius is given below,

$$F = C \cdot \frac{9}{5} + 32$$

Output should be formatted to *two (02) decimal* places.

(2)

a. Evaluate the following expressions. Assuming that x = 2, y = 6.0, and z = 3, specify whether the result is true or false.

    i)   (x <= 5) || (y > 2) || (z == 6)   ii)   (x == 1.3) || (y > 5.0)&& (z > 2.0)

b. Describe the syntax of the if-else statement in C programming.

c. Rewrite the following C program segment using *switch* statement.

```
if (i ==1)
        m=30;
else if  (i ==2)
        m= 50;
    else if (( i == 3) || i == 4))
        m = 700;
    else
        m=100;
```

d. i) Explain two (02) differences between a **while loop** and a **for loop** in a C program with aid of simple examples.

   ii) Write down the value of the variables (**sum** and **count**) after code is executed.
```
int count = 1;
int sum = 2;
while (count < 8)
{       sum += count;
        count += 2;
}
```

   iii) Translate the above **while loop** (d (ii)) into an equivalent *for loop*.

e. Write a C program to generate the following output by using a *for* loop.
   Output:
   1
   4
   9
   16
   25
   36
   49
   64

(3)

a. Write down three (03) advantages of using user-define functions in a C program.

b. Explain the following terms with examples.

    i)   Function Definition in C

    ii)   Function Invocation in C

c. Write a C program to find diameter, circumference and area of circle using functions. (Reads radius of the circle from keyboard)
Function prototypes are given below,

        double diameter (double radius); // Diameter = 2 x radius

        double circumference (double radius); // Circumference = 2 x PI x radius

        double area (double radius);   // area = PI x radius x radius

d. Explain why arrays are important for programming languages?

e. Describe the Bubble sorting algorithm by using a suitable diagram.

(4)

a. What is a pointer in C programing? What are the advantages of using pointer variable in C? Explain by using an example.

b. Examine the C code below and write the output produced by **LINE A, LINE B, LINE C** and **LINE D.**

```
# include<stdio.h>
int main(){
    int x, *p;
    p=&x;
    *p=0;
    printf("x is %d\n",x);    //LINE A
    printf("*p is %d\n", *p); //LINE B
    *p+=1;
    printf("x is %d\n",x);  //LINE C
    (*p)++;
    printf("x is %d\n",x); // LINE D
return 0;}
```

c. What is the difference between **structure** and an **array** used in C?

d. Examine C code segment below and write the meaning of **LINE A, LINE B, LINE C, LINE D, LINE E and LINE F.**

```
struct StudentRecord{                               //LINE A
        char name[20];
        int Id;
        char Dept[5];
        char gender;
};
StudentRecord Student1;                             //LINE B
strcpy(Student1.Name, "Gihan");                     //LINE C
Student1.Id = 12345;                                //LINE D
strcpy(Student1.Dept, "Engineering");               //LINE E
printf("Enter gender of student");
scanf( "%c", &Student1.gender);                     //LINE F
```

e. Describe following two (02) variables related to command line arguments in C.

   i) agrc   ii) *argv[ ]

f. Explain four (04) main steps in file processing in C program.

g. Explain functionalities of following basic file operators use in C program

   i) fopen()   ii) fscanf()   iii) fprint()   iv) fclose()

i. Write a C program to input the Student_ID, name and marks of three subjects (Maths, English and DBMS) of a student from the keyboard and write the data to "marks.txt" file.

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