MACHAKOS UNIVERSITY

University Examinations for 2016/2017

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR FIRST SEMESTER EXAMINATION FOR
BACHELOR OF SCIENCE (MATHS AND COMPUTER SCIENCE)
BACHELOR OF SCIENCE (STATISTICS AND PROGRAMMING)
BACHELOR OF SCIENCE (MATHEMATICS)

SMA 191: INTRODUCTION TO PROGRAMMING

DATE: 29/5/2017 **TIME: 2:00 – 4:00 PM**

INSTRUCTIONS

Answer Questions ONE and Any Other Two Questions

QUESTION ONE (30 MARKS)

a) Explain why C is a Structured programming language (2 marks)

b) Explain the following as used in c programming Language (8 marks)

i. Linker

ii. #include directive

iii. main() function

iv. Comments

c) i. Write a C function that can calculate the area of a triangle and return the calculated result. The function should accept two arguments height and base. Hint Area= ½ B * H. (3 marks)

ii. Write a C program that calls the C function in (i) above to calculate area then print out the return a using user inputs and print result from the function on the screen. (6 marks)

d) Briefly explain the importance of making proper choice of data types (2 marks)

e) Explain the use of the sizeof operator giving an example (2 marks)

f) Write a C program to calculate the powers of two for all numbers between 0 and 9 using the math.h library functions (4 marks)

QUESTION TWO (20 MARKS)

Jacob has been instructed to create a computer program that can be used to calculate the surface area of a closed cylinder:

i. Design a pseudo code that he is likely to use in representing the program. (6 marks)

ii. Draw a well labeled flow chart for the pseudo code in 4 (ii) above. (6 marks)

iii. Write a C program that implements 4 (i) and (ii) above (8 marks)

QUESTION THREE (20 MARKS)

a) Explain the following data structured used in C programming giving an example in each case:

i. Arrays

ii. Structures (4 marks)

b) Write code snippets in c to declare and initialize (4 marks)

i. Character array

ii. Pointer to a function

c) Write a simple program that accepts a radius from the keyboard calculates and then displays the area and circumference of a circle. Use a constant called PI (3.14). (6 marks)

d) Briefly explain the use of the following functions using examples (6 marks)

i). Strcat( )

ii). Strcpy( )

QUESTION FOUR (20 MARKS)

a) (i) Explain the term *translation* as used in computer programming. (2 marks)

(ii) Outline **two** reasons that could make a programmer prefer a compiler to an interpreter. (2 marks)

b) The following is a C program, study the program and then answer the question that follows.

```
#include <stdio.h>
int main( )
{
        int a = 10;
        while (a < 20)
        {
                printf ("The value of a is %d\n", a);
                a++;
                if (a > 15)
                {
                        break;
                }
        }
return 0;
}
```

(i) Trace the program statements. (4 marks)

(ii) Write the output generated when the program is executed. (2 marks)

c) Discuss the stages that a programmer would follow in developing a typical computer program. (10 marks)

QUESTION FIVE (20 MARKS)

a) Outline **four** benefits of using modular design in program development. (4 marks)

b) Given the declarations:

```
float x;

int k, i = 5, j = 2;
```

Determine the value of x and k in each of the following statements:

I. k = i/j;

II. x = i/j;

III. k = i%j;

IV. x = 5.0/j;

V. k = j++ (10 marks)

(c) Table 1 shows the criteria used in a Masomo University to award grades to students. Use it to answer the question that follows.

Mark	**Grade**
Greater than 70	A
Greater than 60	B
Greater than 50	C
Greater than 40	D
Default	E

Table 1

Write a program in C language to accept the mark scored by a student. The program should then output the grade awarded. Use *switch* statement. (6 marks)