



(Knowledge for Development)  
**KIBABII UNIVERSITY**

**UNIVERSITY EXAMINATIONS  
2022/2023 ACADEMIC YEAR**

**END OF SEMESTER EXAMINATIONS  
YEAR ONE SEMESTER TWO EXAMINATIONS**

**FOR THE DEGREE OF SCIENCE  
MATHEMATICS (SMA)**

**COURSE CODE : CSC 111**  
**COURSE TITLE : INTRODUCTION TO PROGRAMMING**

**DATE: 19/12/2022 TIME: 9:00 A.M. – 11:00 A.M.**

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**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTIONS ONE AND ANY OTHER TWO.**

**QUESTION ONE (COMPULSORY) [30 MARKS]**

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- a. Differentiate between the following as used in C programming:
- i. Assembler and Compiler [2 Marks]
  - ii. High level and Low-level Programming Language [2 Marks]
  - iii. Linker and Loader [2 Marks]
- b. Write a program in C to output:
- i. 

1	1	1
1	1	1
1	1	1

 [3 Marks]
  - ii. 

5	5	5
5	5	
	5	

 [3 Marks]
- c. Analyze the program below and answer the questions that follow:
- ```
#include <stdio.h>
void main()
{
    int num1, rem1;

    printf("Input an integer : ");
    scanf("%d", &num1);
    rem1 = num1 % 2;
    if (rem1 == 0)
        printf("%d is an even integer\n", num1);
    else
        printf("%d is an odd integer\n", num1);
}
```
- i. Draw a flowchart for the program [3 Marks]
  - ii. Given the input is 23 and 46. Give the output respectively. [3 Marks]
- d. What is top-down analysis? [4Marks]  
Describe the steps involved in top-down analysis.
- e. Differentiate between 3<sup>rd</sup> generation and 4<sup>th</sup> generation programming languages [4 Marks]
- f. Describe the demerits of machine language [4 Marks]

### QUESTION TWO [20 MARKS]

- a) Identify which one of the following is not a variable and which one is a variable. [4 Mark]
- float Kenya\_123\_Kenya
  - int Kenya\_123
  - int Kenya#123
  - char X\_123\_Count
- b) Describe the following Terms:
- Array
  - Recursion Function [4 Marks]
- c) Distinguish between Local variables and Global variables. [4 Marks]
- d) With the aid of **TWO** examples show how constants can be declared in C. [4 Marks]
- e) Write a pseudocode to calculate the area of triangle. [4 Marks]

### QUESTION THREE [20 MARKS]

- a) Define
- Program
  - Programming [2 Marks]
- b) Write a program in C to find the sum of digits of a number using recursion.
- Test Data :
- Input any number to find sum of digits: 25
- Expected Output :
- The Sum of digits of 25 = 7 [4 Marks]
- c) Briefly explain the compilation and execution of a program written in high-level language. [4 Marks]
- d) Describe the characteristics, merits, demerits, year of Evolution and examples of the 1<sup>th</sup> and 2<sup>nd</sup> generation programming languages [10 Marks]

### QUESTION FOUR [20 MARKS]

- a) Describe the three types of Loops used in C programming language. Give appropriate examples for each loop [6 Marks]
- b) Explain the **THREE** features of an algorithm [6 Marks]
- c) Describe flow of control or decision are handled in C programming language [4 Marks]
- d) Write a program in C programming language to grade university students. The Lecturer should be able to Input the mark and the Output should be an appropriate Grade. Given that:

| Mark                                 | Grade |
|--------------------------------------|-------|
| Marks $\geq$ 0 and Marks $<$ 40      | F     |
| Marks $\geq$ 40 AND Marks $<$ 50     | D     |
| Marks $\geq$ 50 AND Marks $<$ 60     | C     |
| Marks $\geq$ 60 AND Marks $<$ 70     | B     |
| Marks $\geq$ 70 AND Marks $\leq$ 100 | A     |

[6 Marks]

#### NESTED IF ELSEIF LOOP

### QUESTION FIVE [20 MARKS]

a) Illustrate the use of Switch case statements using a program of choice [4 Marks]

b) Given the following program, show the values of the array in the following figure:

[4 Marks]

```
#include<stdio.h>
int main()
{
    int values[5];
    for(int i=1;i<5;i++)
    {
        values[i]=i;
    }
    values[0]=values[1] + values[4];
    return 0;
}
```

After the array is created

|   |  |
|---|--|
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |

After the first iteration in the loop is done

|   |  |
|---|--|
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |

After the loop is completed

|   |  |
|---|--|
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |

After the last statement in the main method is executed

|   |  |
|---|--|
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |

c) Describe structured programming

[2Marks]

d)

i. Declare (give a prototype for) a function named *average\_grade*. This function returns a double and has four double arguments, test1, test2, test3 and test4. The return value should be the average or arithmetic mean of the four arguments. [4 Marks]

ii. Define the above prototyped function and include a comment that tells *briefly* what the function does. [6 Marks]