

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

SECOND YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF
BACHELOR OF EDUCATION SCIENCE COMPUTER SCIENCE OPTION

COSC 225: C. PROGRAMMING

STREAMS: BSC. COMP

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 24/03/2021

8.30 A.M. – 10.30 A.M

INSTRUCTIONS: Answer ALL questions in section A and any other TWO in section B.

SECTION A (COMPULSORY - ANSWER ALL QUESTIONS IN THIS SECTION)

QUESTION ONE (30 MARKS)

a) Discuss the three main basic features of a programming language. (3 marks)

b) Consider the code below. How many times will the loop get executed? What will be the output?. (5 marks)

```
int main ()  
{  
    int i :  
    for ( i = 9; i = i - 2 )  
    {  
        printf ( “ n%d”, i);  
    }  
}
```

c) Give two reasons why initial values are useful in a program ; (2 marks)

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- d) Translate the following while loop into a for loop which does the same thing as the while loop. (4 marks)

```
i = 20
while ( i > 0 )
    print " i = i ", i
    i = - 1
```

- e) Distinguish between the following set of terms as used in programming; (4 marks)
- Source code and object code
 - Loosely typed and strongly typed languages
 - Parameters and arguments
 - Compiler and Interpreter
- f) With an example of a suitable syntax, describe the three main parts of a user defined function. (4 marks)
- g) Use a diagram to describe the C Program Development Cycle (2 marks)
- h) Write a program using a nested for loop that finds and displays all the prime numbers from 2 to 100: (4 marks)
- i) Distinguish between L- values and R- values in C (2 marks)

SECTION B: ANSWER ANY TWO QUESTIONS IN THIS SECTION {20 MARKS EACH}

QUESTION TWO (20 MARKS)

- a) Structured programs are often composed of simple, hierarchical program flow structures; Discuss (5 marks)
- b) Distinguish between the following three categories of High level programming languages ; (6 marks)
- Procedure-oriented languages.
 - Problem-oriented languages.
 - Natural languages .
- c) Evaluate the following expressions using the rules of precedence and associativity: (2 marks)
- 1). $\text{Sum} = 2 * ((i \% 5) * (4 + (j - 3) / (k + 2)))$; Given that, $i = 8$, $j = 15$ and $k = 4$.

II). Total = a + b * c / d % e ((8 * c) + 30 / (b * d)); where a= -1, b=5, c=3, d=1 and e=7.

- d) Translate the following for loop into a while loop (which does the same thing as the for loop). (7 marks)

```
for i in the range ( 1 ; 10 ):
    print " i = ", i
```

QUESTION THREE (20 MARKS)

- a) Using suitable examples name and describe three main categories of operators used in computer programming. (6 marks)
- b) Write a simple code in C language that would print the words "**COVID 19 Pandemic**". (4 marks)
- c) Describe three components required by looping control structures to successively iterate a block of statements. (6 marks)
- d) Discuss the concept of arrays as used in structured programming. (4 marks)

QUESTION FOUR (20 MARKS)

- a) Study the following program available in C programming language, write the result produced at every line when you compile and execute the program. (6 marks)

```
#include <stdio.h>
Int main()
{
int a = 21;
int b = 10;
int c ;
c = a + b;
printf("Line 1 - Value of c is %d\n", c );
c = a - b;
printf("Line 2 - Value of c is %d\n", c );
c = a * b;
printf("Line 3 - Value of c is %d\n", c );
c = a / b;
printf("Line 4 - Value of c is %d\n", c );
c = a % b;
printf("Line 5 - Value of c is %d\n", c );
c = a++;
printf("Line 6 - Value of c is %d\n", c );
c = a--;
printf("Line 7 - Value of c is %d\n", c );
return 0 ;
}
```

- b) Highlight four characteristics of a well-engineered software that can be considered to adhere to good programming practices. (4 marks)
- c) An electrical designer needs a C program that can compute the area of a rectangle and displays the computed area on the screen. Use a flow chart to illustrate the code sequence of the program. (5 marks)
- d) Write a syntax to show how to declare a struct variable inside its declaration. (5 marks)

QUESTION FIVE (20 MARKS)

- a) Distinguish between static and dynamic binding (4 marks)
 - b) Explain three benefits of modular programming. (6 marks)
 - c) Write a C program that mimics a simple calculator. The program should prompt for two integers and a mathematical operator. The computations should be performed depending on the operator entered. (10 marks)
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