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UNIVERSITY EXAMINATIONS 2022/2023

FIRST YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN MATHEMATICS AND PHYSICS, BACHELOR OF TECHNOLOGY IN ELECTRICAL, BACHELOR OF TECHNOLOGY IN CIVIL AND BACHELOR OF TECHNOLOGY IN MECHANICAL

CIT 3102: FUNDAMENTALS OF COMPUTER PROGRAMMING

DATE: APRIL 2023

TIME: 2 HOURS

INSTRUCTIONS: Answer Question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

- a) Outline two advantages of high-level programming language (2 Marks)
- b) Explain the term bug as used in programming (2 Marks)
- c) State two symbols for comments in a C program (2 Marks)
- d) Differentiate between sequence and iteration control structures (4 Marks)
- e) Distinguish between source code and object code as used in programming (4 Marks)
- f) Draw a flowchart that could be used to solve the values of x in a quadratic equation $f(x) = ax^2 + bx + c$ (5 Marks)
- g) Distinguish between do...while and while loops as used in C programming (2 Marks)
- h) Identify any three characteristics of an algorithm (3 Marks)
- i) Explain two approaches used by programmers to improve the readability of a program (2 Marks)

- j) Explain two types of errors that are encountered when developing a program
(2 Marks)
- k) Distinguish between top-down and bottom-up program design as used in programming
(2 Marks)

QUESTION TWO (20 MARKS)

- a) Write a function that displays the quotient of two even integers
(5 Marks)
- b) Using repetition, write a C program that gives the following output.
(5 Marks)

```
*  
  
*      *  
  
*      *      *
```

- c) Write a program in C language that accepts 5 numbers (5 to 9) and stores them in an array.
The program then displays the numbers in reverse order.
(5 Marks)
- d) The table below shows the outcomes of a competency-based test. Use it to answer the question that follows.

Outcome	Meaning
E	Exceed Expectation
M	Met Expectation
A	Approaching Expectation
B	Below Expectation
	Enter a valid outcome

Write a program in C language that prompts a user to enter the outcome. The program then displays the corresponding meaning. Use the switch statement
(5 Marks)

QUESTION THREE (20 MARKS)

- a) A program prompts a user to enter two numbers. The program then divides the first number by the second and displays the result. When the second number is zero, the program displays an error message “Error. Division by zero!” and terminates the program. Draw a flowchart to represent the logic of this program (6 Marks)
- b) The following program was written by a student during a practical lesson. Use it to answer the question that follows

```
#include<stdio.h>
int main()
{
    int x;
    x = 1;
    do
    {
        printf(“x is %d \n”, x);
        x+=1;
    }
    while (x>10);
    return 0;
}
```

Explain the loop body

(4 Marks)

- c) Identify errors, if any in the following C program, then correct the error by writing the correct program (6 Marks)

```
#include<stadi.h>

Main ( ) {

    int A;B;C;

    product=a*b*c,
```

```
print("the product is;",product)

}
```

- d) Project management is a very important stage during program development state three undesirable effects that may result due to lack of proper resource management (4 Marks)

QUESTION FOUR (20 MARKS)

- a) State the format specifiers used with a printf() statement to display each of the following: (4 Marks)

- i) A value of an integer
- ii) A string variable

- b) Write a program in C language that generates the first ten positive numbers. Use a pretesting loop other than for loop (4 Marks)

- c. The table below shows the employee monthly bonus in a manufacturing company based on sales. Use it to answer the question that follows.

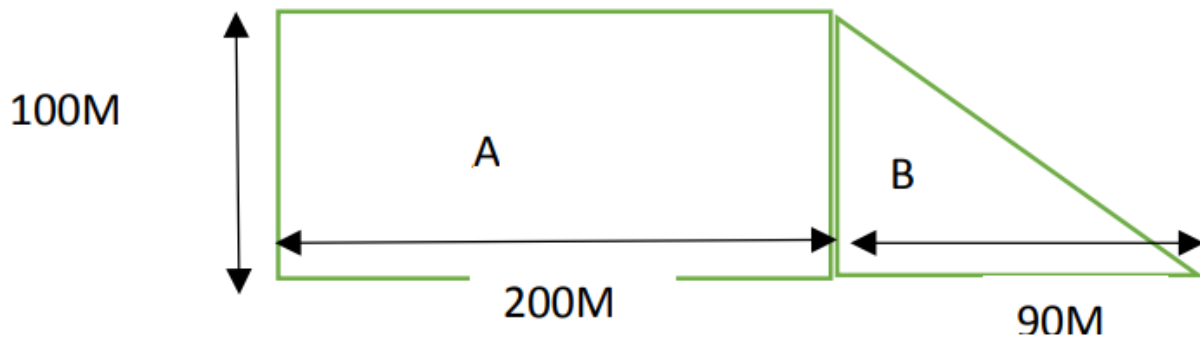
Sales	Bonus Rate (%)
Above 50,001	15
Between 25,001 and 50,000	10
Between 1 and 25,000	5

Write a pseudocode for a program that prompts a user to enter the employee's basic salary and sales. The program then calculates the gross salary and outputs the employee's basic salary, gross salary, and bonus (6 Marks)

- d. Write a program in C language that prompts the user to enter the amount of fees paid. When the amount of fees paid is less than Kshs 20,000, the program displays a message 'Cyber services denied' (6 Marks)

QUESTION FIVE (20 MARKS)

- a) Write a program in C that prompts the user to enter a price of the item and the quantity bought. The price should range between 10 and 100 shillings while the maximum number of items one could buy is 20. The program then computes and displays the cost of the items. (5 Marks)
- b) Write the syntax that implements a 'for loop'. (5 Marks)
- c) The figure below shows the playground of a certain institution. Using a function for each of the parts labeled A and B. Write a C program to calculate the total area covered by the playground (6 Marks)



- d) Most programs come with user documentation. Explain two advantages of proper documentation in a program (4 Marks)