

**DEDAN KIMATHI UNIVERSITY OF TECHNOLOGY**

**University Examination 2014/2015**

**FIRST YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHEROR OF SCIENCE IN INFORMATION TECHNOLOGY AND BACHEROR OF BUSINESS INFORMATION TECHNOLOGY**

**BIT 2104: INTRODUCTION TO PROGRAMMING & ALGORITHMS**

**DATE: 19TH AUGUST 2014 TIME: 8.30AM – 10.30AM**

**INSTRUCTIONS**:

Attempt **Question 1** (compulsory - 30 marks) and any other **TWO** Questions (20 marks each).

**Question One [30 Marks]**

1. Define the following terms as used in computer programming. **(4mks)**
2. Pseudo code
3. Flowchart
4. Syntax
5. Program
6. i) Outline any two differences between the first and the third generations of

computer programming languages.  **(4mks)**

ii) What is the difference between a compiled and a translated program? **(1mk)**

iii) Explain any two advantages of compiled programs over interpreted programs.

**(2mks)**

1. In a football match, if a player does a mistake which is considered serious by the rule of the game he/she is given a Red card otherwise a Yellow card.
2. Using the *If..then..Else* structure write the pseudo code for the scenario above. **(3 mks)**
3. Convert the pseudo code in C (i) above into a flowchart. **(3 mks)**

A program is required to process and award students grades according to the summary shown in the table below. Use it to answer the questions that follow.

|  |  |
| --- | --- |
| **MARKS** | **GRADE** |
| 70-100 | A |
| 60-69 | B |
| 50-59 | C |
| 40-49 | D |
| 0-39 | E |

1. Design a pseudo code for a program that requests for the marks obtained by each student and then assign and prints out the grade. **(5 mks)**
2. Translate the pseudo code in d(i) above to a flowchart. **(5 mks)**

1. Outline the three steps followed in solving a programming problem. **(3mks)**

**Question Two [20 marks]**

1. Using a well labelled diagram, explain the six stages of solving a programming problem.

**(12mks)**

1. Differentiate between the bottom up and the top down approaches of program development. **(4mks)**
2. Debugging means detecting, tracing, and correcting errors (bugs) in a program. Using appropriate examples explain any two types of programming errors. **(4mks)**

**Question Three [20 Marks]**

1. The roots of a quadratic equation X1 and X2 are calculated using the equation shown below.



1. Design a pseudo code to calculate the value of the two roots **(4mks)**
2. Convert the above pseudo code into a flowchart **(5mks)**
3. Write a complete C program to calculate and display the roots **(5mks)**
4. Explain the function of the following C program components. **(3mks)**
5. Comments
6. Keywords
7. Statements
8. Using an example, explain the general syntax for initializing a one dimensional array statically. **(3mks)**

**Question Four [20 marks]**

1. Suppose that you have the following variable declared and initialized as

shown below.

*int x = 10; int y = 15; int z = 20;*

Determine whether the following expressions are true or false.

i) !(x < 10) **(2mks)**

ii) x <= 5 || y > 15 **(2mks)**

iii) (x != 5) && (y == z) **(2mks)**

iv) x <= z && (x + y >= z) **(2mks)**

1. Write a program to display all even numbers between 0 and 20 inclusive using a *while…structure.* **(6mks)**
2. C operators can be classified into the following categories.
3. Arithmetic operators

ii) Relational operators

1. Logical operators

For each of the category above indicate at least three operators and their order of precedence. **(6mks)**

**Question Five [20 marks]**

1. Using appropriate diagrams, explain the two main differences between the *while* and the *do….while iteration* statements. **(4mks)**
2. Write a program that mimics an electronic calculator by reading two values from the keyboard and operating upon them based on the operator keyed in.e.g if the user keys in % operator the program should return the modulus. **(9mks)**
3. Using an example, explain the correct syntax for declaring a two dimensional array data type. **(3mks)**
4. Write C statements to do the following:

i) Declare an array Exams that stores 5 components of type int. **(2mks)**

iv) Set the value of the 9th component of the Exam array to the sum of the

6th and 13th components of the alpha array. **(2mks)**