ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Advanced Level

COMPUTER SCIENCE 6023/1

PAPER 1

SPECIMEN PAPER 3 hours

Additional materials:
Answer paper

TIME 3 hours

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces provided on the answer paper/answer booklet.

Answer **all** questions.

Write your answers on the separate answer paper provided.

If you use more than one sheet of paper, fasten the sheets together.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

You are reminded of the need for good English and clear presentation in your answers.

This question paper consists of 4 printed pages.

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[Turn over]

1 **(a)** Explain the term:

(i) data integrity, [1]

(ii) data privacy, [1]

(iii) data security, [1]

(iv) biometric system. [1]

(b) Discuss any three biometric techniques. [6]

2. Explain the

(a) character set, [2]

(b) ASCII, [2]

(c) EBCDIC. [2]

3 **(a)** Using the binary number 11100111111101 as an example, show how to use the binary representation of a number to work out its value in hexadecimal with minimum amount of calculation. [3]

(b) A floating point number system uses 8-bit numbers, 5 bits for the mantissa and 3 bits for exponent.
Convert the following binary number to denary
01101010 [2]

(c) Using an 8-bit byte for the mantissa and an 8- bit byte for the exponent, show $-15\frac{1}{2}$ as a 2 byte, normalised, floating point number. [4]

4 **(a)** Describe the purpose of each of the following parts of a DBMS.

(i) Data dictionary, [2]

(ii) Data Manipulation Language (DML). [2]

(b) Every student in a school belongs to a Form. Every Form has a FormTutor. All the form tutors are teachers and some teachers are part-time. Some forms have more than one FormTutor although no FormTutor can teach more than one form. Students are identified by a student-ID and each form has a unique form name.

Draw an ERD to show the relationship between the entities student, form and Form Tutor. [6]

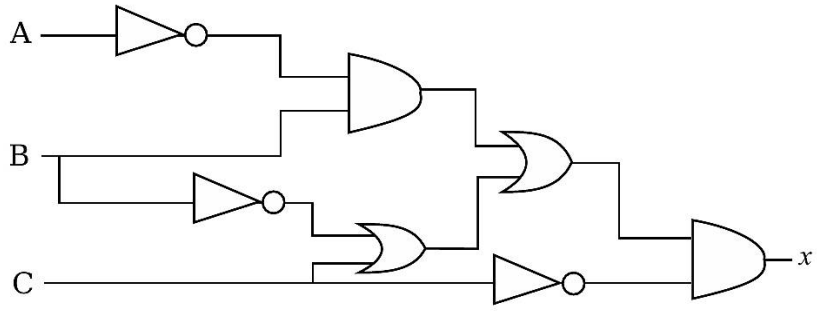
5 **(a)** **(i)** Draw a diagram to represent the Von Newmann Architecture. [4]

(ii) Explain the role of an accumulator in the Fetch Execute Cycle. [2]

(iii) With the aid of a diagram, illustrate the Fetch Execute Cycle. [4]

(b) Compare features of the Von Newmann Architecture and the Havard Architecture. [4]

6 **(a)** The following is a logic circuit



Write a logic statement that describes the above logic circuit. [3]

(b) Use a diagram to represent the XOR gate. [3]

7 **(a)** Draw the diagram for the OSI Model. [7]

(b) Describe the following protocols as they are related to TCP/IP suite:

(i) TCP [2]

(ii) IP [2]

(iii) HTTP [2]

(c) State which layer each of the protocols in **(b)** belong to. [3]

8 **(a)** Explain the term Domain Name System (DNS). [2]

(b) Distinguish between private IP and public IP. [2]

9 **(a)** Explain the difference between static and dynamic data structures. [2]

(b) The details of a car part are stored in a binary tree according to the following algorithm.

```
Read Value New Part
  Start at Root Node
     While Node Not Empty Do
      If New- Part < Value At Node
        Then follow Left Subtree
      Else
         Follow Right subtree
      Endif
    End While
     Insert New- Part At Node
  End
```

(i) Show the binary tree after the following values have been input
Rusape, Victoria Falls, Bulawayo, Triangle, Alaska, West Nichleson. [3]

(ii) Illustrate an algorithm using a flowchart for a programm that accepts two numbers A and B. If A>B then display "A is bigger", if A<B then display
"B is bigger" else display "A and B are equal" [6]

(c) Arrange the following numbers in ascending order using the bubble sort algorithm
17 8 2 11 0 [4]

10. A software company has developed a new product for industrial usage.

(a) Define e-business. [1]

(b) Outline how an organisation can use any 3 Ps of marketing in launching and marketing this newly developed product. [9]