



ZIMBABWE SCHOOL EXAMINATIONS COUNCIL
General Certificate of Education Advanced Level

COMPUTER SCIENCE
PAPER 2 Practical

6023/2

NOVEMBER 2021 SESSION

3 hours

Additional materials:

CD for each candidate
Printing facility
Bond paper

TIME 3 hours

INSTRUCTIONS TO CANDIDATES

This is a purely practical examination. All answers should be printed. Handwritten answers will **not** be marked.

This paper consists of **three** sections.

Section A 20 marks
Section B 50 marks
Section C 30 marks

Answer **one** question from each section.

Each answer sheet should include the following information in the header section:

- Candidate Name and Candidate Number
- Centre Name and Date
- Subject Code

When answering programming questions, indicate the language used.

All work should be backed up by a soft copy on a CD.

If you print on more than one sheet, fasten the sheets together.

All answers should be correctly and clearly numbered.

INFORMATION FOR CANDIDATES

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

This question paper consists of 6 printed pages and 2 blank pages.

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Section A [20 marks]

Answer any **one** question from this section.

1 A boiler (B) will be ON if:

- the timer (C) is ON and temperature sensor (T) is OFF

OR

- Timer (C) is OFF and frost sensor (F) is ON.

(a) Deduce the

(i) Boolean statement; [3]

(ii) Boolean expression. [3]

(b) Draw a logic circuit for the system. [5]

(c) Produce a truth table for the system. [4]

(d) Draw a simplified and well-labelled diagram of a Harvard Computer architecture. [5]

2 (a) Using a suitable application software package, draw diagrams to illustrate the following addressing modes:

(i) Direct

(ii) Indirect

(iii) Immediate

(iv) Indexed

(v) Relative [15]

(b) Identify the logic gates described below and draw the symbol and type the logic expressions that

(i) produce a high output when the number of high inputs is odd;

(ii) produce a high output when all of its inputs are identical. [5]

Section B [50 marks]

Answer any **one** question from this section.

- 3 (a) Study the pseudocode below.

```

10  FUNCTION Myfunction (BYVAL x : INTEGER): LONG
20  IF x > 0 THEN
30  Myfunction = x * Myfunction (x - 1)
40  else IF x = 0 THEN
50  Myfunction = 1
60  ELSE
70  Myfunction = 0
80  END IF
90  END IF
100 END FUNCTION

```

- (i) Produce a trace table (or otherwise) for the function call
Myvalue = Myfunction. (5)
to show how the final value is assigned to the return value. [6]
 - (ii) Identify the line number which shows this algorithm and explain why. [2]
 - (iii) Re-write the algorithm using iteration to perform the same task. [10]
- (b) Write an algorithm using pseudocode or otherwise that accepts 30 integers into an array and then outputs the following statistical data:
- (i) mean (average of the number) [6]
 - (ii) whether or not the mean value is part of the data that was input by the user

Note

$$\text{mean} = \frac{\sum_{i=1}^n x_i}{n}$$

a sum of all the numbers
input divided by the
number of
numbers (count of numbers)

[8]

- (c) PaGumbo Travel Agency runs an airline for its clients. For a particular flight, the agency charges \$1000.00. They offer discounts using the following criteria in the same order of precedence.

1. ZIMSEC candidates get 20% discount.
2. Advance bookings are granted a further 15% discount on any amount charged.

Construct a flowchart for the calculation of airfares due to clients. [8]

- (d) Using a programming language of your choice, write (code) the declaration and initialisation of a 2-dimensional array of characters with the character 'X'. [8]

- (e) Write a line of code that will ensure that if a user input a string, only the first character is taken. [2]

- 4 Xolani is a programmer at ABC Building Contractors. He is required to develop a program to calculate employee wages at the end of each week. The program is expected to collect the following information from the user.

Employee Name
Number of hours worked

The program then computes and outputs the following information.

Normal pay
Overtime pay
Tax
Gross pay
Net pay

After calculating pay for one employee, the program should re-initialise the interface for the next employee's details to be accepted and processed.

Notes

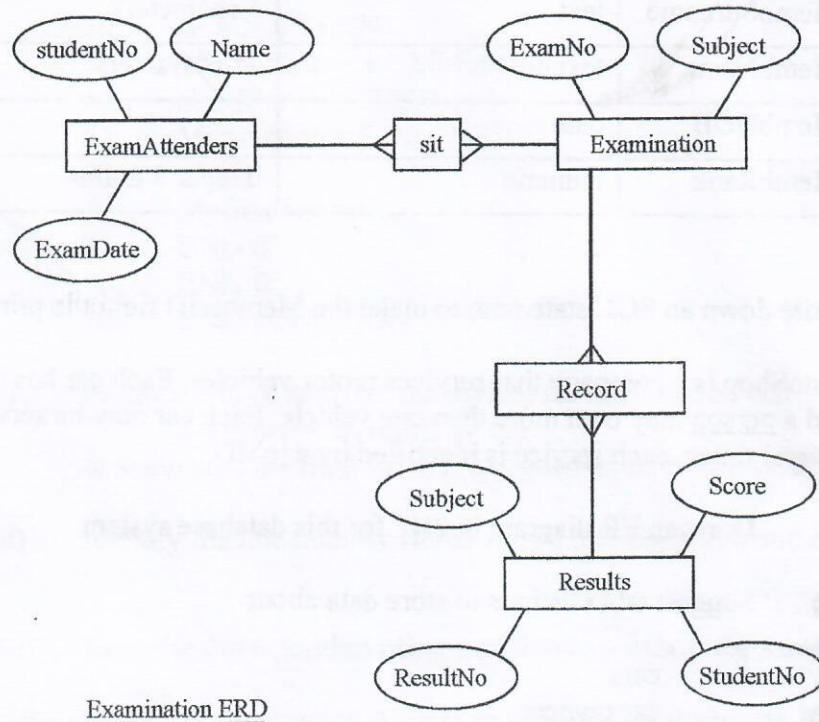
Normal working hours	40
Normal rate per hour	\$8.00
Overtime rate per hour	\$12.00
Tax rate (Overtime not taxed)	10.00%

- (a) Design a user interface for the program. [10]
- (b) Write the program corresponding to the user interface in part (a) that fulfils the requirements of the system. [30]
- (c) Write a program that accepts 200 characters and then determines the following:
the number of capital letters
the number of vowels
the number of consonants [10]

Section C [30 marks]

Answer any **one** question from this section.

- 5 The diagram below is an entity-relationship diagram for an Examinations Database.



- (a) Write SQL code to create the tables in a database represented in the Examinations ERD. [17]
- (b) (i) Write SQL statements to display all fields in the examAttendees table for a student identified by StudentNo = R0013. [3]
- (ii) Write SQL statement(s) to delete Computer Science Paper 4 from the examination table. [3]
- (iii) Write SQL statements to add a duration field in the examination table. [3]
- (iv) Write SQL statement(s) to change score for ResultNo 138 from 70 to 95. [3]
- (c) Suggest a key that could be used to establish the link between Examinations and Results tables. [1]

- 6 (a) Using SQL create the following table.

Table : Member

Field	Datatype	Size
MemberID	text	10 characters
MembSurname	text	5 characters
MembName	text	35 characters
MembDOB	date	
MembRank	numeric	integer 3 digits

[10]

- (b) Write down an SQL statement to make the MemberID field the primary key. [2]

- (c) AutoShop is a company that services motor vehicles. Each car has an owner and a person may own more than one vehicle. Each car may be serviced several times, each service is identified by a jobID.

- (i) Draw an ER diagram in 2NF for this database system. [7]

- (ii) Suggest table listings to store data about

cars
car owners

to match your design in (i) above, showing how the relationship between two entities is established. [8]

- (iii) Suggest any **three** other attributes for the service (other than jobID) and their datatypes in a table listing. [3]

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MINISTRY OF EDUCATION EXAMINATIONS COUNCIL

COMPUTER SCIENCE

6023/2

PART A

NOVEMBER 2021

Time

INSTRUCTIONS TO CANDIDATES

1. The examination is for the subject of Computer Science.

2. The examination is for the subject of Computer Science.

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