

GENERAL CERTIFICATE OF EDUCATION BOARD

General Certificate of Education Examination

COMPUTER SCIENCE 2
0595

ORDINARY LEVEL

JUNE 2023

Subject Title	COMPUTER SCIENCE
Paper No.	2
Subject Code No.	0595

Two Hours

Answer any FIVE questions.

All questions carry 20 marks each. For your guidance, the approximate mark for each part of a question is indicated in brackets.

You are reminded of the necessity for good English and orderly presentation in your answers.

In calculations, you are advised to show all the steps in your working, giving your answer at each stage.

Calculators or Phones are NOT allowed.

(1 mark)	(1 mark)	(1 mark)	(1 mark)
(2 marks)	(2 marks)	(2 marks)	(2 marks)
(3 marks)	(3 marks)	(3 marks)	(3 marks)
(4 marks)	(4 marks)	(4 marks)	(4 marks)
(5 marks)	(5 marks)	(5 marks)	(5 marks)
(6 marks)	(6 marks)	(6 marks)	(6 marks)
(7 marks)	(7 marks)	(7 marks)	(7 marks)
(8 marks)	(8 marks)	(8 marks)	(8 marks)
(9 marks)	(9 marks)	(9 marks)	(9 marks)
(10 marks)	(10 marks)	(10 marks)	(10 marks)
(11 marks)	(11 marks)	(11 marks)	(11 marks)
(12 marks)	(12 marks)	(12 marks)	(12 marks)
(13 marks)	(13 marks)	(13 marks)	(13 marks)
(14 marks)	(14 marks)	(14 marks)	(14 marks)
(15 marks)	(15 marks)	(15 marks)	(15 marks)
(16 marks)	(16 marks)	(16 marks)	(16 marks)
(17 marks)	(17 marks)	(17 marks)	(17 marks)
(18 marks)	(18 marks)	(18 marks)	(18 marks)
(19 marks)	(19 marks)	(19 marks)	(19 marks)
(20 marks)	(20 marks)	(20 marks)	(20 marks)

Turn Over

0595/2
©GCEB2023

Go on to the next page

33702223

1. UMBRELO is a wholesale business enterprise that sells two categories of umbrellas called **Economy** and **Business**. Purchases are placed by phone and delivery is made at doorsteps. The sale is restricted to a minimum of 25 umbrellas per purchase. UMBRELO intends to introduce online sales and add two extra umbrella categories called Sport and Leisure categories. UMBRELO aims to implement a new information system that updates the database that manages sales and stores the data they collect. The system will be implemented in one of the following ways:

1. Running both the new system and current system, at the same time for a period of one month.
2. Changing to a new system immediately.

A section of their current database design is as shown on **Table 1**.

Table 1

Field	Data type	Description
Product ID	T1	Unique product identifier made up of three characters and a three digit code such as TRA001 or BUS001 or ECO201 or BUS201
Umbrella Category	T2	Economy Category or Business Category umbrella (E or B)
Umbrella price	T3	Umbrella price per unit in FCFA
Acceptance	T4	User accepts product to be left at their doorstep if they are not at home (Y or N)
Order quantity	T5	Number of umbrellas sold per order (minimum of 25)
Sale ID	T6	Unique number for sale identifier

- (a) (i) From Table 1, state the data types for T1 to T6. (6 marks)
- (ii) What is a primary key? What field on Table 1 can represent a key field? (2 marks)
- (b) (i) What term describes the new online service that UMBRELO plans to introduce? (1 mark)
- (ii) Explain the following terms as used in the given text.
- update
 - database
- (4 marks)
- (c) (i) What condition must be fulfilled to validate Order quantity? (1 mark)
- (ii) Identify the two types of change over methods described above. (2 marks)
- (iii) State an advantage and a disadvantage in each case in c(ii) that UMBRELO will face. (4 marks)

2. A well-defined finite set of instructions listed below are used to solve a problem.

1. Begin
2. Get Price of item, P
3. Get Number of item, N
4. Total Amount, $T = P * N$
5. Discount, $D = 0.25 * T$
6. If $N > 10$
7. Amount Paid, $A = T - D$
8. Else
9. Amount Paid, $A = T$
10. Output P, N, D, T, and A
11. End

- (a) (i) What is an algorithm? (2 marks)
- (ii) Briefly explain the problem that the algorithm above solves. (2 marks)
- (iii) If $P = 1000$ and $N = 20$, what values the output comprise? (4 marks)
- (iv) Represent the algorithm above as a flow chart. (6 marks)

- (b) Long term use of computer equipment can lead to health problems. State one health problem that may result from:
- (i) Long term use of the keyboard. (1 mark)
 - (ii) Long term use of the screen. (1 mark)
 - (iii) What problem does ergonomics address? (2 marks)
 - (iv) How can ergonomics be applied in order to solve the problem of (i) and (ii) above? (2 marks)

3. (a) Consider the following Boolean expression
 $Q = (A \cdot B) + (\overline{A + B})$
- (i) Draw the logic circuit that corresponds to the expression of Q. (4 marks)
 - (ii) Copy and complete the truth table in **Table 2**:

Table 2

A	B	$A \cdot B$	$A + B$	$\overline{(A + B)}$	Q
0	0				
0	1				
1	0				
1	1				

- (4 marks)
- (iii) What does a truth table represent? (2 marks)
- (b) Briefly explain each of the following:
- (i) Computer network (2 marks)
 - (ii) Computer ethics (2 marks)
 - (iii) Network protocol (2 marks)
- (c) With the aid of a sketch, briefly explain the difference between tracks and sectors on a magnetic disk (4 marks)

4. (a) When a key is pressed on the keyboard, the computer stores the ASCII code representing the character entered in the main memory. The decimal ASCII values for **C** is 67, **D** is 68 and **E** is 69. Two characters **A** and **E** are in a memory location as shown below:

Location 1:	A
Location 2:	E

- (i) Evaluate the contents of Location 1 and Location 2 in binary. (4 marks)
 - (ii) Convert the binary numbers in a(i) to hexadecimal numbers. (2 marks)
 - (iii) Evaluate $11000111_2 + 111101_2$ (2 marks)
- (b) Explain what a computer interface is and give an example. (2 marks)
- (c) (i) What is an information system? (2 marks)
- (ii) Name four components of an information system and give a function of each component. (8 marks)

Turn Over

5. (a) (i) Give a simple definition for a *project* (2 marks)
 (ii) What is the role of a Gantt chart in project management? (2 marks)

Study the **Table 3** and answer the questions that follow.

Table 3

Activity	Description	Number of weeks to complete activity	Dependency
A	Identify requirements	1	
B	Structural design	1	A
C	Write program code	4	B
D	Test modules	2	C
E	Integrated testing	2	C
F	Install software	1	D, E
G	Trial/acceptance testing	2	F
H	Write software documentation	2	E
I	Write training material	2	G
J	Train users	1	I
K	Handover/signature	1	J

- (b) (i) Using the information provided on Table 3, establish a Gantt chart. (7 marks)
 (ii) State the critical path and the duration of the project. (4 marks)
- (c) (i) What is green computing? State one way to promote green computing in everyday use. (3 marks)
 (ii) Briefly describe how green computing can be promoted in the management of electronic waste from old computers. (2 marks)
-
6. (a) (i) What is an operating system? (2 marks)
 (ii) State two functions of an operating system. (2 marks)
 (iii) What is mobile operating system software? (2 marks)
 (iv) State two examples of mobile operating system software. (2 marks)
- (b) (i) What is social networking? (2 marks)
 (ii) List two examples of social networking sites and/or software. (2 marks)
 (iii) State one advantage and one disadvantage of social networking. (2 marks)
- (c) List and briefly explain the three stages of the machine instruction cycle. (6 marks)
-
7. (a) Architects commonly use CAD software to design houses.
 (i) Write CAD in full and state one example. (2 marks)
 (ii) State two advantages of CAD software. (2 marks)
- (b) Differentiate between the following:
 (i) Impact and non-impact printers (2 marks)
 (ii) Optical storage devices and magnetic storage devices. (2 marks)
 (iii) Coaxial cables and optic fibre cables. (2 marks)
 (iv) Wireless and physical communication channels (2 marks)
- (c) As a security measure in a company, access is granted after a fingerprint scan.
 (i) Explain how the system works. (2 marks)
 (ii) State one advantage and one disadvantage of automatic data capture system. (2 marks)
- (d) (i) What is telemedicine? (2 marks)
 (ii) State one advantage and one disadvantage of telemedicine. (2 marks)