Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

COMPUTER SCIENCE **0478/12**

Paper 1 Theory **February/March 2019**

1 hour 45 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

No calculators allowed.

READ THESE INSTRUCTIONS FIRST

Write your centre number, candidate number and name in the spaces at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
No marks will be awarded for using brand names of software packages or hardware.

Any businesses described in this paper are entirely fictitious.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The maximum number of marks is 75.

This syllabus is regulated for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **11** printed pages and **1** blank page.

Cambridge Assessment International Education

1 **(a)** Elle has a file stored on her computer that is 20 MB in size. Jordan has a file that is 10 GB in size.

Tick (✓) to show which is the **larger** file.

File size	Tick (✓)
20 MB	
10 GB	✓

[1]

(b) Bob has a file stored on his computer that is 3500 kB in size. Gerty has a file that is 3 MB in size.

Tick (✓) to show which is the **larger** file.

File size	Tick (✓)
3500 kB	✓
3 MB	

[1]

2 Many computer systems have an input device and an output device.

(a) (i) State what is meant by an input device.

A device that is used to enter/input data into a computer. [1]

(ii) Give an example of an input device.

Keyboard [1]

(b) (i) State what is meant by an output device.

A device that is used to output information from a computer. [1]

(ii) Give an example of an output device.

Monitor. [1]

3 **(a)** A long distance running race uses an electronic counter that counts each competitor who finishes the race.

The count is stored as binary in a **12-bit** register.

A denary value of the count is displayed on a screen above the finish line.

(i) The screen currently displays:

0	0	3	9

State the binary value that is currently stored to display the count shown.

000 000 0 1 0 0 1 1 1 .....

..... [2]

(ii) More competitors cross the finish line and the screen now displays:

0	3	5	0

State the binary value that is currently stored to display the count shown.

..... 000 10 10 1 1 1 0 .....

..... [2]

(iii) At the end of the race the binary value stored is:

011011000111

Give the denary value that would be displayed on the screen at the end of the race.

Show your working.

..... 1024 + 512 + 128 + 64 + 4 + 2 + 1 .....

..... 1735 .....

.....

.....

Screen display: 1735

[2]

(b) Sensors are used at the finish line to identify the number of competitors who finish the race.

(i) Identify **two** different sensors that could be used to identify the number of competitors.

Sensor 1 Pressure Sensors

Sensor 2 Light Sensors

[2]

(ii) The sensors are used with a microprocessor to count how many competitors finish the race.

Explain how the sensor and the microprocessor are used.

A pressure sensor reads a value. This value is analogue and is sent to the processor. But first it is converted to digital using an ADC. Once in the CPU it will be compared to a preset value. If the data is out of range then the CPU will send a signal/instruction to increament a counter

[6]

4 Darius is writing a computer program that allows binary values to be calculated.

Darius chooses to write the program in a high-level language rather than a low-level language.

(a) Explain why Darius chooses to write the program in a high-level language.

Since it closely resembles english/natural language it will be easy to understand and read and also to debug errors

..... [2]

(b) Darius will use a translator to translate the program. He could use a compiler or an interpreter.

Five statements are given about compilers and interpreters.

Tick (✓) to show if the statement applies to a **Compiler** or an **Interpreter**. Statements may apply to both.

Statement	Compiler (✓)	Interpreter (✓)
A report of errors is produced at the end of translation.	✓	
The program is translated one line at a time.		✓
The program is translated from high-level language into machine code.	✓	✓
An executable file is produced.	✓	
The program will not run at all if an error is detected.	✓	

[5]

Darius is sending several programs that he has created to his friend Selma.

(c) He wants to compress the files to send them as he needs to attach them to an email.

Darius tells Selma he is going to use lossy compression. Selma tells him that he should use lossless instead.

Explain why Selma tells Darius to use lossless compression instead of lossy.

lossless compression would reduce the size of the file without a loss in quality
Using lossy compression would change the meaning of the code.
Using lossless compression means the data can be restored to its original value / state. [4]

(d) Errors can occur when data is transmitted, stored or entered into a system.

Darius could use an error detection method to find whether errors have occurred.

One error detection method he could use is a checksum.

(i) Describe how a checksum detects errors.

A checksum value of the data is calculated. The data and the value are sent to the receiver. The receiver recalculates a checksum value from the data. He compares his value to the one received. If they are the same then the data is uncorrupted. If they are different it means there is an error. [5]

(ii) State **three** other error detection methods that Darius could use.

Method 1 ..... echo check .....

Method 2 ..... ARQ Automatic Repeat Request .....

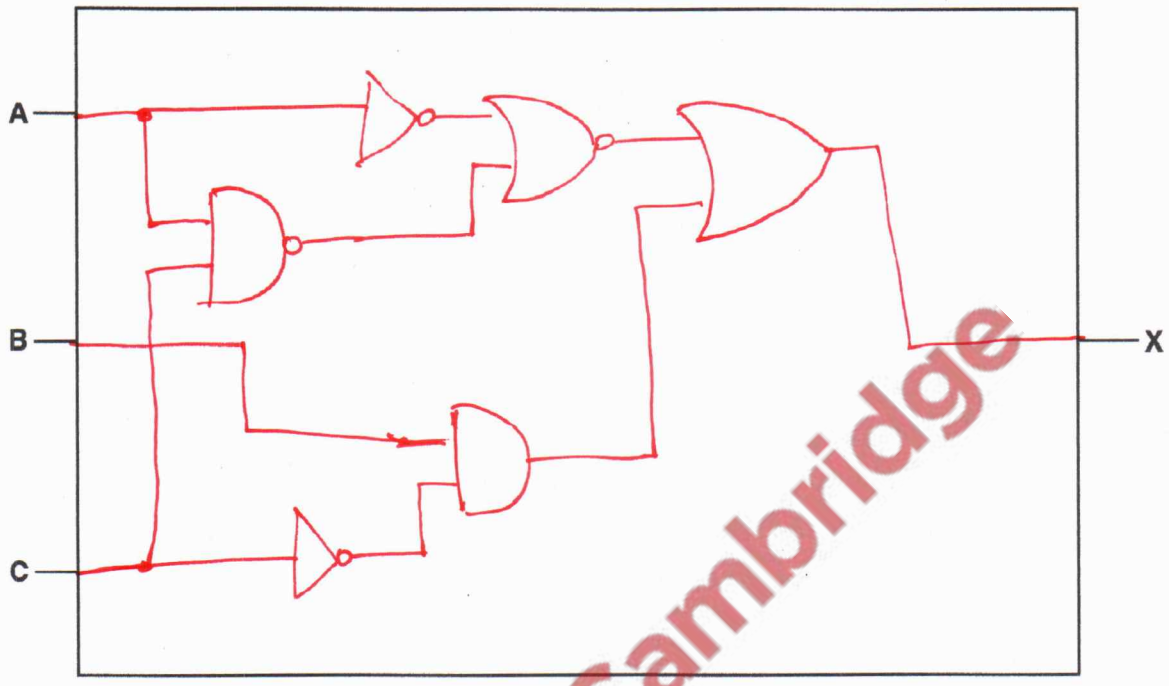
Method 3 ..... Parity checks and Parity Blocks .....

[3]

5 Consider the following logic statement:

X = 1 if ((A is 1 NAND C is 1) NOR A is NOT 1) OR (B is 1 AND C is NOT 1)

(a) Draw a logic circuit that represents the given logic statement. Your logic gates must have a maximum of two inputs. Do **not** simplify the logic statement.



[6]

(b) Complete the truth table for the given logic statement.

A	B	C	Working space	X
0	0	0		0
0	0	1		0
0	1	0		1
0	1	1		0
1	0	0		0
1	0	1		1
1	1	0		1
1	1	1		1

[4]

6 Nadia purchases a printer to print out her homework.

She connects the printer to her computer using USB.

(a) Explain what is meant by USB.

Universal Serial Bus.
A modern method of connecting peripherals to a computer. It is a connection method that uses serial data transfer.

[3]

(b) Nadia's printer uses powdered toner rather than liquid ink.

(i) State the type of printer Nadia has purchased.

laser printer [1]

(ii) Give **two** benefits of using this type of printer.

Benefit 1 faster in printing bulk material

Benefit 2 cheaper printing cost per page.

[2]

(iii) Give **one** drawback of using this type of printer.

Drawback 1 Expensive to purchase printer and toner ink [1]

(c) Nadia uses several types of computer storage for her homework and other projects.

(i) **Five** examples of computer storage are given.

Tick (✓) to show if the computer storage is **Primary**, **Secondary** or **Off-line**.

Storage example	Primary (✓)	Secondary (✓)	Off-line (✓)
Solid state drive (SSD)		✓	
Blu-ray disc			✓
USB flash memory			✓
Random access memory (RAM)	✓		
Read only memory (ROM)	✓		

[5]

(ii) Nadia is considering purchasing a magnetic storage device.

Describe how a magnetic storage device stores data.

This device has platters with a metalic surface on them. They also have concentric tracks on them. They have sectors on them too. and it spins on a spindle An arm connected to an actuator moves back an forth close to each platter. It induces a small magnetic polarity on the platter in the pattern of binary values. These are interpreted to be data..

[6]

(iii) Give **two** advantages of using a magnetic storage device rather than a solid state storage device.

Advantage 1 has a greater longevity

Advantage 2 has a cheaper cost per unit of data.

[2]

7 Arya regularly uses the Internet as a research tool for her school projects.

Identify **and** describe **three** risks to Arya's computer when she is using the Internet for research.

Risk 1 Hacking

Description Since the computer is connected to the network, a person can have illegal access to her computer.

Risk 2 Viruses

Description This is a program that will attach itself to her files, replicate itself and even cause damage to her files

Risk 3 Malware

Description A software program that may be used to cause damage to the computer system

[6]