Cambridge Assessment International Education

# Cambridge IGCSE™

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*0063325412*

**COMPUTER SCIENCE** **0478/11**

Paper 1 Theory **October/November 2021**

**1 hour 45 minutes**

You must answer on the question paper.

No additional materials are needed.

**INSTRUCTIONS**

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- Calculators must **not** be used in this paper.

**INFORMATION**

- The total mark for this paper is 75.
- The number of marks for each question or part question is shown in brackets [ ].
- No marks will be awarded for using brand names of software packages or hardware.

This document has **12** pages. Any blank pages are indicated.


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**1** Binary is a number system that is used by computers.

**(a)** Tick (✓) **one** box to show whether binary is a base-2, base-10 or base-16 number system.

**Tick (✓)**

☐ Base-2

☐ Base-10

☐ Base-16

[1]

**(b)** Hexadecimal and denary are number systems that can be used by programmers.

Convert these **four** hexadecimal values into denary values.

09 .....

10 .....

28 .....

A1 .....

[4]

Working space

.....

.....

.....

.....

.....

**2** Magda has a mobile telephone.

She uses the touch screen on her telephone to send emails to her customers. The touch screen breaks, stopping Magda from using it to type her emails.

**(a)** Identify **one** other input device that would be built into the mobile telephone that Magda could use to send an email to her customers.

..... [1]

**(b)** The touch screen operates by using the conductive properties of the object that is used to touch the screen.

State whether the touch screen is a resistive, capacitive or infra-red touch screen.

..... [1]

**(c)** Magda is listening to music on her mobile telephone when she receives a telephone call. A signal is sent within the telephone to stop the music and output that a call has been received.

Give the name of this type of signal.

..... [1]

3 **Five** statements are given about the error-checking methods checksum, check digit and parity check.

**(a)** Tick (✓) to show whether each statement applies to checksum, check digit or parity check. Some statements may apply to more than **one** error-checking method.

| Statement | Checksum (✓) | Check digit (✓) | Parity check (✓) |
|---|---|---|---|
| uses an additional bit to create an odd or even number of 1s | | | |
| checks for errors on data entry | | | |
| compares **two** calculated values to see if an error has occurred | | | |
| will **not** detect transposition errors | | | |
| sends additional values when data is transmitted from a computer to another | | | |

[5]

**(b)** Identify **one** other error-checking method.

..... [1]

4 Georgia is a wedding photographer. She wants to store 10 photographs on a USB flash memory drive for a customer. Each photograph is 100 pixels wide and 50 pixels high.

The photographs are 8-bit colour photographs.

**(a)** Calculate the total file size, in kilobytes (kB), of all the photographs. For this calculation, you may use the unit of measurement of 1024 or 1000.

Show all your working.

.....

.....

.....

.....

.....

.....

.....

Answer ..... kB

[3]

**(b)** Georgia compresses photographs to store them on the USB flash memory drive. It is important that the compression does **not** affect the quality of the photographs in any way.

State which type of compression is the most suitable. Justify your choice.

Compression type .....

Justification .....

.....

.....

.....

[3]

**(c)** Georgia uses a digital camera. The digital camera takes a photograph that is then converted into a digital image.

Complete the paragraph about the operation of a digital camera, using the most appropriate terms from the list. **Not** all terms in the list need to be used.

- analogue-to-digital
- binary
- charge-coupled
- digital-to-analogue
- lens
- light
- mirror
- pixel
- reflection
- sensor
- storage

When Georgia pushes the button to take a photograph, an aperture opens at the front of

the camera to allow ..... to stream in through

the ..... . This is captured by a sensor called a

..... device. The .....

converter then converts each ..... into a digital value.

[5]

**5** Tamaz stores confidential data on his computer.

He uses the Internet regularly and is concerned about his data being viewed by unauthorised people. He currently has **one** software method to stop his data being viewed, which is a password.

He wants to add other software methods to stop his data being viewed by unauthorised people.

**(a)** State **two** other software methods that Tamaz could use to stop his data being viewed by unauthorised people.

1 .....

2 .....
[2]

**(b)** Tamaz's computer has an operating system. **Two** functions of the operating system are file management and memory management.

State **two** other functions of the operating system.

1 .....

2 .....
[2]

**6** **Six** statements are given about the role of components in the Central Processing Unit (CPU).

**(a)** Tick (✓) to show whether each statement applies to the Memory Address Register (MAR), Memory Data Register (MDR) or Program Counter (PC).

Some statements may apply to more than one component.

| Statement | MAR (✓) | MDR (✓) | PC (✓) |
|---|---|---|---|
| it is a register in the CPU | | | |
| it holds the address of the next instruction to be processed | | | |
| it holds the address of the data that is about to be fetched from memory | | | |
| it holds the data that has been fetched from memory | | | |
| it receives signals from the control unit | | | |
| it uses the address bus to send an address to another component | | | |

[6]

**(b)** Identify the component in the CPU that carries out calculations.

..... [1]

7 **(a)** Tick (✓) **one** box to identify if an internal Solid State Drive (SSD) is an example of primary, secondary or off-line storage. Justify your choice.

**Tick** (✓)

- ☐ Primary
- ☐ Secondary
- ☐ Off-line

Justification .....

.....

.....

.....

[3]

**(b)** Describe the operation of an SSD and how it stores data.

.....

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..... [4]

**8** Victoria develops a computer game to sell on a gaming website. She writes her program using English-like statements.

**(a)** State which type of programming language Victoria is using.

..... [1]

**(b)** Victoria uses **two** different types of translator when creating the program for the computer game.

State which translator is the most suitable for the given tasks.

Give the benefits of using that translator for the task.

You must choose a different translator for each task.

**(i)** To translate the code during development of the game.

Translator .....

Benefits .....

.....

.....

.....

.....

.....

[3]

**(ii)** To translate the final program and upload to the website for distribution, without the source code.

Translator .....

Benefits .....

.....

.....

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.....

.....

[3]

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**9** A washing machine uses sensors and a microprocessor to control the washing cycle of clothes.

**(a)** A sensor is used in each of the given tasks.

Identify **one** suitable sensor that would be used for each task.

Each sensor given must be different.

| Task | Sensor |
|---|---|
| checking the water is 30 °C | |
| checking the water acidity level after detergent is added | |
| checking the weight of the clothes to make sure that the machine is **not** overloaded | |

[3]

**(b)** Describe how the sensor and the microprocessor are used to make sure the water remains at 30 °C.

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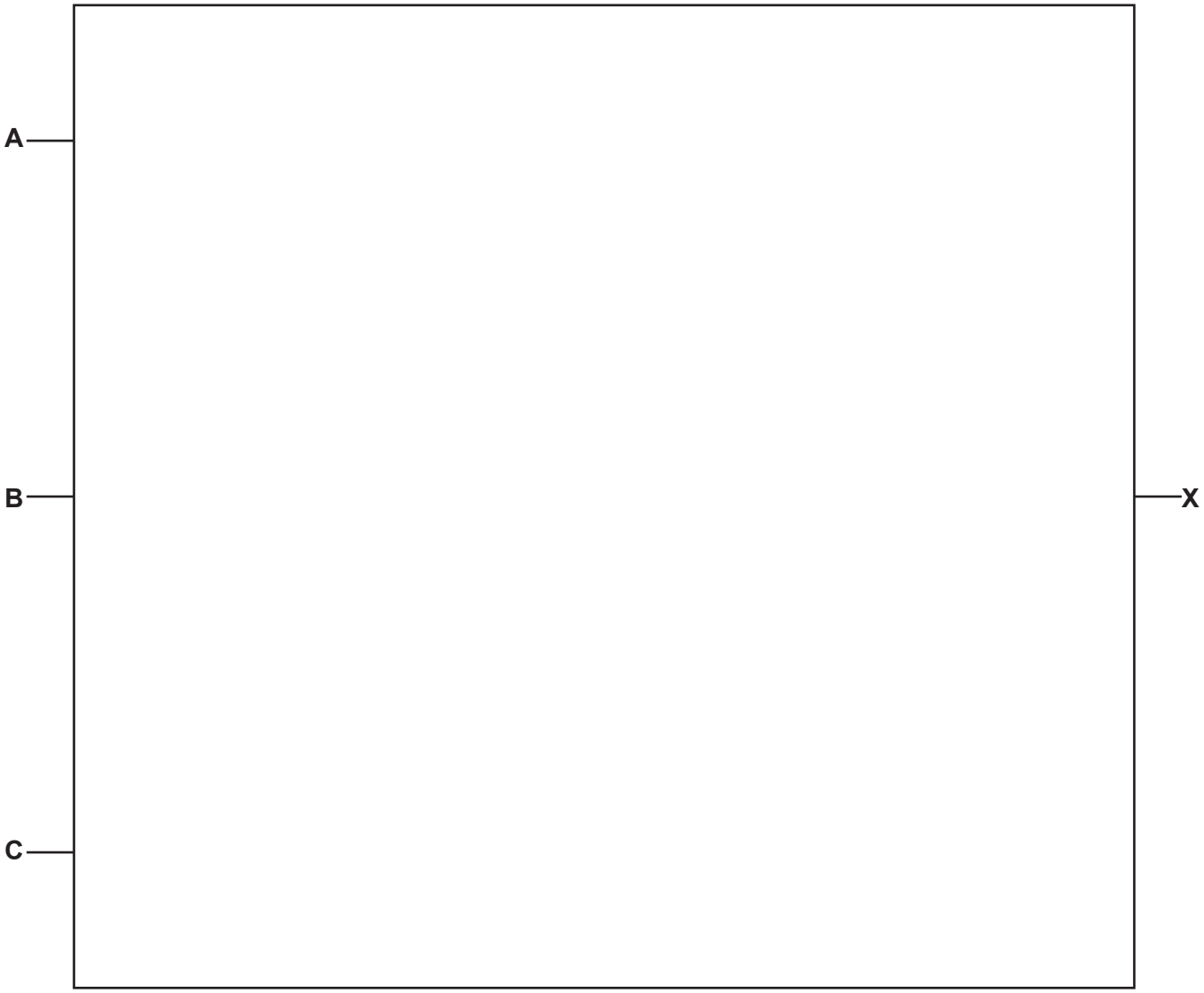
..... [6]

**10** Consider the following logic statement:

**X** = (((**A** OR **B**) OR (NOT (**B** XOR **C**))) AND **C**)

**(a)** Draw a logic circuit to represent the given logic statement.

Do **not** attempt to simplify the logic statement. All logic gates must have a maximum of **two** inputs.




[5]

**(b)** State the name of a logic gate that does **not** appear in the logic statement and draw the symbol for the logic gate.

Name of logic gate ..... Logic gate symbol:

[2]

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**(c)** Complete the truth table for the given logic statement.

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

[4]

**11** The table contains descriptions relating to web pages and the Internet.

Complete the table with the correct terms for the given descriptions.

| Term | Description |
|---|---|
| | the language used to create a web page |
| | the type of software application used to display a web page |
| | an address given to a computer, by a network, to allow the computer to be uniquely identified |
| | a text file sent by a web server to collect data about a user's browsing habits |
| | the company that provides a connection to the Internet |

[5]

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