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*5416518687*

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

Paper 1 Theory **October/November 2022**

**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.


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**1** A shopping mall has an information point. Visitors can use it to find out which shops are in the mall and where they are located.

**(a)** Identify **one** input device that could be built into the information point.

Give an example of how that device would be used.

Input device .....

Example .....
[2]

**(b)** Identify **one** output device that could be built into the information point.

Give an example of how that device would be used.

Output device .....

Example .....
[2]

**(c)** Identify **one** example of primary storage that could be built into the information point.

State what would be stored in your example of primary storage.

.....

.....

.....

..... [2]

**2** Phil has a computer that is designed using the Von Neumann model. The computer has a central processing unit (CPU).

**(a)** One type of component within the CPU is an address bus.

Identify **two** other types of bus and state what each is responsible for transmitting in the CPU.

Bus 1 .....

.....

Bus 2 .....

.....

[4]

**(b)** The CPU performs a cycle that has three stages. One of these stages is execute.

Identify **one** other stage of the cycle that is performed by the CPU.

..... [1]

**(c)** Identify the component within the CPU that the accumulator is built into and describe the purpose of the accumulator.

.....

.....

.....

.....

.....

..... [3]

**3** Error codes for a computer are often displayed as hexadecimal values. Each error code is stored in a 12-bit binary register.

**(a)** The error code 404 means 'file not found'.

Give the 12-bit binary value that would be stored for the hexadecimal error code 404

.....

Working space

.....

.....

.....

[2]

**(b)** The error code 12B means 'hardware fault'.

Give the 12-bit binary value that would be stored for the hexadecimal error code 12B

.....

Working space

.....

.....

.....

[2]

**(c)** Hexadecimal values can also be represented as denary values.

The hexadecimal error code 022 means 'file system error'. The hexadecimal error code 0AC means 'insufficient memory'.

Convert the hexadecimal error codes 022 and 0AC to denary values.

022 .....

0AC .....

Working space

.....

.....

.....

.....

.....

[2]

**(d)** The register stores the binary value 100111100000

Give the hexadecimal error code that would be displayed for the binary value 100111100000

.....

Working space

.....

.....

.....

[2]

**(e)** Give **two** reasons why error codes are represented in hexadecimal, instead of binary.

Reason 1 .....

.....

Reason 2 .....

.....

[2]

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**[Turn over**

**4** Rebekah discovers that her bank details have been used fraudulently.

She thinks her bank details were stolen electronically, whilst she was using the Internet.

**(a)** Identify and describe **two** methods that could have been used to steal Rebekah's bank details electronically.

Method 1 .....

.....

.....

.....

.....

.....

Method 2 .....

.....

.....

.....

.....

.....

[6]

**(b)** Rebekah decides to encrypt the data that she transmits whilst using the Internet. She does this to keep the data safe.

**(i)** State why encryption helps keep the data safe.

.....

..... [1]

**(ii)** The data is encrypted using symmetric encryption.

Describe how the data is encrypted using symmetric encryption.

.....

.....

.....

.....

.....

.....

.....

..... [4]

**(iii)** Identify **three** other methods Rebekah could use to help keep her data safe.

Method 1 .....

Method 2 .....

Method 3 .....

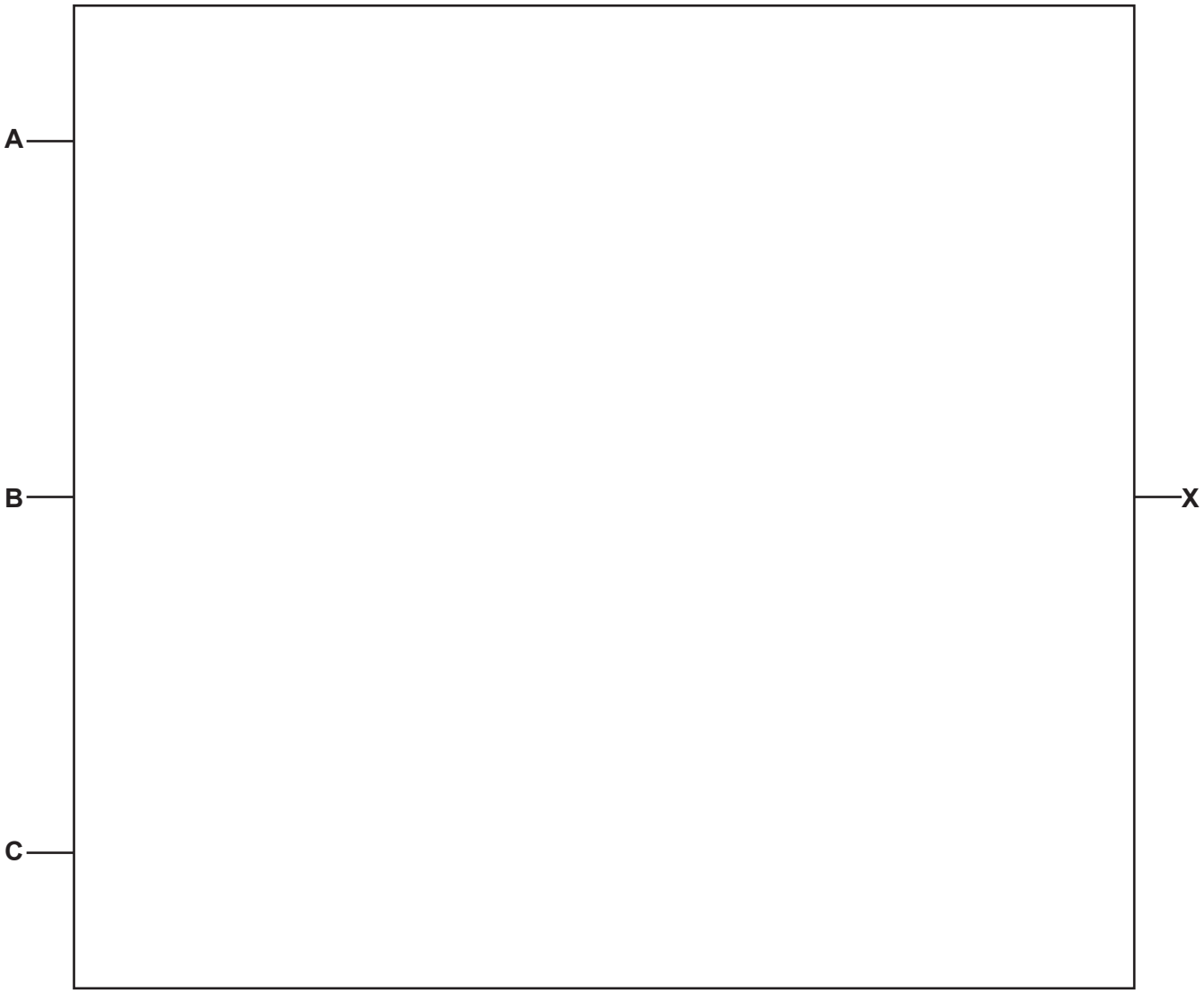
[3]

**5** Consider the logic statement:

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

**(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.




[6]

**(b)** State the name of **one** logic gate that is **not** included in the given logic statement.

..... [1]

**(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]

**6** A computer sends the data for an image to the print buffer, to wait to be processed for printing, until the buffer is full.

When the buffer is no longer full, it sends a signal back to the computer to state it is ready for more data.

State the name of this signal and give **two** other examples of when this type of signal is used.

Signal name .....

Examples .....

.....

.....

.....

.....

[3]

**7** Cameron writes software for coffee machines. He uses assembly language to write his software.

**(a)** Tick (✓) to show whether assembly language is an example of a high-level language, a low-level language or machine code.

| | **Tick (✓)** |
|---|---|
| High-level language | ☐ |
| Low-level language | ☐ |
| Machine code | ☐ |

[1]

**(b)** Identify the translator that is required for assembly language.

..... [1]

**(c)** Give **two** reasons why Cameron chooses to write the software for the coffee machines in assembly language.

Reason 1 .....

.....

Reason 2 .....

.....

[2]

**(d)** Give **two** drawbacks of using assembly language to write programs.

Drawback 1 .....

.....

Drawback 2 .....

.....

[2]

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**8** Eleanor has a website that she uses to advertise the cakes that she bakes.

**(a)** Hypertext Markup Language (HTML) is used to create the website. The HTML is separated into presentation and structure.

**(i)** Give **two** examples of HTML presentation.

Example 1 .....

Example 2 .....
[2]

**(ii)** Give **two** examples of HTML structure.

Example 1 .....

Example 2 .....
[2]

**(b)** Eleanor uses a secure connection to allow customers to buy the cakes from her website.

Describe how the secure connection is created.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

**(c)** Eleanor's website uses cookies.

Explain what is meant by the term cookies and give **two** examples of how cookies can be used.

.....

.....

.....

.....

.....

.....

.....

..... [4]

**(d)** Eleanor is worried about a denial of service (DoS) attack on her web server.

She wants to help prevent a DoS attack reaching the web server.

Identify a security method that she could use to help prevent a DoS attack.

Explain how the method you identify helps to prevent the attack.

Security method .....

Explanation .....

.....

.....

.....

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.....

.....

[4]

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