Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

1428246498

COMPUTER SCIENCE **0478/12**

Paper 1 Theory **February/March 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. Any blank pages are indicated.

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1 A computer stores data in binary form. Binary numbers can be represented as hexadecimal and denary numbers.

(a) Convert the 8-bit binary number 01010101 to denary.

..... [1]

Working space

.....

.....

.....

(b) Convert the binary number 11000000 to hexadecimal.

..... [1]

Working space

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(c) Convert the hexadecimal number 1A to denary.

..... [1]

Working space

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(d) Binary numbers can be stored as bytes.

State how many bits are in **two** bytes.

..... [1]

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2 Nadia creates a digital image for a school project.

(a) Give **one** example of an image format.

..... [1]

(b) Describe how a digital image file is stored by a computer.

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..... [3]

(c) Nadia compresses the digital image file before emailing it to a friend.

(i) State what is meant by data compression.

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..... [1]

(ii) Explain why Nadia compresses the digital image file before emailing it.

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..... [2]

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(iii) Nadia's email service uses parity bits as a method of error detection during the transmission of data.

Describe how the parity bits are used to detect errors.

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..... [5]

(iv) Identify and describe **one** other method of error detection used during the transmission of data.

Method .....

Description .....

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[4]

3 **(a)** Tick (✓) to show which logic gates will give an output of 1 for the given inputs A and B.

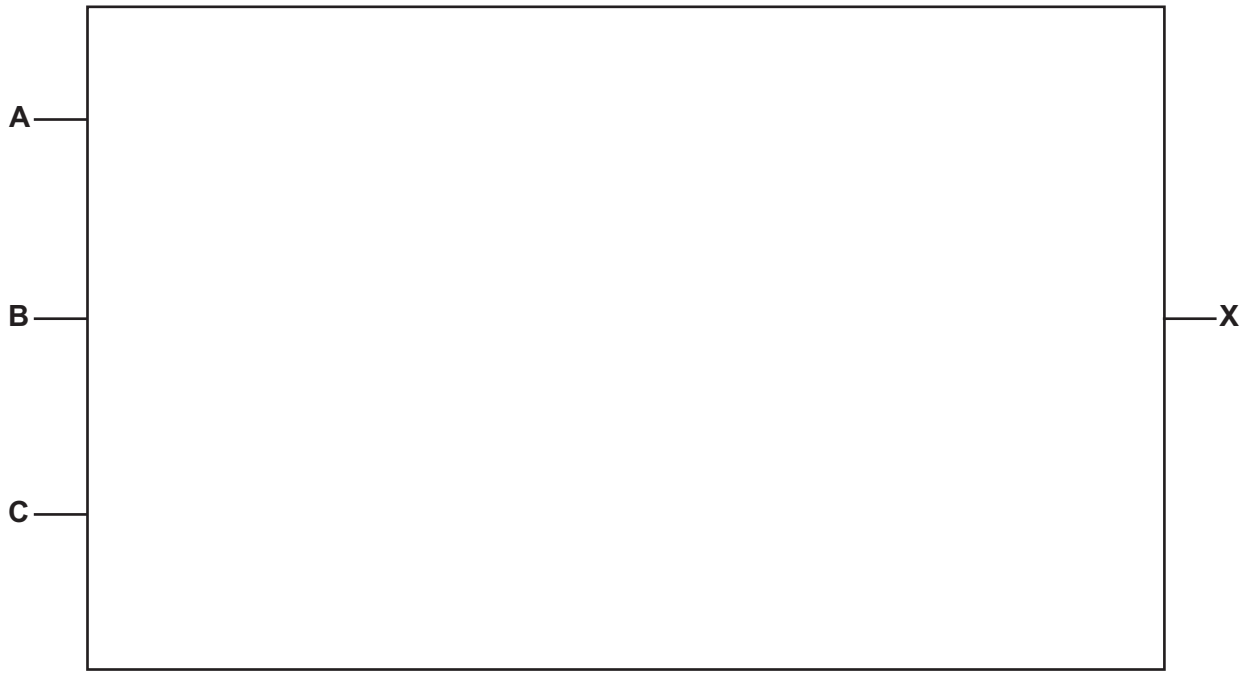
Inputs	AND	OR	NAND	NOR	XOR
A = 1 B = 1					
A = 0 B = 0					
A = 1 B = 0					

[3]

(b) Draw the logic circuit for the given logic statement:

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

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



[4]

4 Pradeep uses his personal computer to complete work at home.

(a) Pradeep uses a mouse and a keyboard to control the computer.

(i) Complete the descriptions of the principles of operation of a mouse and a keyboard using the most appropriate terms from the list. **Not** all terms in the list need to be used.

- absorbs
- ball
- biometric
- circuit
- colour
- digital
- direction
- Light-Emitting Diode (LED)
- Liquid Crystal Display (LCD)
- reflects
- speed
- switch
- transparency

An optical mouse shines a red light from a ..... underneath the mouse. The light ..... back from a surface through a lens in the mouse and is converted to a value. This value is transmitted to the computer. The computer then determines the ..... and ..... of the movement.

When the user presses a key on a keyboard, the key pushes the ..... on the circuit board. This completes a ..... . Signals are sent to the computer. The computer uses the data to calculate which key was pressed.

[6]

(ii) Identify **two** other input devices Pradeep could use with his personal computer.

Input device 1 .....

Input device 2 .....

[2]

(b) Pradeep uses a projector attached to the ceiling at his home to watch high-definition (HD) films.

The projector has broken. He wants to buy a replacement. He needs to choose between an LCD projector and a Digital Light Projector (DLP).

Explain why an LCD projector would be more appropriate for Pradeep.

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..... [3]

(c) Pradeep stores his collection of films and his work files on his personal computer.

Pradeep wants to save a copy of all his films and files onto a single storage device.

Identify and justify an appropriate storage device to store the copies.

Storage device .....

Justification .....

.....

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.....

[4]

5 A holiday company has a website where customers can create accounts and can book and pay for holidays.

(a) The website is written in Hypertext Markup Language (HTML).

Give **two** examples of HTML structure and **two** examples of HTML presentation.

Structure 1 .....

Structure 2 .....

Presentation 1 .....

Presentation 2 .....

[4]

(b) The website is stored on a web server. Customers use their own computers to access the website.

Uniform Resource Locator (URL), Internet Protocol (IP) and Media Access Control (MAC) are three types of address used by computers when accessing the Internet.

Give **two** features of each type of address in the table.

Type of address	Features
URL	....
IP	....
MAC	....

[6]

(c) The company is concerned about threats to its web server.

Complete the table by identifying:

- **two** potential threats to its web server
- the impact each threat could have on the company
- software the company can use to help to limit each threat.

Each impact must be different.

Threat	Impact on company	Software
....	....	....
....	....	....

[6]

6 A business uses a closed-circuit television (CCTV) system that starts recording when motion is detected. It stops recording after two minutes if no further motion is detected. The system uses a motion sensor and a microprocessor.

Describe how the motion sensor and microprocessor work together to control the CCTV system.

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..... [7]

7 Ishani is a software developer who is creating a new computer game.

(a) Ishani uses an interpreter and a compiler at different stages of the game creation.

(i) Explain when it is most appropriate for Ishani to use an interpreter.

.....

.....

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..... [3]

(ii) Explain when it is most appropriate for Ishani to use a compiler.

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..... [3]

(b) Ishani has to decide between releasing her game as freeware or free software.

Describe freeware and free software.

Freeware .....

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Free software .....

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[4]

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