Cambridge Assessment International Education

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CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

6104118326

COMPUTER SCIENCE **0478/12**

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 bus station has a ticket machine.

A customer can use the ticket machine to select and pay for their ticket.

One input device built into the ticket machine is a touch screen.

(a) Identify **two** other input devices that could be built into the ticket machine.

Input device 1 .....

Input device 2 .....
[2]

(b) The ticket machine has a help icon that a user can touch to contact customer support.

The ticket machine has an output device that allows the user to hear the customer support person.

Identify an output device that would be used for this purpose.

..... [1]

(c) The touch screen for the ticket machine uses resistive technology.

(i) Describe how resistive touch screen technology operates to recognise a user's touch.

.....

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.....

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..... [4]

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(ii) Give **two** benefits of using resistive touch screen technology for the ticket machine.

Benefit 1 .....

.....

Benefit 2 .....

.....

[2]

(iii) Give **two** drawbacks of using resistive touch screen technology for the ticket machine.

Drawback 1 .....

.....

Drawback 2 .....

.....

[2]

(iv) Identify **one** other touch screen technology that could have been used.

..... [1]

(d) The computer in the ticket machine uses the stored program concept.

Describe the stored program concept.

.....

.....

.....

..... [2]

(e) The computer in the ticket machine has an operating system.

One function of the operating system is to provide an interface for the user.

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

Function 1 .....

Function 2 .....

Function 3 .....

[3]

(f) The computer uses 12-bit binary registers to store data whilst it is being processed.

Customers are given a denary ticket number.

(i) Give the 12-bit binary value that is stored in the register for each denary ticket number.

100 .....

235 .....

301 .....

Working space

.....

.....

.....

.....

.....

[3]

(ii) Show the denary ticket number that would be given to the customer for each 12-bit binary value.

000000010110 .....

000001110111 .....

001101011001 .....

Working space

.....

.....

.....

.....

.....

[3]

(iii) Binary values can also be represented as hexadecimal values.

Show the hexadecimal value that represents each of the **two** 12-bit binary values.

000010010101 .....

101011010001 .....

Working space

.....

.....

.....

[4]

2 An automated water tap system uses a sensor and a microprocessor to operate. Water flows from the tap when a person's hands are placed underneath the tap. Water stops flowing when the person's hands are removed from underneath the tap.

(a) Explain how the water tap system uses a sensor and a microprocessor to operate.

.....

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..... [6]

(b) **Three** descriptions are shown of different systems.

Identify the most suitable sensor that could be used in each system.

Description of system	Sensor
it checks the air is dry enough in a garage that spray paints cars	
it automatically switches on the headlights on a car when it is dark	
it checks that the soil in a greenhouse has the correct level of acidity	

[3]

3 **Five** statements are shown about Random Access Memory (RAM), an internal Solid State Drive (SSD) and a USB flash memory drive.

Tick (✓) to show which statements apply to each component. Some statements may apply to more than **one** component.

	Component		
Statement	**RAM (✓)**	**Internal SSD (✓)**	**USB flash memory drive (✓)**
it is a type of primary storage			
it is volatile			
it uses NAND and NOR technology			
it does **not** have any moving parts			
it is **not** directly connected to the central processing unit (CPU)			

[5]

4 Doris has data stored on her computer.

She accidentally loses some data by deleting a file.

State **two** methods she could use to help prevent accidental loss of data in this way.

Describe how each method would help prevent accidental loss of the data.

Method 1 .....

.....

.....

.....

Method 2 .....

.....

.....

.....

[4]

5 8 bytes of data are transmitted from one computer to another. Each byte of data has a parity bit.

The data is also sent with a parity byte. Each bit in the parity byte allows a check to be performed on each column of bits.

A parity check is performed on the data and an error is found in one bit. The table shows the data that was received.

	Parity bit	**Bit 2**	**Bit 3**	**Bit 4**	**Bit 5**	**Bit 6**	**Bit 7**	**Bit 8**
Byte 1	0	1	0	1	0	0	1	1
Byte 2	1	0	0	1	1	1	1	1
Byte 3	1	1	1	1	1	1	0	0
Byte 4	1	1	0	1	0	1	0	1
Byte 5	1	0	0	0	1	1	1	0
Byte 6	1	1	1	0	1	0	1	1
Byte 7	1	1	0	0	1	1	0	0
Byte 8	1	1	1	1	0	0	1	1
Parity byte	1	0	1	1	0	1	1	1

Identify which bit has an error by giving the Byte number and Bit number.

Explain how you found the error.

Byte number .....

Bit number .....

Explanation .....

.....

.....

.....

.....

.....

[4]

6 Jian has a website that uses the Secure Socket Layer (SSL) protocol to make sure that data is kept secure during transmission.

(a) Give **two** ways that a user could check that a website uses the SSL protocol.

1 .....

.....

2 .....

.....
[2]

(b) State the name of the updated version of the SSL protocol.

..... [1]

(c) Jian's system for his website has a proxy server.

Explain why Jian uses a proxy server as part of the system for his website.

.....

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..... [4]

(d) Jian sells products using his website. He wants to create a secure login system for user accounts.

He is worried that a user's login details may be gathered by malware when they are logging into their account.

(i) State the type of malware that could be used to gather a user's login details.

..... [1]

(ii) Give **three** methods that could be used to help prevent a user's login details being gathered by malware, when they are logging into their account.

Describe how each method can help prevent this happening.

Method 1 .....

.....

.....

.....

Method 2 .....

.....

.....

.....

Method 3 .....

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.....

.....

[6]

(e) The paragraph describes how the web pages are obtained and displayed for the user.

Complete the paragraph using the list of terms. **Not** all terms in the list need to be used.

- browser
- Hypertext Markup Language (HTML)
- Internet Protocol (IP) address
- Internet Service Provider (ISP)
- Media Access Control (MAC) address
- presentation
- protocols
- structure
- Uniform Resource Locator (URL)
- web pages
- web server

The browser sends the ..... to the

Domain Name Server (DNS) that looks up the corresponding

..... . This is returned to the browser, which

then sends a request to the ..... where the

..... are stored. The website is written in

..... that is rendered by the

..... .

[6]

7 NAND, OR and XOR are three types of logic gate.

(a) **Four** statements are shown about the logic gates.

Tick (✓) to show which statements apply to each logic gate. Some statements may apply to more than one logic gate.

Statement	NAND (✓)	OR (✓)	XOR (✓)
if both inputs are 1, the output is 1			
if both inputs are different from each other, the output is 1			
if both inputs are 0, the output is 0			
if both inputs are the same as each other, the output is always 0			

[4]

(b) NAND, OR, XOR, NOR and NOT are all examples of logic gates.

State the name of **one** other logic gate and complete its truth table.

Logic gate .....

Truth table:

A	B	Output
0	0	
0	1	
1	0	
1	1	

[2]

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