Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

0190384781

COMPUTER SCIENCE **2210/12**

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.

1 **(a)** Denary is a number system that is used by programmers.

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

Tick (✓)	
☐	Base-2
☐	Base-10
☐	Base-16

[1]

(b) Hexadecimal values can be used to represent denary values.

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

05 .....

20 .....

1A .....

AB .....

[4]

Working space

.....

.....

.....

.....

.....

(c) Hexadecimal values can also be converted to binary values.

Tick (✓) **one** box to show the correct 8-bit binary value for each hexadecimal value.

(i) Hexadecimal value 25

Tick (✓)	
☐	00011001
☐	00100101
☐	10100001

[1]

(ii) Hexadecimal value 1B

Tick (✓)	
☐	00011011
☐	10110001
☐	00011010

[1]

(d) (i) Give **one** way that hexadecimal is used in website development.

..... [1]

(ii) Give **one** way that hexadecimal is used in low-level programming.

..... [1]

2 A train company wants to install a self-service ticket machine system for its train stations. When the customer has purchased their tickets, the machine will provide a paper ticket.

(a) **One** output device that is used in the ticket machine is a display screen.

Identify **one** other output device that is used in the ticket machine system.

..... [1]

(b) The train company does **not** want users to use a keyboard or a mouse to enter their data, when buying a ticket. The company is worried that they may be stolen or get too dirty.

Identify **one** other input device that would be suitable for use in the ticket machine system, to allow users to enter their data.

..... [1]

[Turn over

3 **(a)** **Six** statements are given about methods of data transmission.

Tick (✓) to show if each statement applies to serial simplex, parallel simplex, parallel half-duplex or serial duplex data transmission. Some statements may apply to more than **one** data transmission method.

Statement	Serial simplex (✓)	Parallel simplex (✓)	Parallel half-duplex (✓)	Serial duplex (✓)
bits are transmitted along a single wire				
data is transmitted in both directions				
it is only suitable for distances less than 5 metres				
bits from the same byte are transmitted one after the other				
data may **not** arrive in the correct sequence				
data is transmitted in both directions, but only **one** direction at a time				

[6]

(b) A Universal Serial Bus (USB) connection can be used to transmit data from a mobile device to a computer.

Give **three** benefits of using a USB connection for this purpose.

Benefit 1 .....

.....

Benefit 2 .....

.....

Benefit 3 .....

.....

[3]

4 The paragraph explains the operation of different touch screen technologies.

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

- capacitive
- change
- circuit
- conductive
- coordinates
- grid
- heat
- infra-red
- insulating
- light
- manufacture
- pressure
- resistive

In ..... touch screen technology, an electrostatic field is present on the surface of the touch screen. The ..... properties of a user cause a ..... in the field. The ..... of the user's touch can be calculated.

In ..... touch screen technology, a user pushes the top layer of the screen and makes it connect with the bottom layer to complete a ..... .

This type of touch screen is cheaper to ..... .

[7]

5 Sammi works for a finance company and has a laptop that he uses for his work. He has confidential data about his customers stored on his laptop.

Sammi does **not** connect the laptop to any networks.

(a) Sammi is concerned about his customers' confidential data being viewed by other people in his office.

One method he uses to prevent others viewing the data is encryption.

Identify **three** other methods Sammi could use to prevent his customers' confidential data being viewed.

1 .....

2 .....

3 .....

[3]

(b) Sammi creates videos for the finance company website that give customers advice about their finances.

He uses lossy compression to reduce the file size of the videos for the website.

(i) Give **three** ways that lossy compression can reduce the file size of the videos.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(ii) Give **one** drawback of using lossy compression to reduce the file size of the videos.

.....

..... [1]

(c) Sammi could have used lossless compression to compress the videos for the website.

(i) Give **one** reason why he would use lossless compression, rather than lossy compression, for the videos.

.....

..... [1]

(ii) Give **two** disadvantages of Sammi using lossless compression, rather than lossy compression, for the videos.

Disadvantage 1 .....

.....

Disadvantage 2 .....

.....

[2]

6 A programmer can use translators, such as an interpreter and a compiler, when developing a computer program.

(a) Give **one** similarity between a compiler and an interpreter.

.....

..... [1]

(b) Describe **two** differences between a compiler and an interpreter.

Difference 1 .....

.....

.....

.....

Difference 2 .....

.....

.....

.....

[4]

(c) Identify **one** other type of translator.

..... [1]

7 **Five** statements are given about devices.

Tick (✓) to show if each statement applies to a 3D scanner, barcode reader or a Quick Response (QR) code reader. Some statements may apply to more than **one** type of device.

Statement	3D scanner (✓)	Barcode reader (✓)	QR code reader (✓)
uses position and alignment markers for orientation when scanning			
scans the shape and appearance of an object			
uses reflected light from a laser to convert a black-and-white pattern into binary			
can often be built into an Electronic Point Of Sale (EPOS) terminal, for example, a supermarket checkout			
it is an example of an input device			

[5]

8 An electronic game has **three** square mats that are coloured red, green and blue.

The player will see a colour displayed on a screen and has 1 second to hit the mat that matches the colour. If the player hits the correct mat, within 1 second, a counter is incremented. When a player hits an incorrect mat, the game ends.

The game uses sensors and a microprocessor to determine if the player hits the correct mat within 1 second.

Explain how the game uses sensors and a microprocessor to count the number of times a player hits a correct mat within 1 second.

.....

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.....

..... [7]

9 Padma opens an application on her computer.

An interrupt is generated to inform the Central Processing Unit (CPU) that the application has been opened.

(a) Give **three** other examples of when an interrupt signal could be generated.

1 .....

2 .....

3 .....

[3]

(b) State what would happen if interrupt signals were **not** used in a computer.

.....

..... [1]

10 Jermain uses the Secure Socket Layer (SSL) protocol for secure transmission when sending data using the internet.

(a) Explain how the SSL protocol secures the data for transmission.

.....

.....

.....

..... [2]

(b) Identify an alternative protocol that could be used for secure transmission of data using the internet.

..... [1]

(c) Give **two** ways that a user can identify if a website uses secure data transmission.

1 .....

.....

2 .....

.....

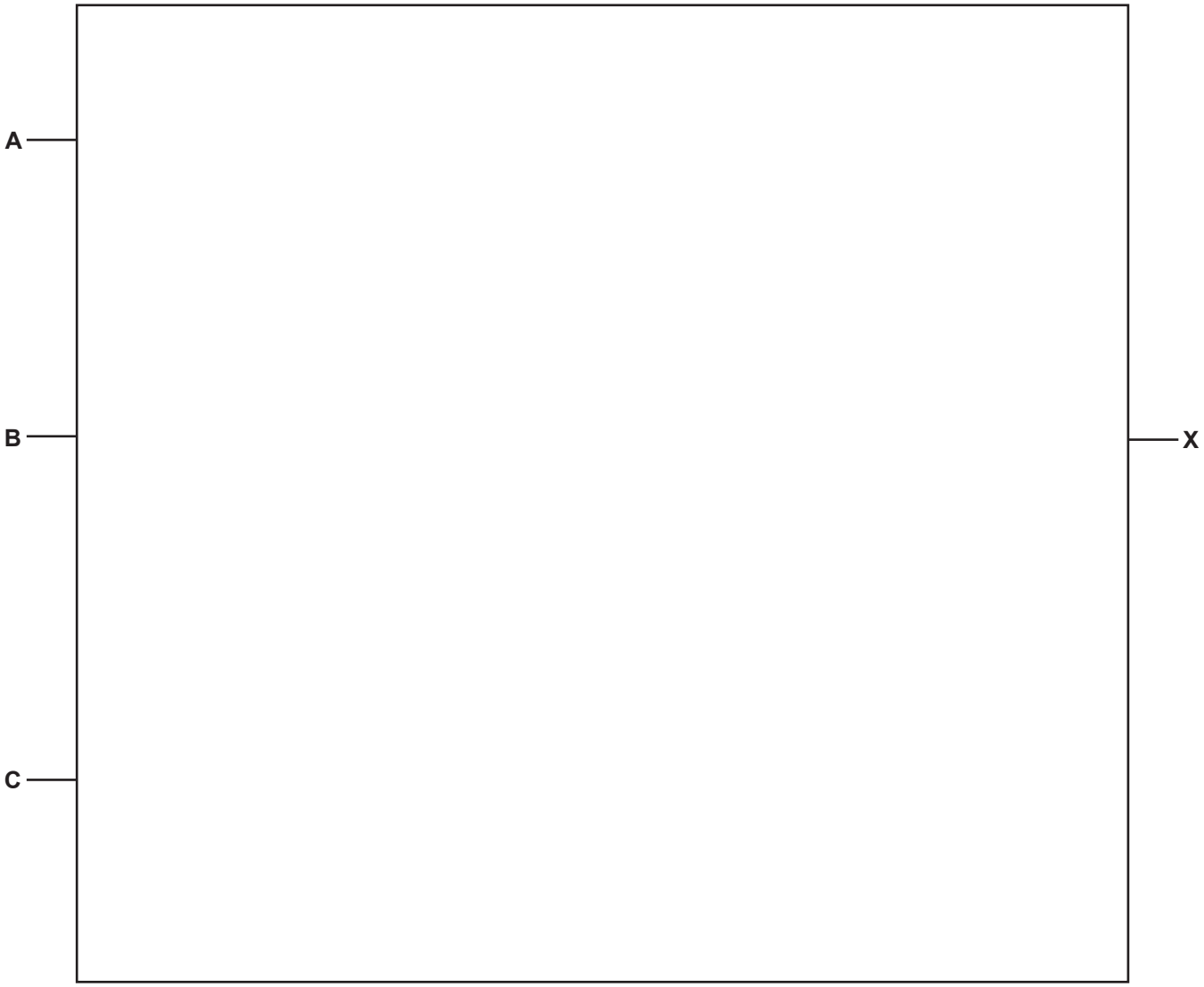
[2]

11 Consider the following logic statement:

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

(c) Identify **two** logic gates that are **not** included in the given logic statement.

Logic gate 1 .....

Logic gate 2 .....

[2]

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