Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

4192404433

COMPUTER SCIENCE **0478/11**

Paper 1 Theory **October/November 2020**

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. Blank pages are indicated.

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[Turn over

1 Six devices are shown.

Tick (✓) to show if each device is an **Input**, **Output** or **Storage** device.

Device	**Input (✓)**	**Output (✓)**	**Storage (✓)**
Keyboard			
Sensor			
3D cutter			
2D scanner			
Microphone			
Hard disk drive (HDD)			

[6]

2 Ron is attending a music concert. He has bought three tickets.

Each ticket number is displayed as a hexadecimal number.

(a) Complete the table to show the **12-bit binary** values and the **Denary** values for each Hexadecimal ticket number.

Hexadecimal ticket number	**12-bit binary value**	**Denary value**
028		
1A9		
20C		

[6]

Working space

.....

.....

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.....

.....

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(b) Each ticket also has a QR code. The QR code is scanned at the entrance to the venue.

A person can only enter the venue with a valid QR code that allows entry.

When a person enters, a count is incremented to show how many people have entered the venue.

Explain how the system scans the QR code, checks if a person can enter and counts how many people have entered.

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..... [7]

3 Transport Layer Security (TLS) protocol is used to secure the transmission of data over the Internet.

(a) Identify the **two** layers in the TLS protocol.

Layer 1 .....

Layer 2 .....
[2]

(b) The following paragraph explains how data is sent securely using the TLS protocol.

Use the terms to complete the paragraph. Not all terms may need to be used.

- authentic
- binary
- browser
- certificate
- internet service provider
- signal
- web page
- web server
- website

The browser requests the ..... to identify itself by providing its ..... . This is sent and a check is performed to see if it is ..... . If it is, the ..... sends a ..... back to the web server and data transmission begins.

[5]

(c) Identify **one** other protocol that can be used to secure data transmission over the Internet.

..... [1]

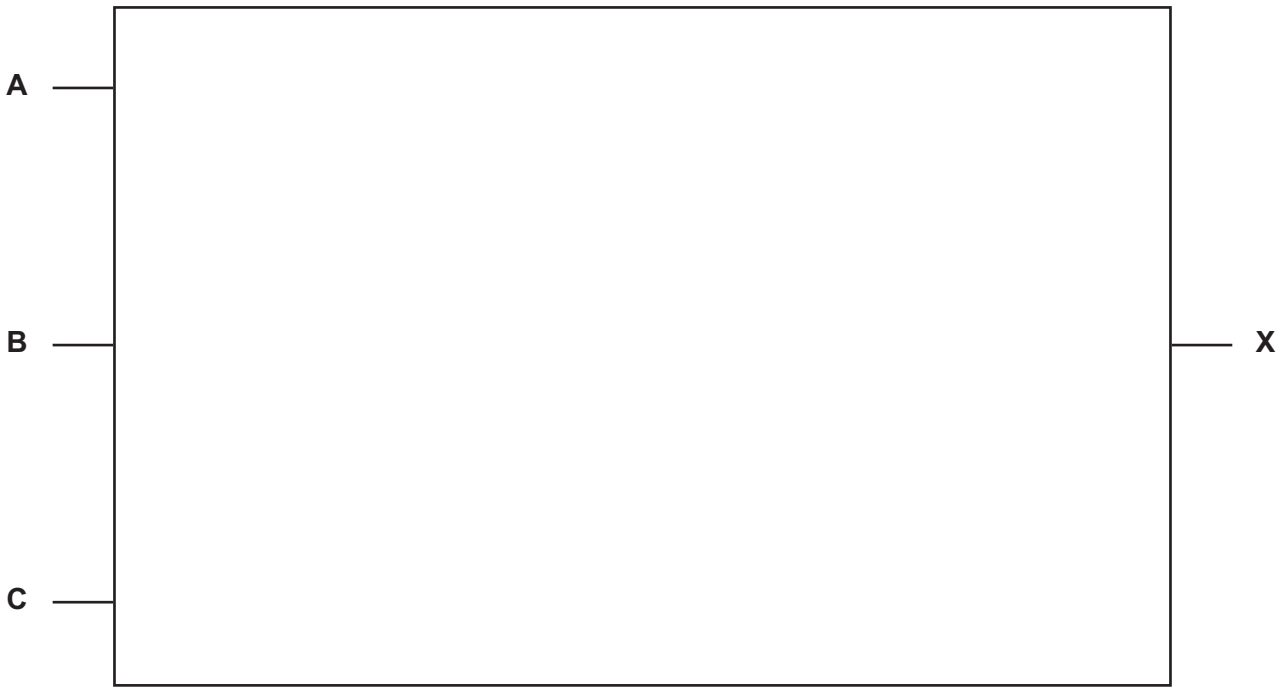
Question 4 starts on page 6.

4 Consider the given logic statement:

X = ((NOT (**A** NAND **B**)) OR (**B** NOR **C**))

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

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



[4]

(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]

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(c) The logic statement given has **four** different logic gates.

Identify **two other** logic gates and complete a truth table for each.

Logic gate

.....

Truth table

A	B	X
0	0	
0	1	
1	0	
1	1	

Logic gate

.....

Truth table

A	B	X
0	0	
0	1	
1	0	
1	1	

[4]

5 Luke is creating a website for his t-shirt design business.

(a) He is using HTML to create the website. HTML can be separated into structure and presentation.

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

Example 1 .....

Example 2 .....

[2]

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

Example 1 .....

Example 2 .....

[2]

(b) Luke is concerned that his web server may be hacked or subjected to a denial of service (DoS) attack.

State **two** security methods that Luke could use to help protect the web server from hacking or a DoS attack.

Method 1 .....

Method 2 .....
[2]

6 A Von Neumann model for a computer system contains several integrated circuits (IC).

(a) Parallel data transmission is used in an IC.

(i) Describe how data is transmitted using parallel data transmission.

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..... [2]

(ii) Give **one** benefit of using parallel, rather than serial, data transmission.

.....

..... [1]

(b) The computer has a central processing unit (CPU).

(i) Identify the bus that carries signals around the CPU to control the components.

..... [1]

(ii) Identify the register built into the arithmetic logic unit (ALU).

..... [1]

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(iii) Four statements about a Von Neumann model for a computer system are shown.

Tick (✓) to show if each statement is **True** or **False**.

Statement	**True (✓)**	**False (✓)**
Data and instructions are stored in the same memory unit		
The control unit manages operations within the CPU		
Data and instructions can be fetched into the CPU at the same time		
The control unit is responsible for decoding an instruction		

[4]

7 Nina is recording some music tracks that she has written. She is researching whether she should record them in MIDI or MP3 format.

Explain what is meant by MIDI and MP3 format.

MIDI .....

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MP3 .....

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.....

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[4]

8 Matthew is buying a new television with a display that uses LED technology.

(a) Explain what is meant by LED technology.

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..... [3]

(b) State **three** benefits of LED technology.

Benefit 1 .....

.....

Benefit 2 .....

.....

Benefit 3 .....

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[3]

(c) Identify **one other** technology that could have been used for the display.

..... [1]

9 Victoria is entering data into a computer system. The data will be transmitted to cloud storage.

(a) An even parity check is used to check for errors in the binary values after transmission.

For each of the **7-bit binary values**, write the **Parity bit** that makes sure **even** parity is met.

7-bit binary value	**Parity bit**
1100010	.....
1001011	.....
0100010	.....
0010111	.....

[4]

(b) Identify **two** other error checking methods that could be used to check the binary values are correct after transmission.

Method 1 .....

Method 2 .....
[2]

(c) A check digit is used to check whether data is correct when entered into the system.

Describe how a check digit can be used to make sure the data entered is correct.

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..... [4]

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