



## Cambridge O Level

CANDIDATE  
NAME

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CENTRE  
NUMBER

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CANDIDATE  
NUMBER

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**COMPUTER SCIENCE****2210/11**

Paper 1 Theory

**May/June 2020****1 hour 45 minutes**

You must answer on the question paper.

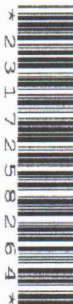
No additional materials are needed.

**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.

1 An image of a smartphone is shown.



(a) Identify **one** input device that is part of the smartphone.

Touchscreen, Microphone ..... [1]

(b) Identify **two** output devices that are part of the smartphone.

1 Speaker .....

2 Touchscreen .....

[2]

(c) All smartphones have a MAC address.

(i) State what is meant by the term MAC address.

Media Access Control. Unique address  
given to each device to identify it  
on the network ..... [1]

(ii) Describe the structure of a MAC address.

This address is made up of hexadecimal  
values. ....

The first half of the address would  
identify the manufacturer of the device  
while the other half would be the serial  
number of the device. .... [3]

The address is provided by the manufacturer  
of the device.

- (d) A smartphone needs both RAM and ROM.

State why a smartphone needs RAM and ROM.

RAM ..... The RAM would hold the running applications or any data that is being processed

ROM ..... The ROM would hold the start up instructions.

[2]

- (e) Modern smartphones can be secured with a biometric system that is built into the phone.

- (i) Identify **two** biometric systems that would be suitable for securing a smartphone.

1 ..... Facial Recognition

2 ..... Fingerprint scanner.

[2]

- (ii) Explain why modern smartphones are secured with a biometric system.

..... It is hard to replicate a persons body features compared to copying a users password.

..... It is a faster method of accessing your device as compared to typing in your password

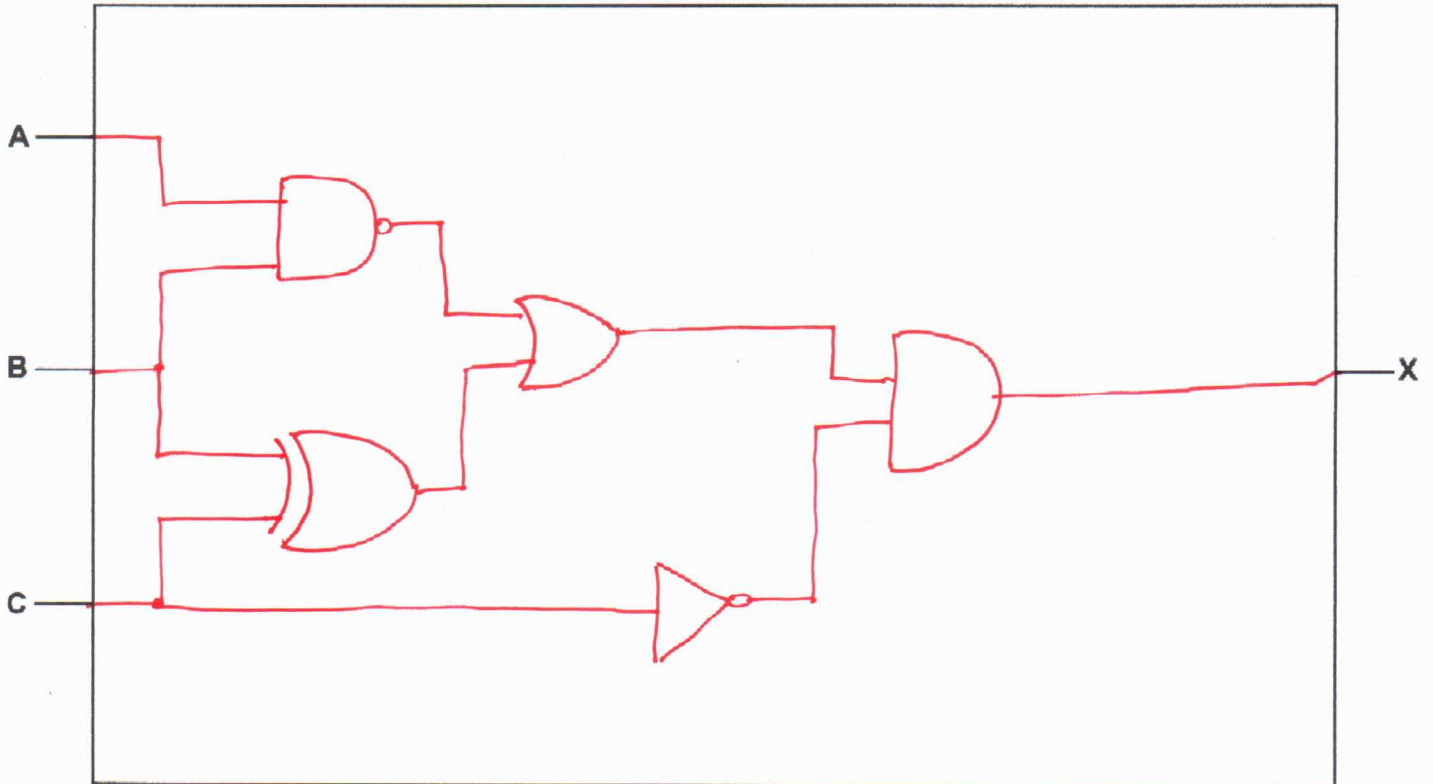
[2]

2 Consider the logic statement:

$$X = (((A \text{ NAND } B) \text{ OR } (B \text{ XOR } C)) \text{ AND NOT } C)$$

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

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



[5]

(b) Complete the truth table to represent the given logic statement.

A	B	C	Working space	X
0	0	0		1
0	0	1		0
0	1	0		1
0	1	1		0
1	0	0		1
1	0	1		0
1	1	0		1
1	1	1		0

[4]

3 Carla's computer has a USB port.

Carla uses the USB port to connect her mobile device to her computer, to transfer her photos.

(a) Give **three** benefits of using a USB port to connect the mobile device to the computer.

Benefit 1 ..... Older USB standards are backward  
..... compatible with new USB standards

Benefit 2 ..... Device Drivers are automatically  
..... detected

Benefit 3 ..... Many devices come with USB  
..... connections these days

[3]

(b) State the type of data transmission used when transferring data using a USB port.

..... Serial data transmission ..... [1]

(c) Carla wants to reduce the file size of the photos she has transferred to her computer. She does not want the quality of the photos to be reduced, so she uses lossless compression.

Describe how lossless compression reduces the file size of the photos.

..... Using Run length encoding (RLE),  
..... the algorithm would group together  
..... similar pixels and write them to an index  
..... The picture can be reconstructed to its  
..... original form

[4]

4 Two error detection methods that Allison's computer uses are check digit and checksum.

(a) Give **two** similarities between the check digit and checksum methods.

- 1 They both use an extra value to confirm that the data transmitted is correct
- 2 The extra value is calculated both during transmission and reception of the data.

[2]

(b) Identify **one other** error detection method that Allison's computer could use.

Describe how the method checks for errors.

Method Automatic Repeat Request

Description Data is sent from one device to another. If the receiving device gets the data it has to send an acknowledgment that it has been received. If the acknowledgment is not sent then the data is automatically sent again.

[4]

5 Six components of a computer are given.

Some are part of the central processing unit (CPU) of the Von Neumann model for a computer system.

Tick (✓) to show if each component is a **CPU component** or is **Not a CPU component**.

Component	CPU component (✓)	Not a CPU component (✓)
Arithmetic logic unit (ALU)	✓	
Hard disk drive (HDD)		✓
Memory address register (MAR)	✓	
Random access memory (RAM)		✓
Solid state drive (SSD)		✓
Control unit (CU)	✓	

[6]

6 Four scenarios are given.

Identify the most suitable sensor for each scenario.

A **different** sensor must be used for each scenario.

Sensor	Scenario
Pressure sensor	Detecting when a person is approaching an automatic door system
pH sensor	Monitoring the pollution level in a river
Temperature	Checking if a tropical aquarium is 25 degrees Celsius
Motion sensor	Counting the number of cars that cross a bridge

[4]

- 7 Hans has a website selling comic books. Customers can create an account to buy the comic books.

Customers enter a username and password to log in to their account.

- (a) Customers may worry about keylogging software being used to gain unauthorised access to their account.

- (i) Describe how keylogging software can be used to gain unauthorised access to a customer's account.

The keylogger is a spyware. It is downloaded unknowingly by the user.

It logs all key presses and saves them to a text file in the HDD. Later the text file is sent to the attacker and from there, they can guess what the users password and username is

[4]

- (ii) Identify a feature that Hans can add to the website to limit the threat of keylogging software.

Hans can use a proxy server. Can also

- (b) Hans makes sure data transmission for his website is secure. use drop down boxes to select parts of a password.

- (i) State how customers can check that the personal details they enter into the website will be transmitted securely.

Look for a padlock sign in the URL

[1]

- (ii) Explain how a customer's browser checks that the website is secure.

A request is sent from the web browser to the server to identify itself. The server sends back its SSL certificate. The browser confirms if the certificate is valid. If it is then transmission/communication can begin with encryption

[4]



8 Benny is a photographer and prints his photos using an inkjet printer.

(a) Benny is printing some photos and the paper gets jammed in the printer.

A signal is sent to alert the computer about the paper jam.

State the name of this type of signal.

..... *Interrupt* ..... [1]

(b) Identify **one** benefit and **two** drawbacks of Benny using an inkjet printer, instead of a laser printer, to print his photos.

Benefit ..... *cheap to operate* .....

..... *Can print quality colored pictures* .....

Drawback 1 ..... *slow in printing large jobs* .....

Drawback 2 ..... *ink can be smeared on the paper* .....

[3]

(c) **Four** statements are given about printers.

Tick (✓) to show whether the statement applies to an Inkjet printer or a Laser printer.

Statement	Inkjet (✓)	Laser (✓)
Uses a rotating drum to transfer the image to the paper		✓
Uses powdered toner		✓
Uses nozzles to spray droplets on to the paper	✓	
Uses a print head mechanism that moves side to side	✓	

[4]

9 Programs can be written in a low-level language.

(a) Identify **three** features of a low-level language.

Feature 1 ..... Machine dependent .....  
 Feature 2 ..... Uses Mnemonics .....  
 Feature 3 ..... closely resembles machine language. .... [3]

(b) Give **two** examples of a low-level language.

Example 1 ..... Assembly language .....  
 Example 2 ..... Machine Code ..... [2]

(c) Give **one** drawback of writing programs in a low-level language, instead of a high-level language.

..... hard to understand, decode, and even .....  
 ..... debug ..... [1]

(d) A low-level language needs to be converted to binary before it can be processed by a computer.

(i) Give the **8-bit binary** value of the two denary values:

180 ..... 10110100 .....  
 201 ..... 11001001 ..... [2]

Working space

.....  
 .....  
 .....  
 .....

(ii) Give the **12-bit binary** value of the denary value **250**.

..... 0000 1111 1010 ..... [1]

Working space

.....  
.....  
.....  
.....

(iii) Binary can be represented as hexadecimal to make it easier to read.

Give the **hexadecimal** values of the 8-bit binary values:

10010011 ..... 93 .....

00011101 ..... 1D .....

[2]