

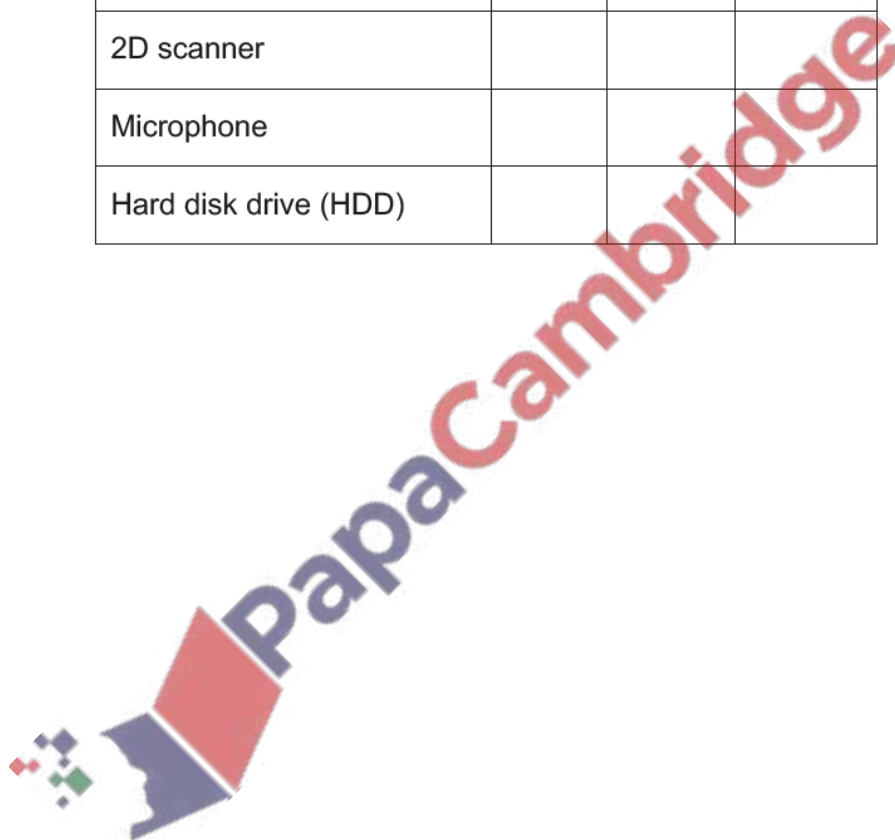
1. Nov/2020/Paper_11/No.1

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]



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

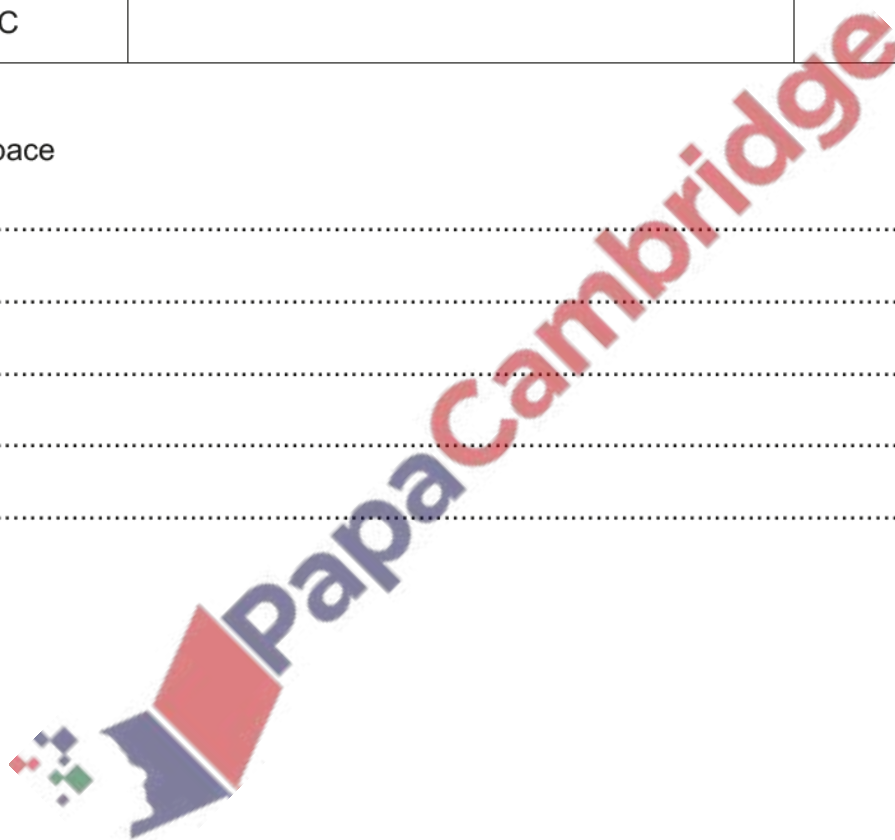
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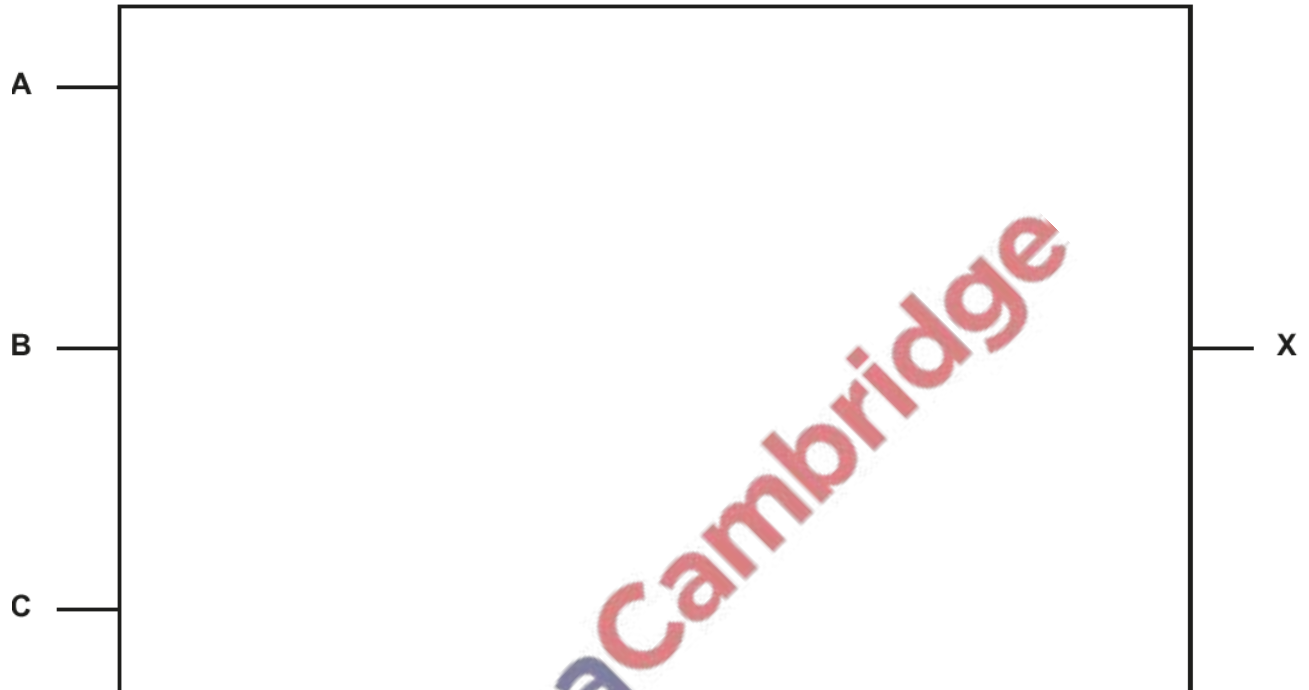
3. Nov/2020/Paper_11/No.4

Consider the given logic statement:

$$X = ((\text{NOT } (A \text{ NAND } B)) \text{ OR } (B \text{ NOR } C))$$

(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]

(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

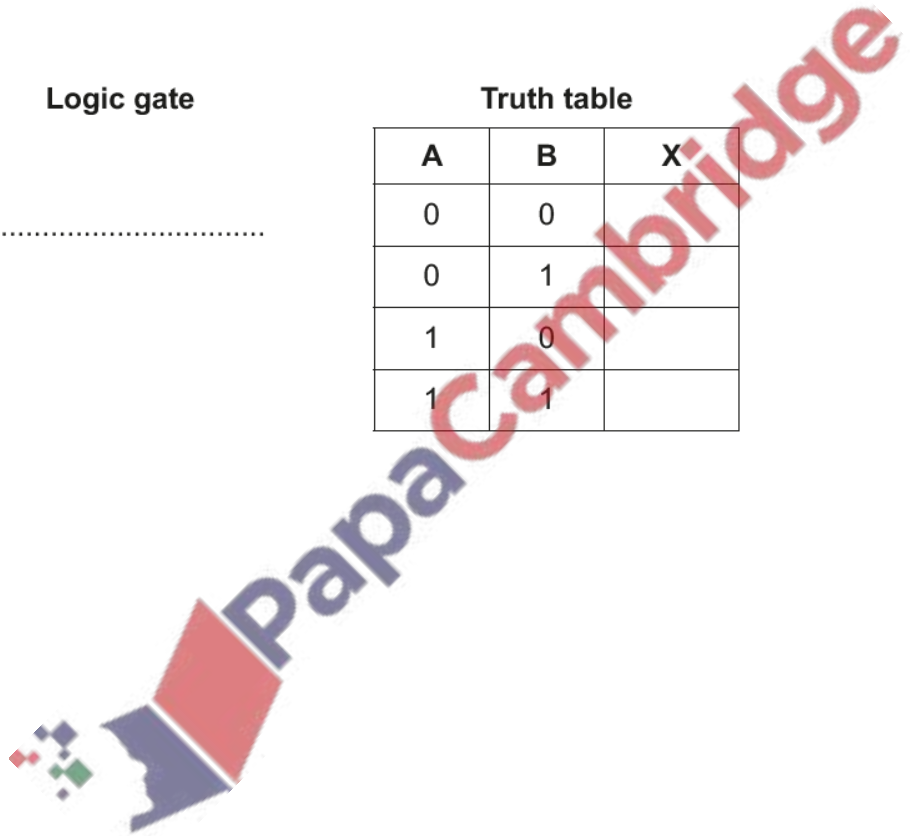
A	B	X
0	0	
0	1	
1	0	
1	1	

Logic gate

.....

Truth table

A	B	X
0	0	
0	1	
1	0	
1	1	



[4]

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.

.....

 [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]

(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]

5. Nov/2020/Paper_11/No.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

.....

.....

.....

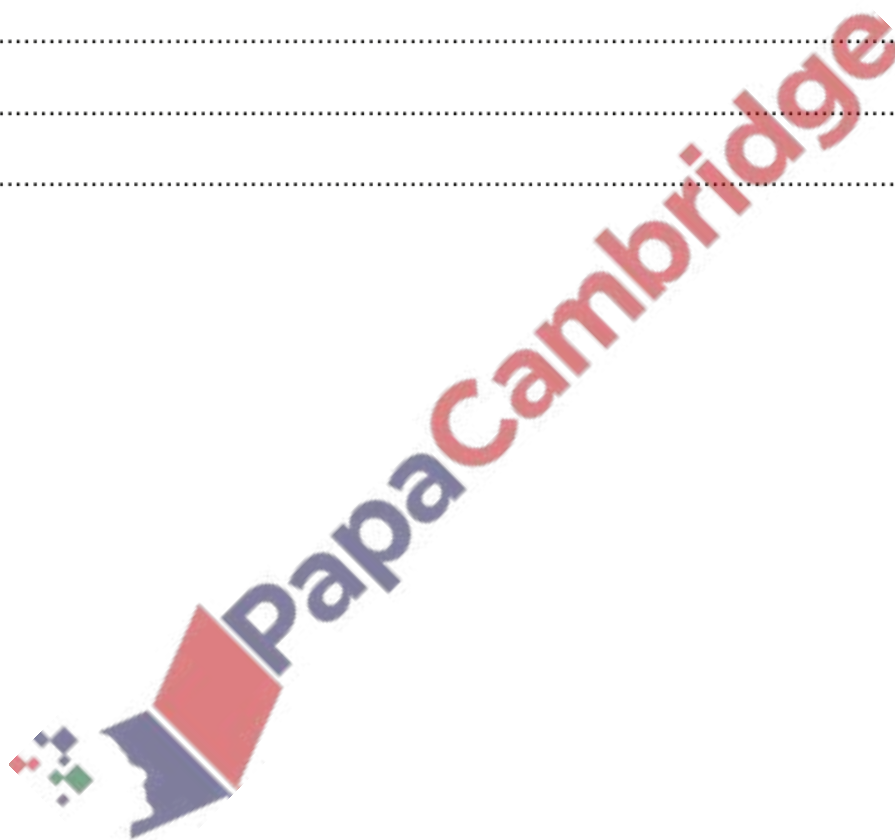
MP3

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[4]



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

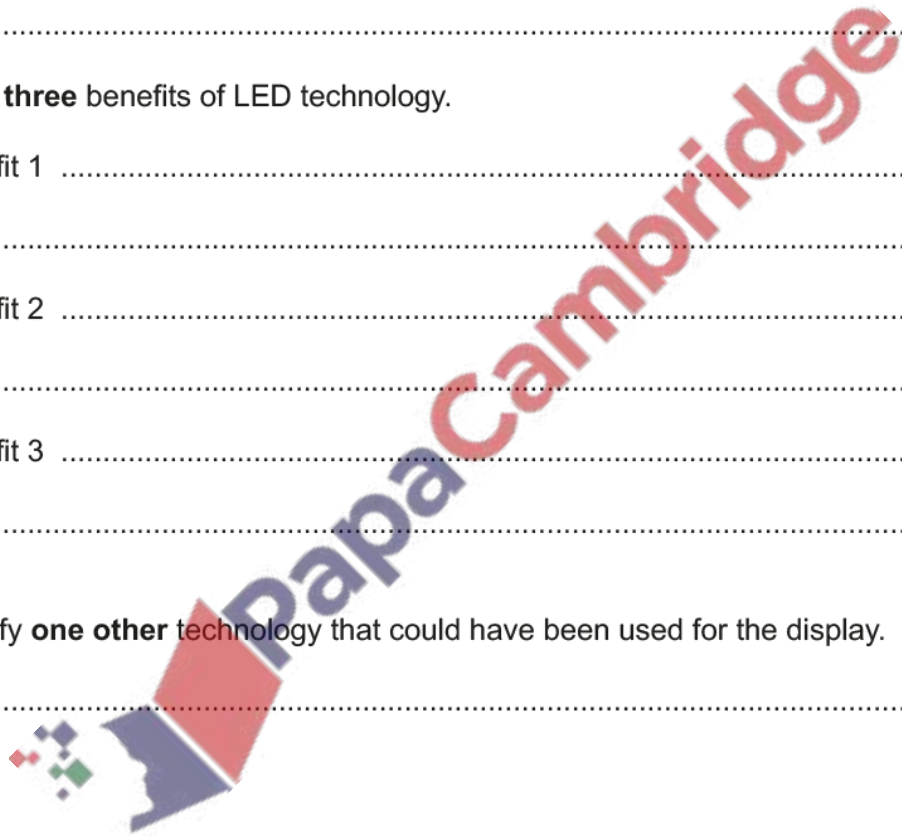
.....

Benefit 3

..... [3]

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

..... [1]



Tina is creating a website for charity events. She uses HTML to create the website.

(a) State what is meant by HTML.

.....
..... [1]

(b) She uses the hexadecimal colour code #43B7F0 as the background colour for her website.

(i) State whether background colour is an example of **structure** or **presentation**, in the website.

..... [1]

(ii) The hexadecimal colour code #43B7F0 is stored in three **8-bit** registers.

Give the **8-bit binary** values for each part of the hexadecimal code.

43							
B7							
F0							

[6]

(c) Tina uses a microphone to record a welcome message for her website.

(i) State whether the microphone is an **input** or **output** device.

..... [1]



- (ii) She wants to compress the recording to make sure that the file is as small as possible for the website.

Identify which type of compression she should use and describe how this would compress the file for the website.

Type of compression

Description

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

[4]

- (iii) Give **two** benefits of compressing the file for the website.

Benefit 1

.....

Benefit 2

.....

[2]



PapaCambridge

(d) Tina will use the TLS protocol in her website when selling tickets to people for different charity events. This makes sure that their personal data is transmitted securely.

(i) Identify the **two** layers that are present in the TLS protocol.

Layer 1

Layer 2

[2]

(ii) Explain how data is sent securely using the TLS protocol.

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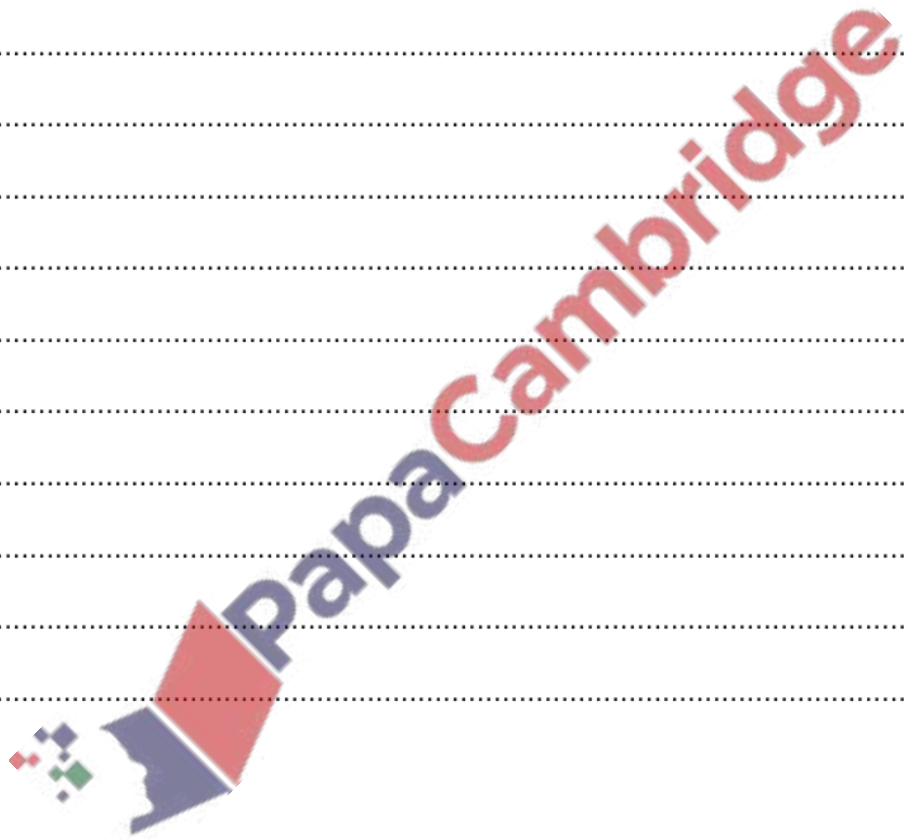
.....

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.....

[6]



(e) Tina is concerned about security threats to her web server.

(i) Identify **three** security threats to her web server that Tina might be concerned about.

1

2

3

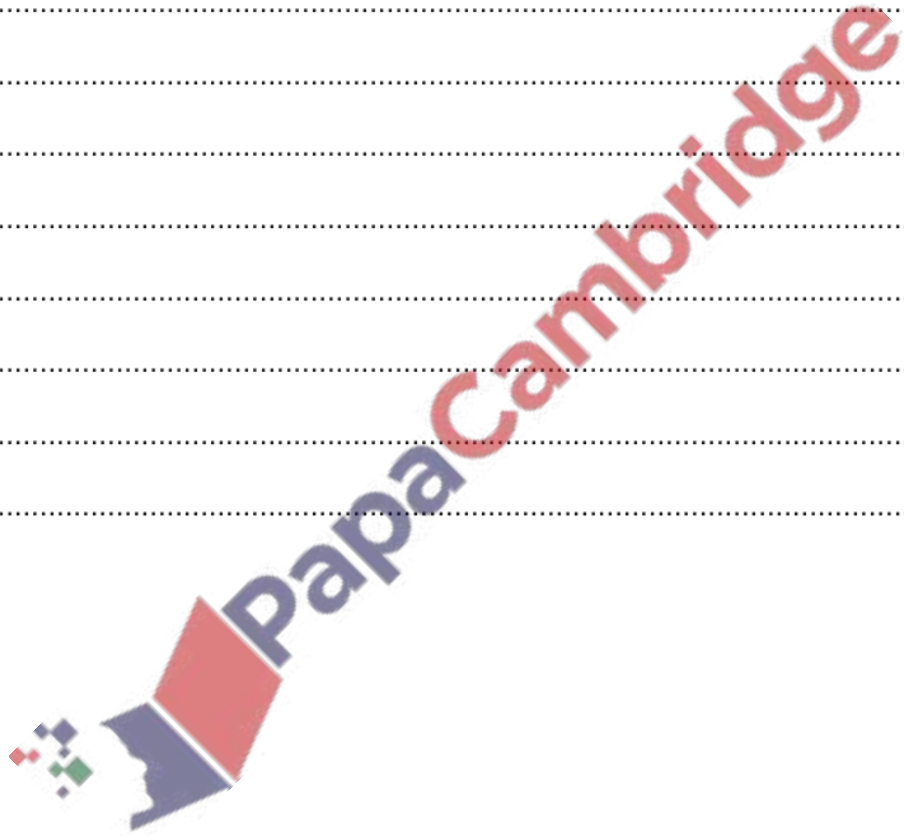
[3]

(ii) Tina installs a proxy server to help protect her website from security threats.

Describe how the proxy server will help protect the website.

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

[4]



Alessandro has some important data stored on his computer.

He is concerned about accidental damage to his data.

(a) (i) Identify **three** ways that the data could be accidentally damaged.

1

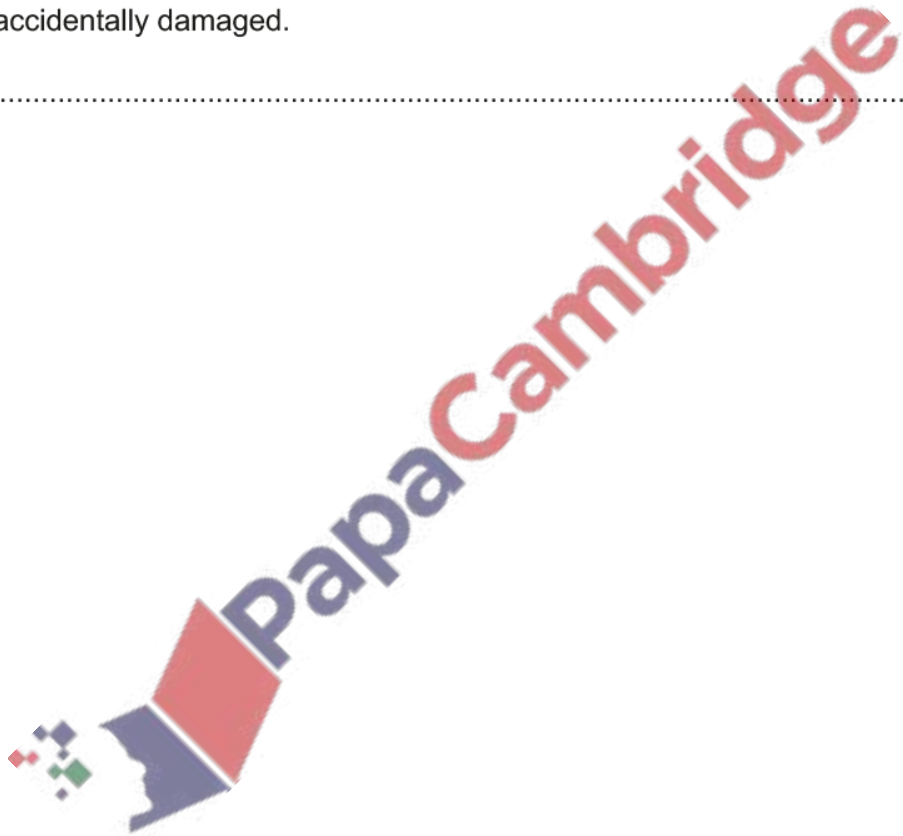
2

3

[3]

(ii) State what Alessandro could do to make sure that he can retrieve his data if it is accidentally damaged.

..... [1]



(b) Alessandro uses an SSD to store his data.

Describe what is meant by an SSD and how it operates to store data.

.....

.....

.....

.....

.....

.....

.....

.....

.....

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.....

[4]

(c) Alessandro also uses off-line storage to store his data.

Three examples of off-line storage are Blu-ray, CD and DVD.

Six statements are given about off-line storage.

Tick (✓) to show if each statement applies to **Blu-ray**, **CD**, or **DVD**.

Some statements apply to more than one example of off-line storage.

Statement	Blu-ray (✓)	CD (✓)	DVD (✓)
A type of optical storage			
Has the largest storage capacity			
Can be dual layer			
Read using a red laser			
Has the smallest storage capacity			
Stores data in a spiral track			

[6]

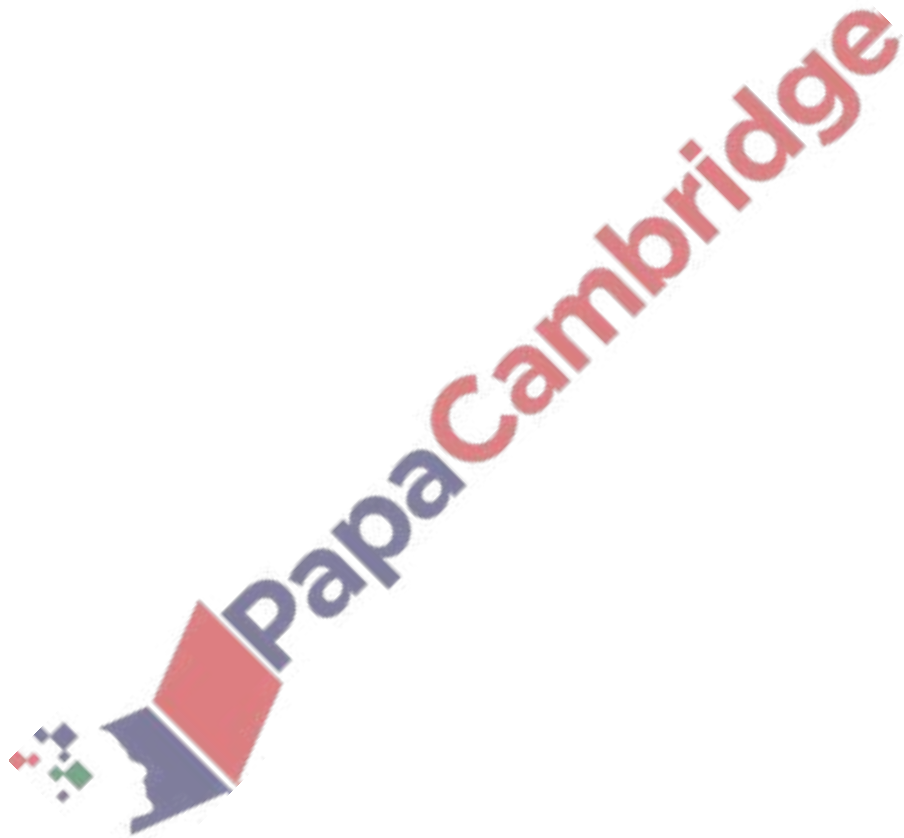
9. Nov/2020/Paper_12/No.4

Consider the logic statement:

$$X = (((A \text{ NAND } B) \text{ NOR } (B \text{ AND } C)) \text{ OR } C)$$

(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.





[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]

10. Nov/2020/Paper_12/No.5a,b

Tammy is buying a new computer that has an LED display.

(a) Five statements about LED displays are given.

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

Statement	True (✓)	False (✓)
It is a flat panel display		
It creates images using red, green and blue diodes		
It is not very energy efficient and gives off heat		
It can be used in mobile devices such as smartphones and tablets		
It is a front-lit display		

[5]

11. Nov/2020/Paper_13/No.1

Five hardware devices are given.

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

Device	Input (✓)	Output (✓)	Storage (✓)
Solid state drive (SSD)			
Headphones			
2D cutter			
LCD projector			
Microphone			

[5]

12. Nov/2020/Paper_12/No.2

Paige has a computer that has a central processing unit (CPU) based on the Von Neumann model for a computer system.

(a) Identify the component within the CPU that controls the flow of data.

..... [1]

(b) Identify the component within the CPU where calculations are carried out.

..... [1]

(c) Identify the component within the CPU that stores the address of the next instruction to be processed.

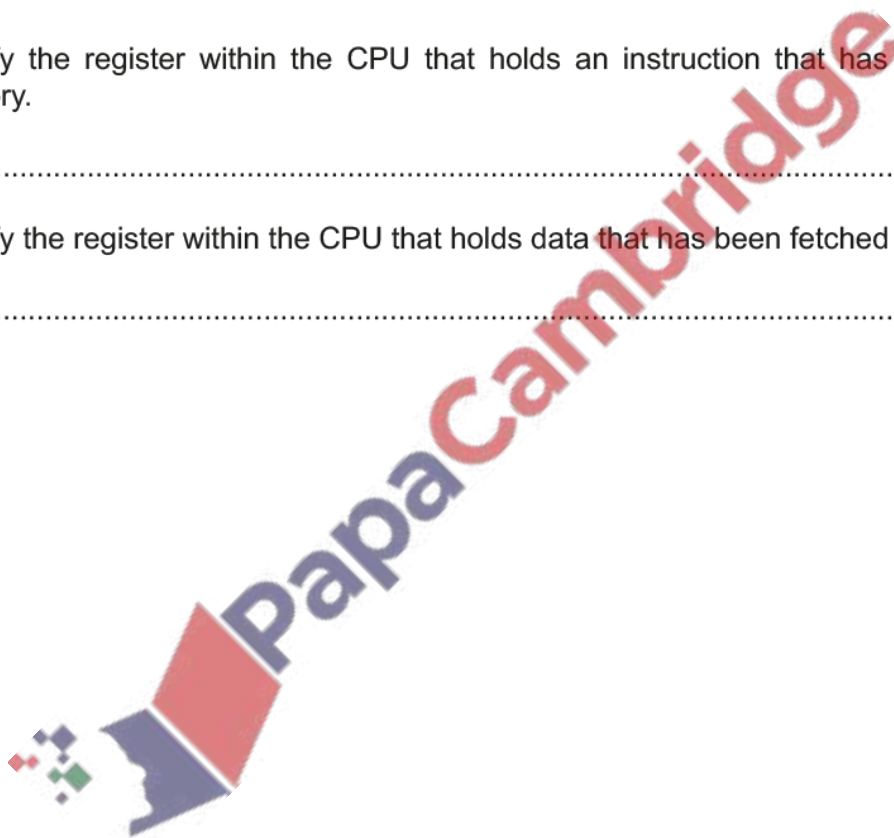
..... [1]

(d) Identify the register within the CPU that holds an instruction that has been fetched from memory.

..... [1]

(e) Identify the register within the CPU that holds data that has been fetched from memory.

..... [1]



Edith is buying a new computer monitor that displays images using LCD technology.

(a) Explain what is meant by LCD technology.

.....

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.....

.....

.....

..... [3]

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

Benefit 1

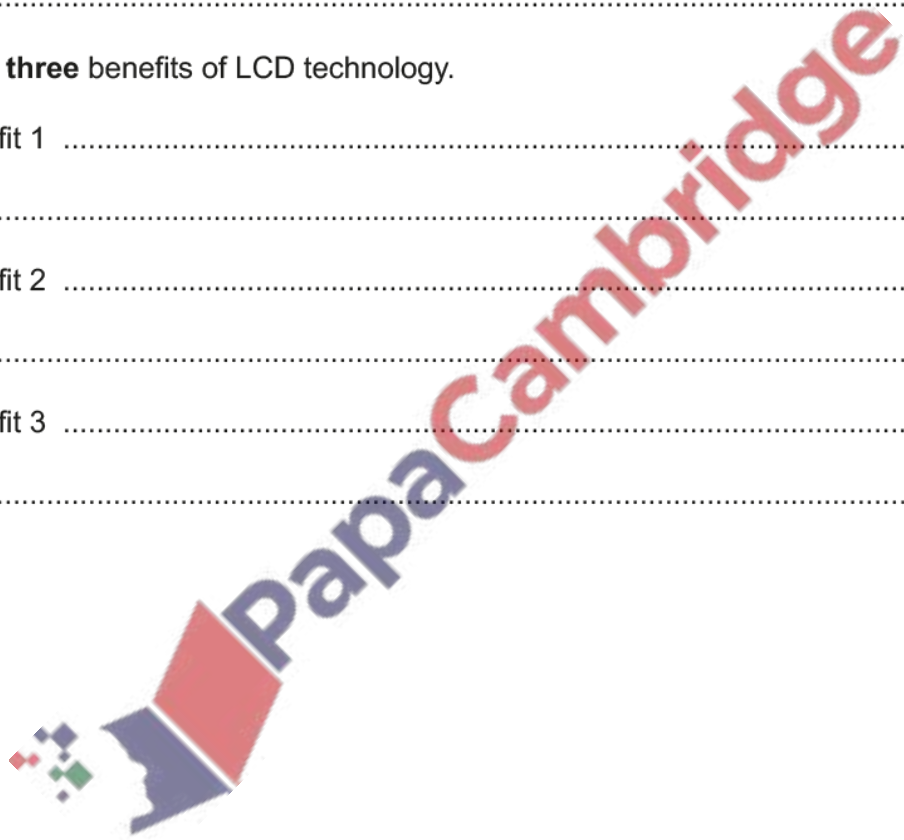
.....

Benefit 2

.....

Benefit 3

..... [3]



14. Nov/2020/Paper_13/No.9

Elle uses both CDs and DVDs to store her school projects.

(a) Give **three** similarities between a CD and a DVD.

1

.....

2

.....

3

.....

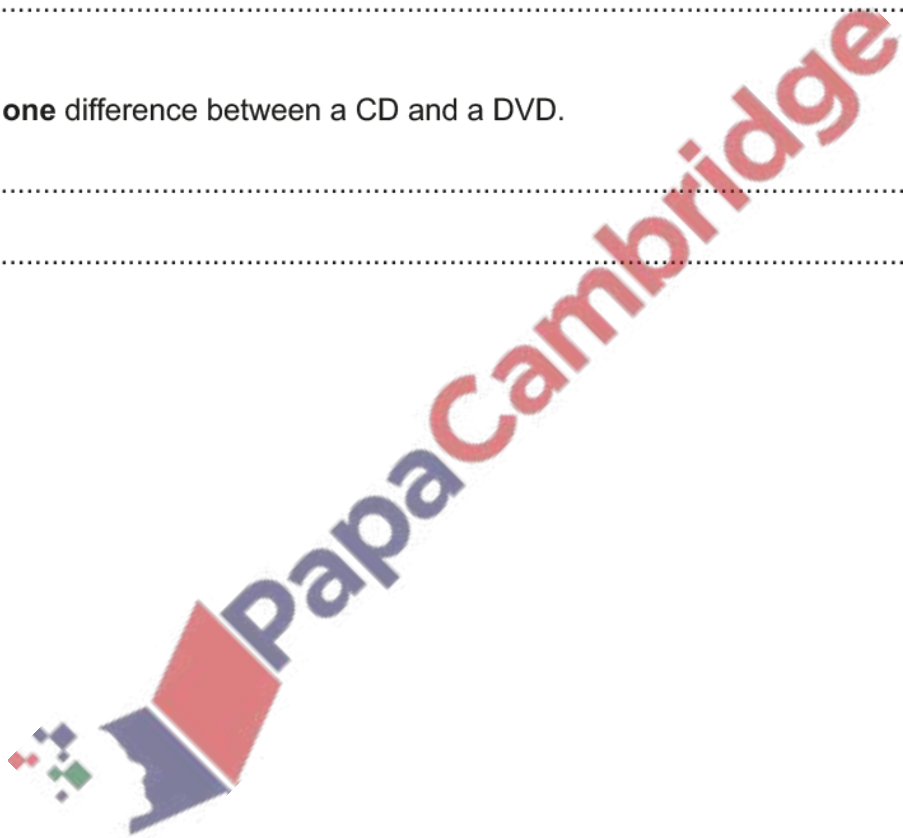
[3]

(b) State **one** difference between a CD and a DVD.

.....

.....

[1]



Consider the following logic statement:

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

- (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.



[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]

16. Mar/2020/Paper_12/No.1

The Von Neumann model for a computer system uses components, such as registers and buses, in the fetch-execute cycle.

(a) Draw a line to connect each component to its correct description.

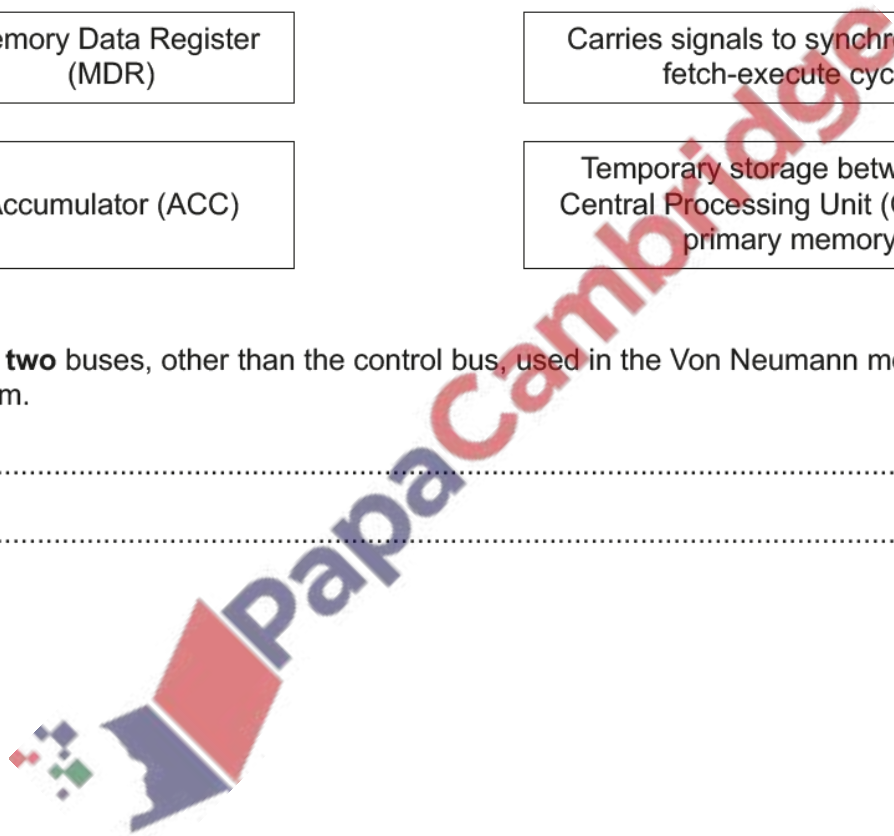
Component	Description
Control Bus	Increments to point to the address of the next instruction to be fetched
Program Counter (PC)	Holds the result of a calculation. It is located within the Arithmetic Logic Unit (ALU)
Memory Data Register (MDR)	Carries signals to synchronise the fetch-execute cycle
Accumulator (ACC)	Temporary storage between the Central Processing Unit (CPU) and primary memory

[3]

(b) State **two** buses, other than the control bus, used in the Von Neumann model for a computer system.

- 1
- 2

[2]



Priya studies music at school. She is buying a new computer to complete her school work at home.

(a) Priya has a choice between an internal Hard Disk Drive (HDD) and an internal Solid State Drive (SSD) to store data.

(i) Give **one** similarity between an HDD and an SSD.

.....

..... [1]

(ii) Explain **three** differences between an HDD and an SSD.

1

.....

.....

2

.....

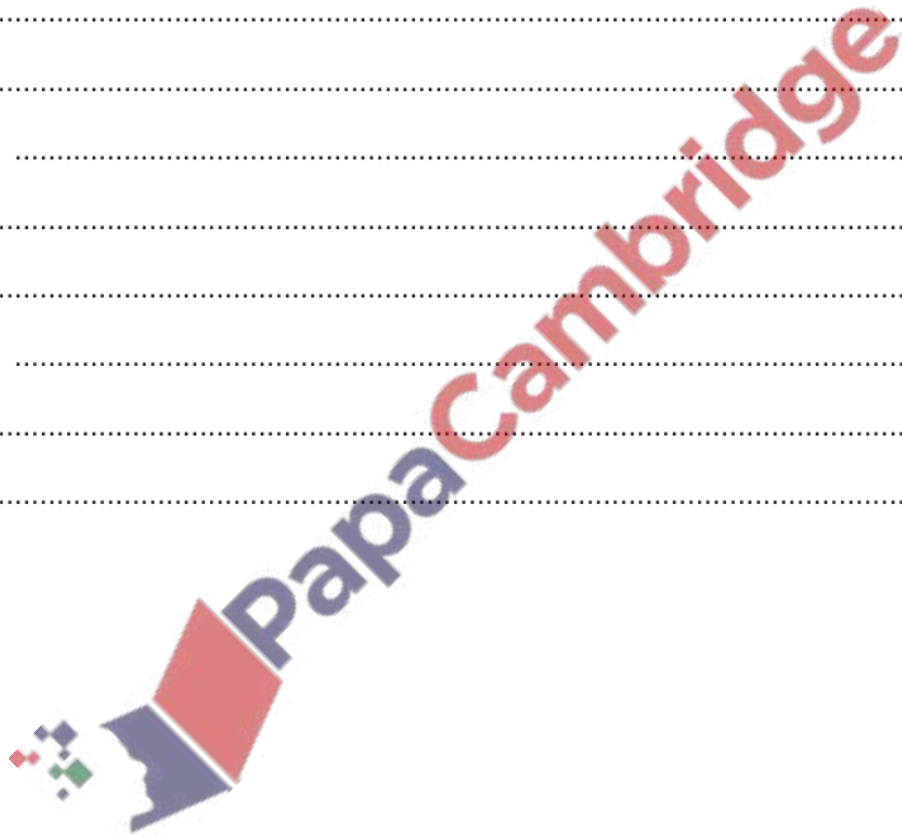
.....

3

.....

.....

[3]



(b) Priya needs to transfer files between the school and her home computer.

Identify **one** off-line storage device she could use to transport the files.

..... [1]

(c) Priya is using sound editing software to record and edit different music tracks.

(i) Identify **two** input devices she would use for this task.

Device 1

Device 2

[2]

(ii) Identify **two** output devices she would use for this task.

Device 1

Device 2

[2]

(d) Priya shares her sound files with other students. Before sharing the sound files, she compresses the files using lossless compression.

Describe how lossless compression reduces the size of a sound file.

.....
.....
.....
..... [2]

(e) Priya currently uses MIDI files to store her music. Priya's friends have asked her if they can have an MP3 version of the file.

(i) Give **two** features of a MIDI file.

1

.....

2

.....

[2]

(ii) Give **two** features of an MP3 file.

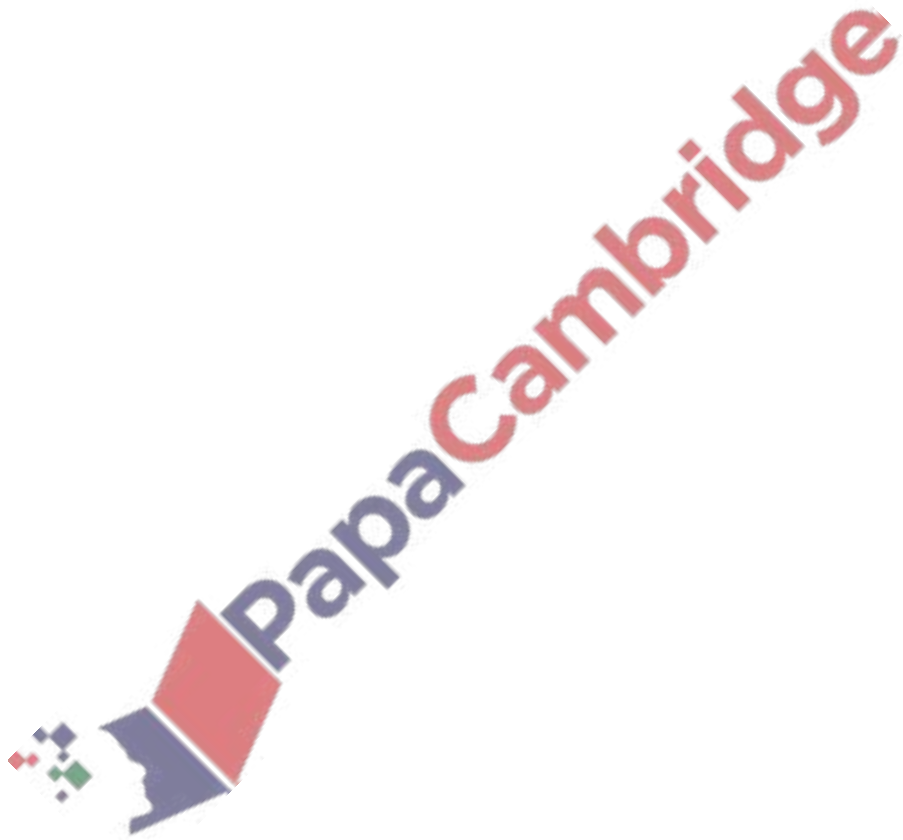
1

.....

2

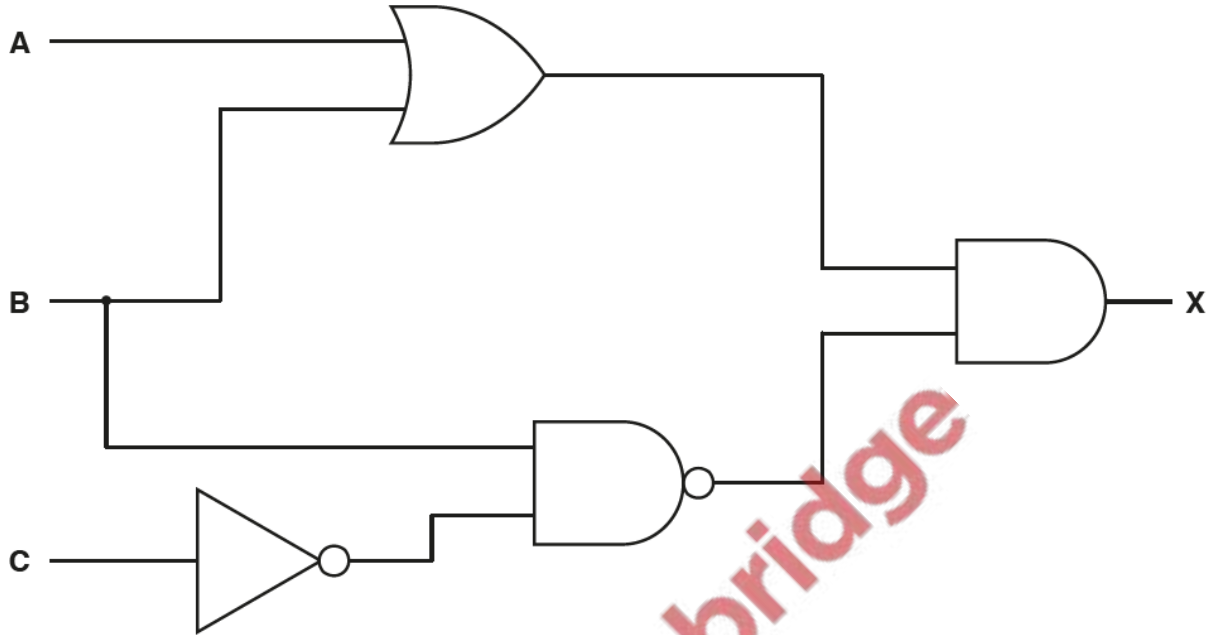
.....

[2]



(a) Complete the truth table for the given logic circuit.

Do **not** attempt to simplify the logic circuit.



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]

(b) A water control system uses a switch and two pressure sensors.

The outputs of the switch and sensors are shown in the table.

Sensor or Switch	Output of 1	Output of 0
Switch (S1)	On	Off
Pressure Sensor (P1)	≥ 3	< 3
Pressure Sensor (P2)	≥ 3	< 3

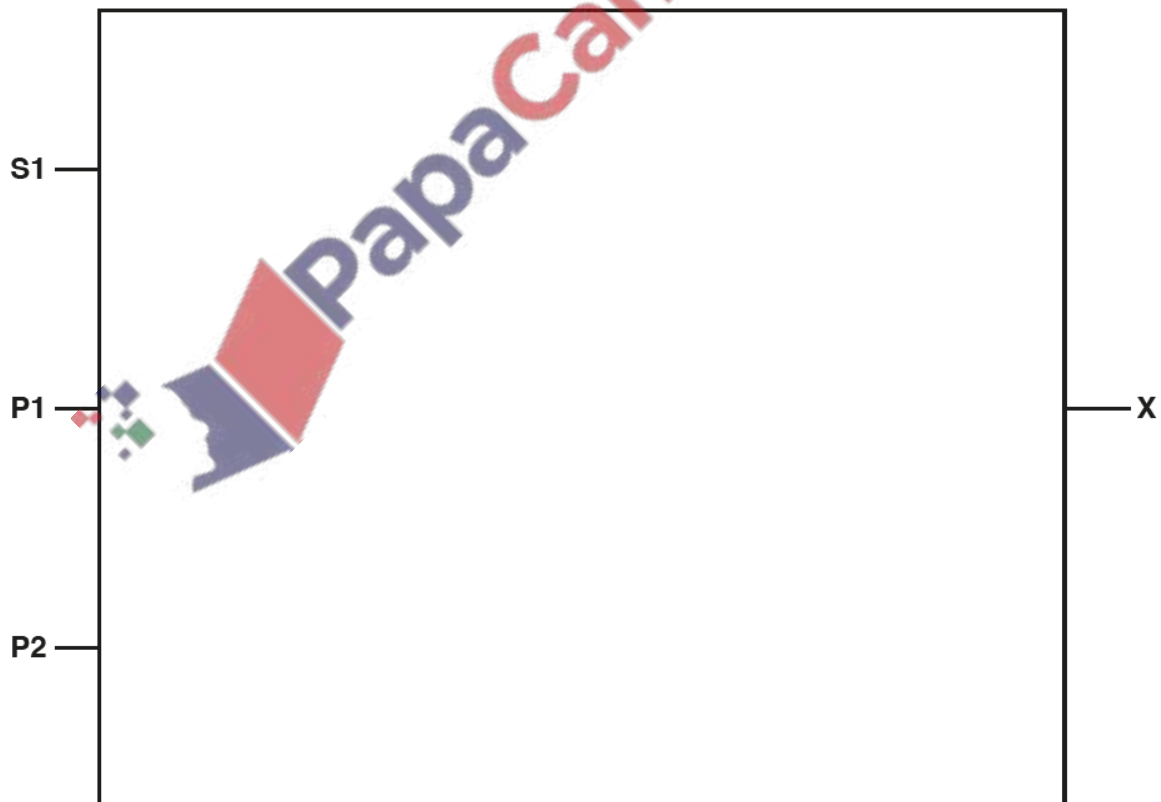
Create a logic circuit that will produce an output (X) of 1 when:

The switch **S1** is on

and

either **P1** is less than 3 or **P2** is less than 3, but not both.

All logic gates used must have a maximum of two inputs.



[4]

An image of a smartphone is shown.



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

..... [1]

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

1

2

[2]

(c) All smartphones have a MAC address.

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

.....

..... [1]

(ii) Describe the **structure** of a MAC address.

.....

.....

.....

.....

.....

..... [3]

(d) A smartphone needs both RAM and ROM.

State why a smartphone needs RAM and ROM.

RAM

.....

ROM

.....

[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

2

[2]

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

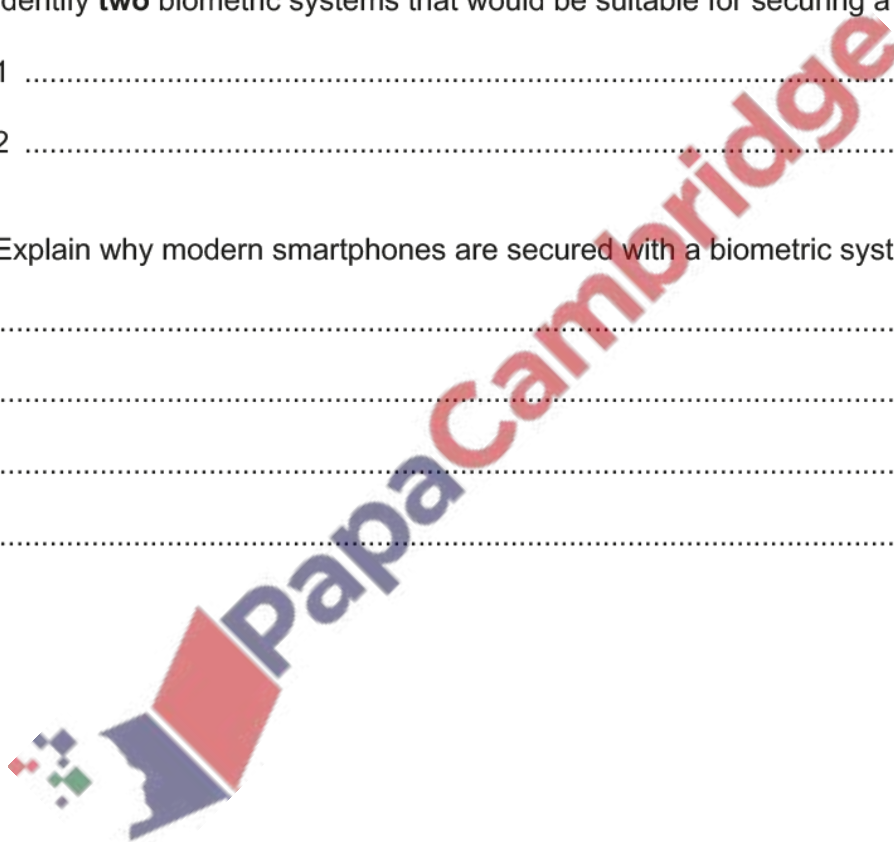
.....

.....

.....

.....

[2]



20. June/2020/Paper_11/No.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		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

[4]

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

.....

Benefit 2

.....

Benefit 3

.....

[3]

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

..... [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.

.....

.....

.....

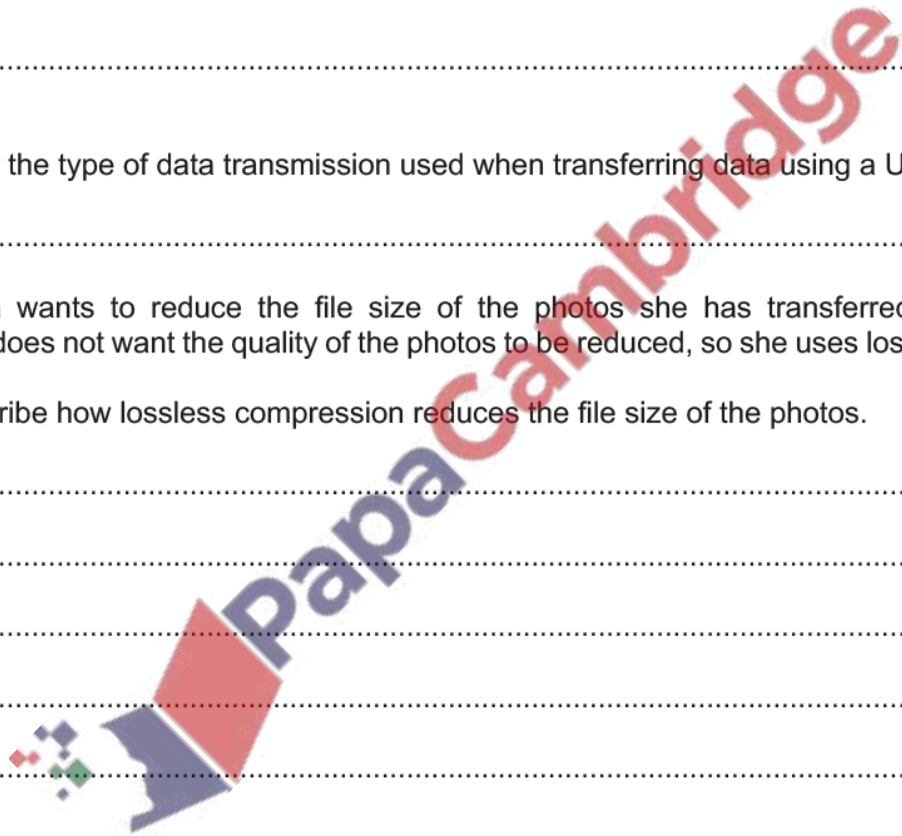
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[4]



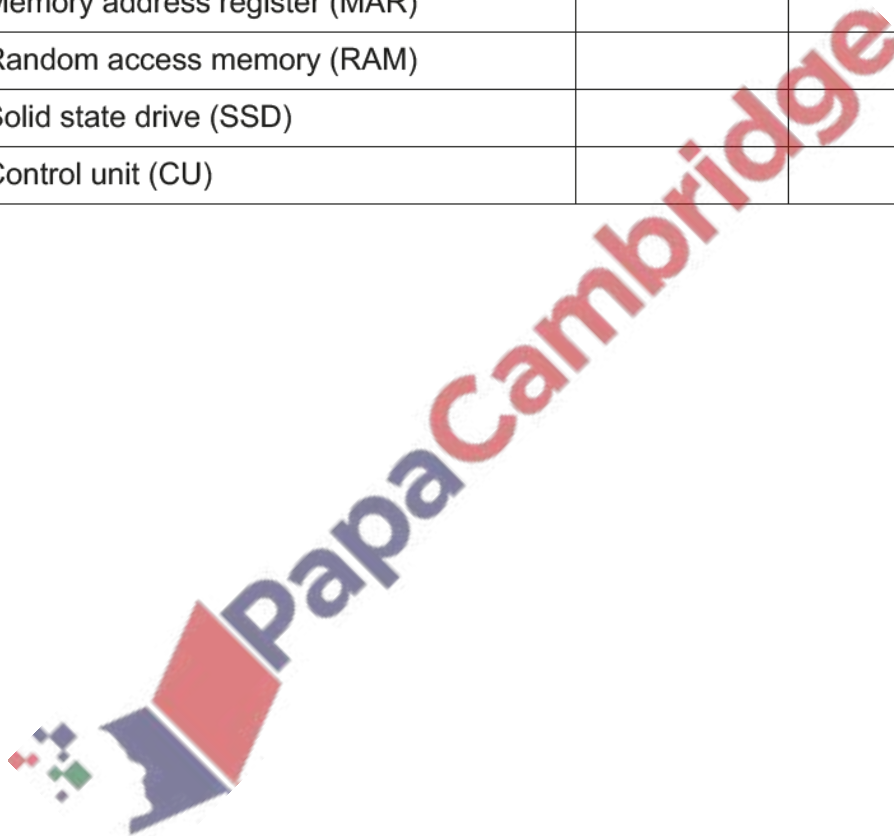
Six components of a computer are given.

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]



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.

..... [1]

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

Benefit

.....

Drawback 1

.....

Drawback 2

.....

[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]

24. June/2020/Paper_12/No.1

A Von Neumann model for a computer system has a central processing unit (CPU) that makes use of registers.

(a) Identify **three** registers that may be used.

Register 1

Register 2

Register 3

[3]

(b) The CPU is responsible for processing instructions.

One stage of processing instructions is the decode stage.

(i) Identify the **two other** stages of processing instructions.

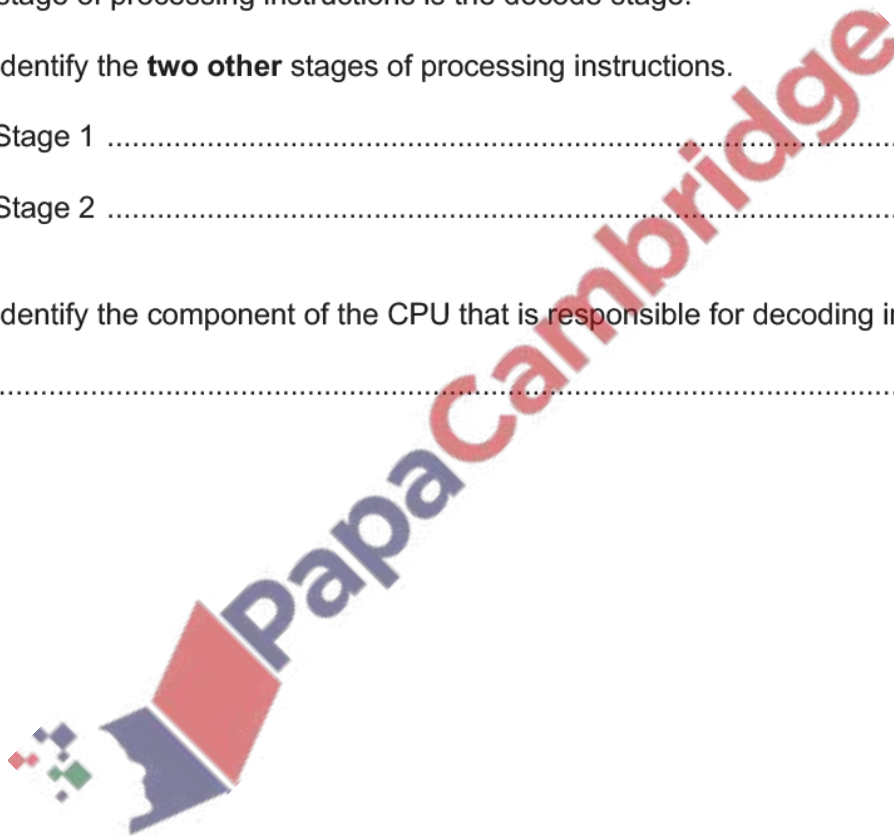
Stage 1

Stage 2

[2]

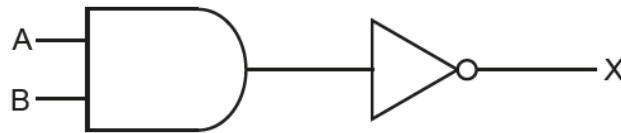
(ii) Identify the component of the CPU that is responsible for decoding instructions.

..... [1]



(a) Identify the name **and** draw the **single** logic gate that can replace the given logic circuits.

(i)



Name of gate:

Drawing of gate:



[2]

(ii)



Name of gate:

Drawing of gate:



[2]

(b) Complete the truth table for the given logic statement:

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

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]

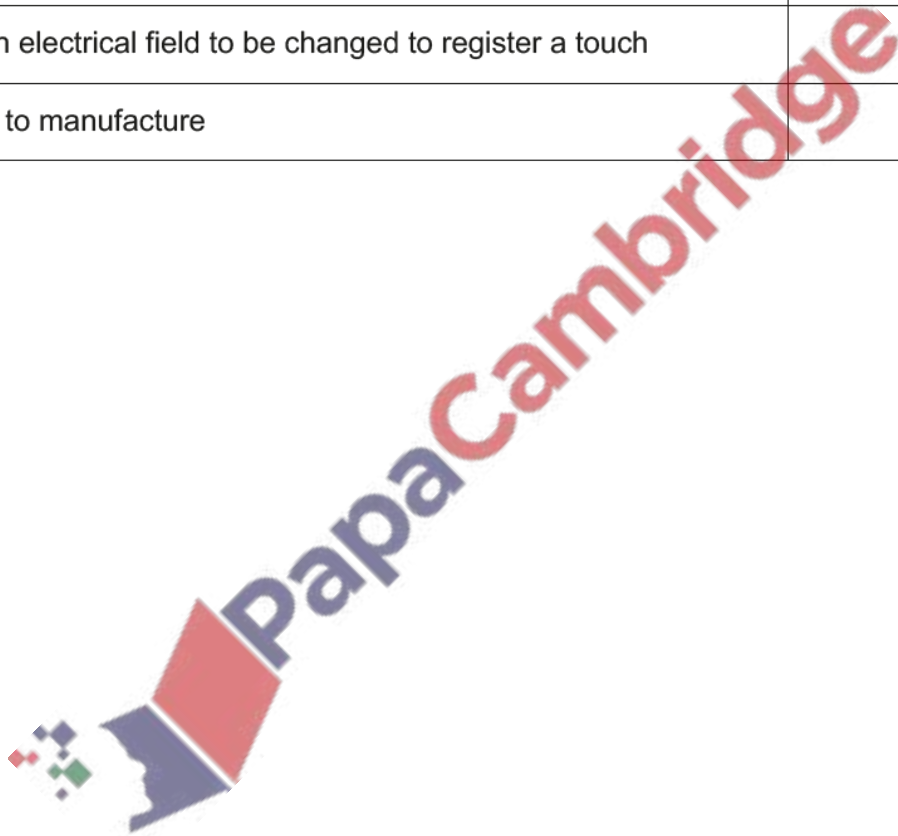
26. June/2020/Paper_12/No.6

Six statements are given about touch screen technology.

Tick (✓) to show if the statement applies to **Capacitive** or **Resistive** touch screen technology.

Statement	Capacitive (✓)	Resistive (✓)
Needs pressure to be applied to create a circuit		
May not register a touch if the user is wearing gloves		
More commonly used in smartphones		
More responsive to a touch		
Needs an electrical field to be changed to register a touch		
Cheaper to manufacture		

[6]



Leonard has a new laser printer to print letters for his business.

Leonard connects his printer to his computer using the USB port.

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

Benefit 1

.....

Benefit 2

.....

Benefit 3

.....

[3]

(b) State **two** benefits and **one** drawback of Leonard using a laser printer, instead of an inkjet printer, to print the letters.

Benefit 1

.....

Benefit 2

.....

Drawback

.....

[3]

(c) An interrupt signal is sent from the printer to the computer.

(i) Give **two** examples of when a printer would generate an interrupt signal.

Example 1

Example 2

[2]

(ii) Many devices send interrupt signals.

Identify the software in the computer that will receive and manage all interrupt signals.

..... [1]

(a) Six statements are given about storage devices.

Tick (✓) to show if the statement applies to hard disk drive (HDD) storage or solid state drive (SSD) storage.

Some statements can apply to both.

Statement	HDD (✓)	SSD (✓)
It has a limited number of read/write cycles		
It uses magnetic properties to store data		
It has moving parts		
It is non-volatile storage		
It can be used as an external storage device to back up data		
It uses flash memory to store data		

[6]

(b) Optical storage is another type of storage.

Give **two** examples of optical storage.

Example 1

Example 2

[2]



(a) Six hardware devices are shown.

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

Hardware device	Input (✓)	Output (✓)	Storage (✓)
Solid state drive (SSD)			
Sensor			
Headphones			
Microphone			
USB flash drive			
Actuator			

[6]

(b) Genevieve writes a paragraph about a barcode reader.

Using the list given, complete the paragraph. Not all terms in the list need to be used.

- actuators
- binary
- black
- input
- microprocessors
- output
- sensors
- storage
- white

A barcode reader is an device. It shines a light at the barcode and the light is reflected back. The bars in the barcode reflect less light than the bars.

..... are used to capture the amount of reflected light and the different reflections are converted to values.

[5]

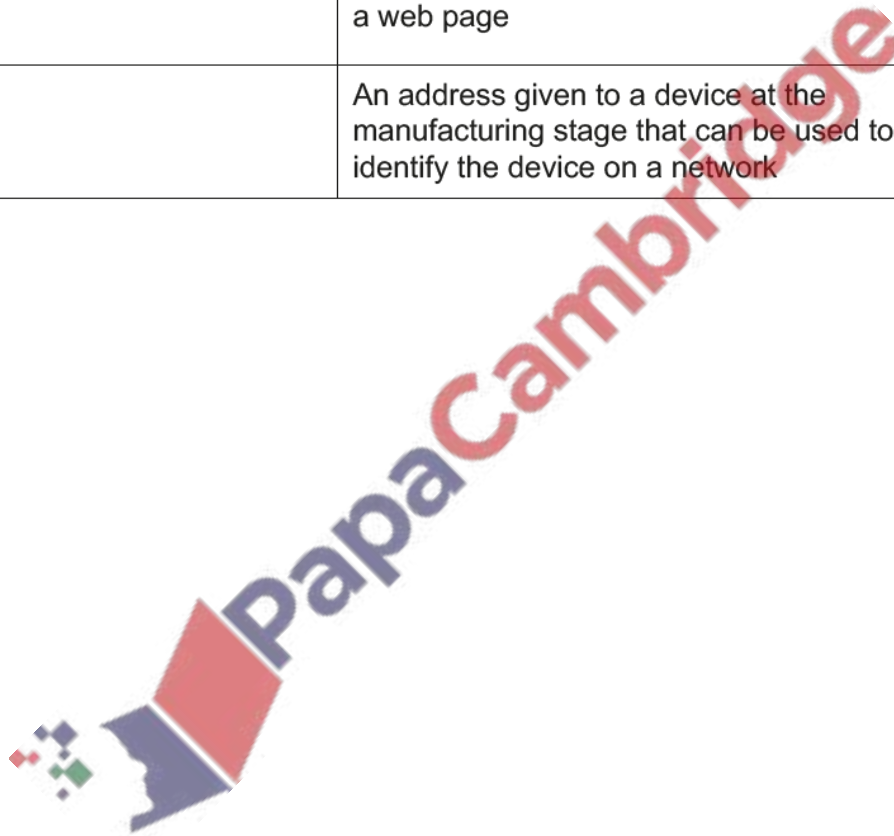
30. June/2020/Paper_13/No.4

The table shows **four** definitions.

Complete the table giving the missing **Term** for each definition.

Term	Definition
	A data transmission method that sends data one bit at a time, down a single wire
	An address given to a device on a network. The address is assigned by the network
	The software used to render HTML and display a web page
	An address given to a device at the manufacturing stage that can be used to identify the device on a network

[4]



31. June/2020/Paper_13/No.5

(a) A clothing shop uses a barcode reader at the checkout.

The checkout is linked to a stock control system. The system monitors stock levels and automatically keeps them above a minimum level.

Explain how the stock control system automatically keeps the stock levels above a minimum level.

.....

.....

.....

.....

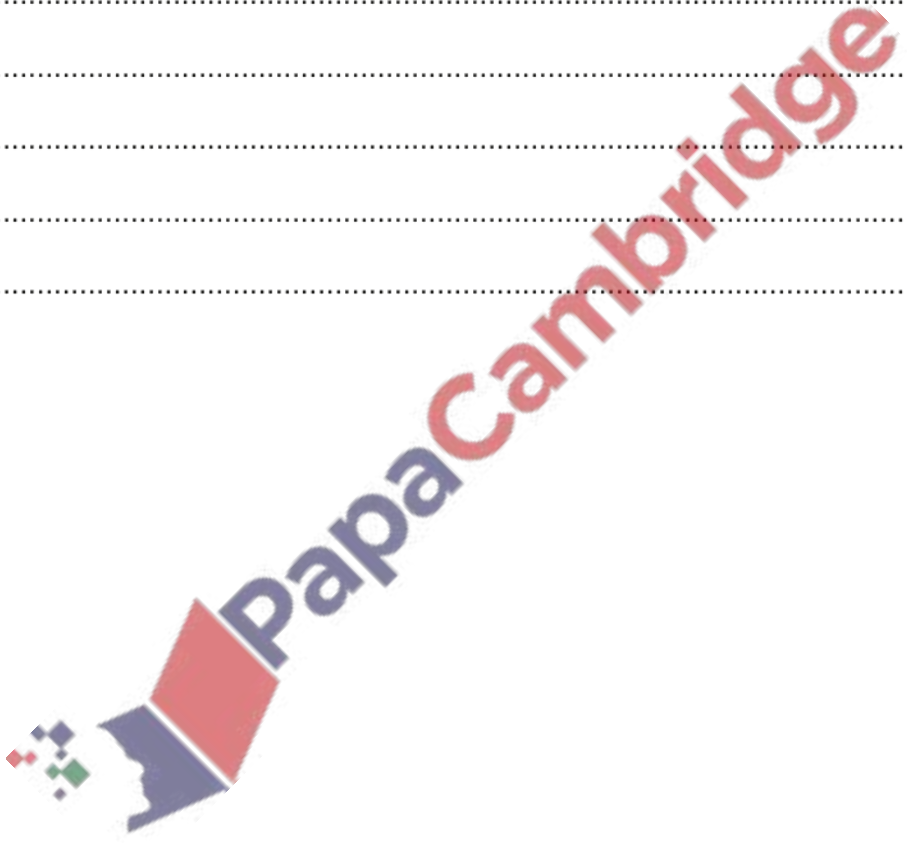
.....

.....

.....

.....

..... [4]



- (b) The software for the stock control system is stored on a central computer. The computer uses random access memory (RAM), read only memory (ROM) and a hard disk drive (HDD).

The computer is a Von Neumann model computer system with a central processing unit (CPU).

- (i) State the purpose of the RAM, ROM and HDD in the central computer.

RAM

.....

ROM

.....

HDD

.....

[3]

- (ii) Identify **four** components that are part of the CPU.

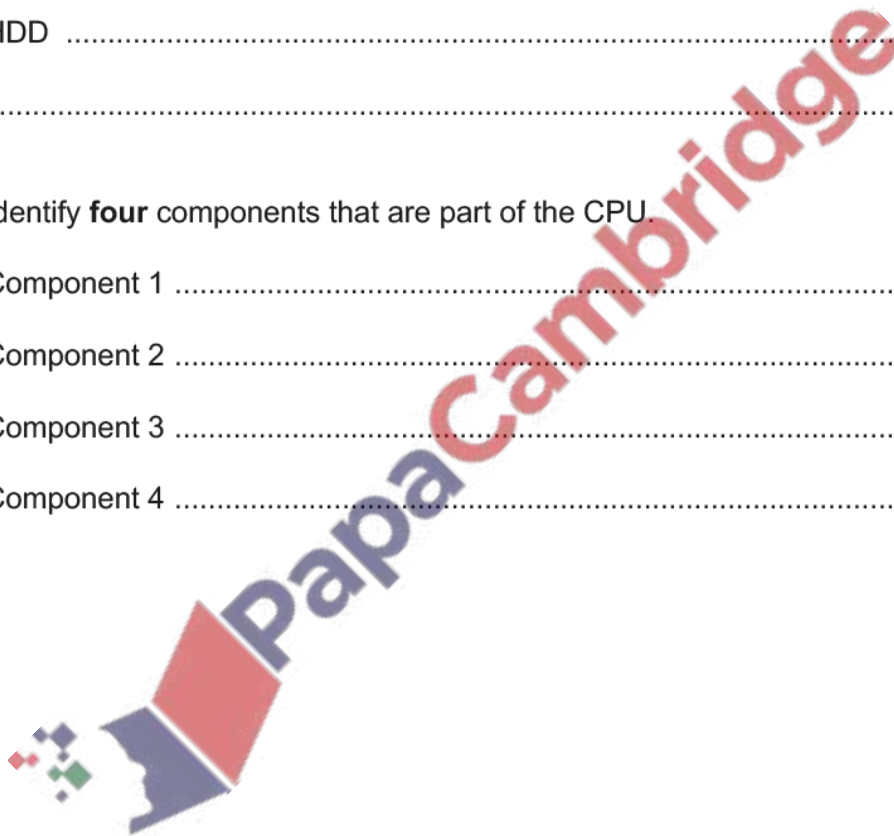
Component 1

Component 2

Component 3

Component 4

[4]



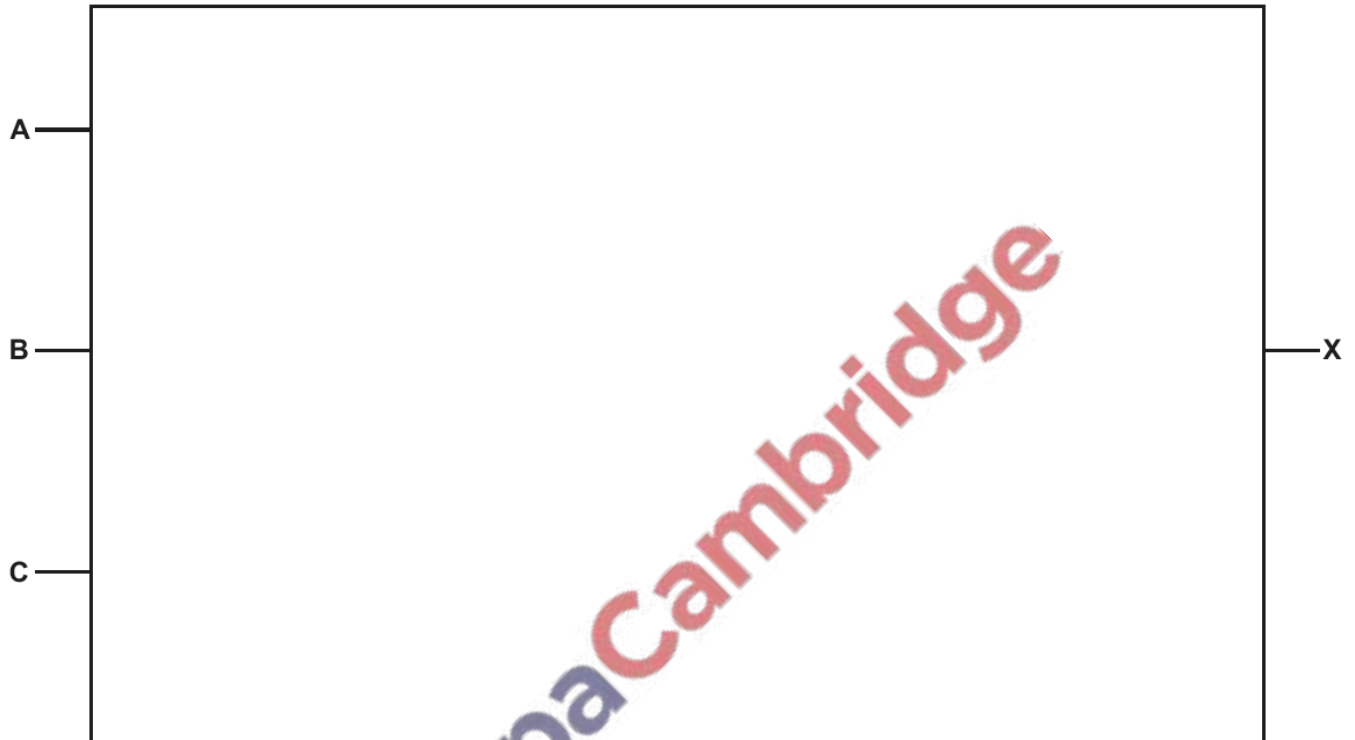
32. June/2020/Paper_13.No.6

Consider the given logic statement:

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

(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.



[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]

33. June/2020/Paper_13/No.8

Six statements are given about printers.

Tick (✓) to show whether the statement applies to a **3D** printer, an **Inkjet** printer or a **Laser** printer.

Some statements apply to more than one printer.

Statement	3D (✓)	Inkjet (✓)	Laser (✓)
Uses a moving print head			
Uses liquid ink			
Produces output using materials such as plastic and resin			
Uses piezoelectric or thermal technology			
Uses a rotating drum to transfer the image to the paper			
Uses layer upon layer of material to create the output			

[6]

