8 An alarm clock is controlled by a microprocessor. It uses the 24 hour clock. The hou
by an 8-bit register, **A**, and the number of minutes is represented by another 8-bit re

(a) Identify what time is represented by the following two 8-bit registers.

A

128	64	32	16	8	4	2	1
0	0	0	1	0	0	1	0

:

B

128	64	32	16	8	4	2	1
0	0	1	1	0	1	0	1

Hours ..... Minutes .....

[2]

(b) An alarm has been set for 07:30. Two 8-bit registers, **C** and **D**, are used to represent the hours and minutes of the alarm time.

Show how 07:30 would be represented by these two registers:

C

Hours

:

D

Minutes

[2]

(c) Describe how the microprocessor can determine when to sound the clock alarm.

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.....[3]

(d) The LCD (liquid crystal display) on the clock face is back-lit using blue LE
diodes). The brightness of the clock face is determined by the level of light in
amount of light given out by the LEDs is controlled by a control circuit.

Describe how the sensor, microprocessor and LEDs are used to maintain the c
brightness of the clock face.

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.....[3]

(e) Modern LCD monitors and televisions use LED back-lit technology.

Give **two** advantages of using this new technology compared to the older cold cathode fluorescent lamp (CCFL) method.

1 .....

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2 .....

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[2]

QUESTION 2.

7 Computer A is communicating with computer B.

(a) Draw an arrow or arrows to show simplex, duplex and half-duplex data transmi… **direction** of the data transmission must be fully **labelled**.

Simplex data transmission

Computer **A**

Computer **B**

Duplex data transmission

Computer **A**

Computer **B**

Half-duplex data transmission

Computer **A**

Computer **B**

[6]

(b) State a use for the following data transmission methods. The use must be different for each data transmission method.

Simplex .....

.....

Duplex .....

.....

[2]

(c) A computer includes an Integrated Circuit (IC) and a Universal Serial Bus transmission.

Describe how the computer uses these for data transmission, including the type transmission used.

IC .....

.....

.....

.....

USB .....

.....

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[4]

QUESTION 3.

8 A supermarket uses a barcode scanner to read the barcodes on its products.

(a) Describe how the barcode scanner reads the barcode.

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[4]

(b) Explain how the barcode system could help the supermarket manage its stock.

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[3]

(c) An infrared touch screen is used to view and navigate the supermarket stock system.

Explain how the infrared touch screen detects a user's touch.

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[4]

(d) The supermarket uses secondary storage and off-line storage to store data a

Explain what is meant by secondary storage and off-line storage.

Secondary storage .....

.....

.....

.....

Off-line storage .....

.....

.....

QUESTION 4.

9 **(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]

QUESTION 5.

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 automatically keeps them above a minimum level.

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

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..... [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]

QUESTION 6.

1 (a) Four hardware items are shown in the table below.

For each hardware item:
- name a suitable application
- state how it is used in the application

Give a different application in each case.

Hardware item	Application	How the hardware item is used
Barcode reader	.....	.....
Microphone	.....	.....
Touch screen	.....	.....
Infrared sensor	.....	.....

[8]

(b) Describe **two** differences between Blu-ray discs and DVDs.

1 .....

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2 .....

.....

[2]

(c) Describe **two** differences between DVD-R and DVD-RAM.

1 .....

.....

2 .....

QUESTION 7.

6 High-level or low-level languages can be used when writing a computer program.

State **two** advantages of using a high-level language and **two** advantages of using a low-level language.

High-level language advantage 1 .....

.....

High-level language advantage 2 .....

.....

Low-level language advantage 1 .....

.....

Low-level language advantage 2 .....

.....

[4]

7 Modern Liquid Crystal Display (LCD) monitors use Light-Emitting Diode (LED) backlit technology.

Give **four** benefits of using LED technology.

1 .....

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2 .....

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3 .....

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4 .....

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[4]

QUESTION 8.

8 Identify whether the **four** statements about file compression are correct by writing in the following table.

Statement	TRUE or FALSE
MIDI files store the actual music notes in a compressed format	
JPEG files are examples of lossless file compression	
MP3 files are, on average, 90% smaller than the music files stored on a CD	
MP4 files are examples of lossy file compression	

[4]

9 **(a)** Explain what is meant by a denial of service attack.

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.....[2]

(b) Name and describe **two other** potential security threats when using the Internet.

Security threat 1 .....

Description .....

.....

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Security threat 2 .....

Description .....

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[4]

QUESTION 9.

9 **(a)** Optical storage media can be used to store data.

Describe how the data is read from a Compact Disc (CD).

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.....[4]

(b) Kamil wants to store a 16-bit colour image file. The image size is 1000 pixels.

Calculate the size of the file.

Give your answer in **bytes**. Show your working.

Working .....

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.....

.....

Answer ..... **bytes**

[2]

(c) Describe the differences between primary and secondary storage.

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.....[4]

QUESTION 10.

8 **(a)** A computer has 2048 MB of RAM.

How many GB of RAM does the computer have?

Show your working.

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.....

.....GB [2]

(b) Describe **one** item that is stored in RAM.

.....

.....

.....[2]

(c) Explain **three** ways that RAM is different to ROM.

1 .....

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2 .....

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3 .....

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[3]

QUESTION 11.

5 **(a)** **Five** storage devices or media are listed in the table.

Tick (✓) to show whether each storage device or media is an example of **primary**, **secondary** or **off-line** storage.

Storage device or media	Primary (✓)	Secondary (✓)	Off-line (✓)
External HDD			
RAM			
Internal SSD			
ROM			
DVD			

[5]

(b) Users can store their data on optical storage media.

Explain how data is written to optical storage media.

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..... [4]

(c) A sports events company uses a digital camera attached to a drone (small [illegible]) to video their events from the sky.

The video is stored as it is captured, on a device that is attached to the drone.

(i) Circle the most suitable type of storage to store the video.

Optical Magnetic Solid state

[1]

(ii) Explain the reasons for your choice in **part (c)(i)**.

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4 A zoo has an information point.

- Visitors use a menu to select information about animals.
- The menu includes 500 different animals.
- The information is provided only using high definition video with an audio track.

(a) State **one** input device that could be used for the information point.

..... [1]

(b) The output is shown on a monitor.

State **one** other output device that could be used for the information point.

..... [1]

(c) The video files are stored at the information point.

State **one** secondary storage device that could be used.

..... [1]

(d) The zoo decides to introduce Quick Response codes in different places in the zoo. These provide further information about the animals.

Describe how customers obtain the information from the Quick Response codes.

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..... [4]

11 Robert has a mobile device that uses RAM, ROM and an SSD.

(a) State what the RAM, ROM and SSD are used for.

RAM .....

.....

ROM .....

.....

SSD .....

.....

[3]

(b) Give **two** reasons why an SSD, rather than a HDD, is used in the mobile device.

Reason 1 .....

.....

Reason 2 .....

.....

[2]

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1 A library has a system that allows customers to check out the books that they wa

Each book has a barcode that can be used to identify the book.

(a) (i) Identify **two** input devices that may be used in the library's system.

Input device 1 .....

Input device 2 .....

[2]

(ii) Identify **two** storage devices that may be used in the library's system.

Storage device 1 .....

Storage device 2 .....

[2]

(iii) Identify **two** output devices that may be used in the library's system.

Output device 1 .....

Output device 2 .....

[2]

(b) The data stored by the library is archived at the end of each day. The archive is held on a server in the library office.

The data is encrypted with an 8-bit key. As some of the data is confidential, the library wants to make the encryption more secure.

(i) State how the library could make the encryption more secure.

.....

..... [1]

(ii) The term used to describe data before it is encrypted is plain text.

State the term used to describe encrypted data.

..... [1]

(iii) The library's archive system uses an error detection and correction syste... a parity check with an automatic repeat request (ARQ).

Describe how this system uses the parity check and ARQ.

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..... [6]

(c) The library has a website that customers can use to search for a book.

(i) The website has a background colour with the hexadecimal colour code #F92A10

The colour code is stored in two 12-bit binary registers.

Show how the colour code would be stored in the registers.

F92												
A10												

[6]

(ii) Videos on the library website show customers which books the librar in stock.

The library wants the file size of a video to be as small as possible.

Identify **and** describe a method the library could use to reduce the file size of a video much as possible.

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..... [4]

(d) The library often holds events that introduce new authors.

At the events, the library has a Liquid Crystal Display (LCD) screen that displays data, including an image and information about the author.

Describe how an LCD screen operates to display this data.

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..... [5]