8 An alarm clock is controlled by a microprocessor. It uses the 24 hour clock. The ho
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.

.....

.....

.....

.....

.....

.....[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 .....

.....

.....

2 .....

.....

.....

[2]

QUESTION 2.

5 Parity checks are often used to check for errors that may occur during data transf

(a) A system uses **even parity**.

Tick (✓) to show whether the following three bytes have been transmitted correc
incorrectly.

Received byte	Byte transmitted correctly	Byte transmitted incorrectly
1 1 0 0 1 0 0 0		
0 1 1 1 1 1 0 0		
0 1 1 0 1 0 0 1		

[3]

(b) A parity byte is used to identify which bit has been transmitted incorrectly in a block of data.

The word "F L O W C H A R T" was transmitted using nine bytes of data (one byte per character). A tenth byte, the parity byte, was also transmitted.

The following block of data shows all ten bytes received after transmission. The system uses **even parity** and column 1 is the parity bit.

	letter	column 1	column 2	column 3	column 4	column 5	column 6	column 7	column 8
byte 1	F	1	0	1	0	0	1	1	0
byte 2	L	1	0	1	0	1	1	0	0
byte 3	O	1	0	1	0	1	1	1	1
byte 4	W	1	0	1	1	0	1	1	1
byte 5	C	1	0	1	0	0	0	1	1
byte 6	H	0	0	1	0	1	0	0	0
byte 7	A	0	0	1	0	0	1	0	1
byte 8	R	1	0	1	1	0	0	1	0
byte 9	T	1	0	1	1	0	1	0	0
parity byte		1	0	1	1	1	1	1	0

(i) **One** of the bits has been transmitted incorrectly.

Write the byte number and column number of this bit:

Byte number .....

Column number .....

[2]

(ii) Explain how you arrived at your answer for **part (b)(i)**.

.....

.....

.....

.....[2]

(c) Give the denary (base 10) value of the byte: **1 0 1 1 1 1 1 0**

.....

.....[1]

(d) A parity check may not identify that a bit has been transmitted incorrectly.

Describe **one** situation in which this could occur.

.....

.....

.....[1]

QUESTION 3.

10 **Six** security issues and **six** descriptions are shown below.

Draw a line to link each security issue to its correct description.

Security issue	Description
Pharming	illegal access to a computer system without the owner's consent or knowledge
Phishing	software that gathers information by monitoring key presses on a user's keyboard; the data is sent back to the originator of the software
Viruses	malicious code installed on the hard drive of a user's computer or on a web server; this code will re-direct the user to a fake website without the user's knowledge
Hacking	creator of code sends out a legitimate-looking email in the hope of gathering personal and financial information from the recipient; it requires the user to click on the link in the email or attachment
Spyware	a message given to a web browser by a web server; it is stored in a text file; the message is then sent back to the server each time the browser requests a page from the server
Cookies	program or code that replicates itself; designed to amend, delete or copy data or files on a user's computer; often causes the computer to crash or run slowly

[5]

QUESTION 4.

5

5 **Six** descriptions and **six** devices are shown below.

Draw a line to link each description to the correct device.

Description	Device
Allows a user to write on a surface using a pen; text and drawings are then captured electronically and stored for later use.	Digital Light Projector
Converts sound into an electrical signal/voltage.	Inkjet printer
Uses thermal bubble and piezoelectric technology to produce a hard copy.	Interactive whiteboard
Uses a bright white light source and micro mirrors (on a chip) to produce an image to be shone onto a wall or screen.	Laser printer
Converts a hard copy document into an electronic form to be stored as a file on a computer.	Microphone
Uses negatively charged images on a rotating drum and positively charged toner to output a hard copy.	Scanner (2D)

[5]

QUESTION 5.

13 **(a)** Gurdeep wants to send a large file to Jennifer over the Internet.

State **two** benefits of compressing the file to send it.

Benefit 1 .....

.....

.....

Benefit 2 .....

.....

.....

[2]

(b) Two types of compression are lossy and lossless.

Choose the most suitable type of compression for the following and explain your choice.

(i) Downloading the code for a computer program:

Type of compression .....

Explanation .....

.....

.....

.....

[3]

(ii) Streaming a video file:

Type of compression .....

Explanation .....

.....

.....

.....

[3]

QUESTION 6.

4 There are various methods used to detect errors that can occur during data t
storage.

Describe each of the following error detection methods.

Parity check .....

.....

.....

.....

Check digit .....

.....

.....

.....

Checksum .....

.....

.....

.....

Automatic Repeat request (ARQ) .....

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.....

.....

[8]

QUESTION 7.

9 Four 7-bit binary values are being transmitted from one computer to another. An
is being used to check for errors in the binary values.

Write the correct **Parity bit** for each **7-bit binary value** to make sure it meets **odd** parity.

Parity bit	**7-bit binary value**
.....	0000011
.....	1000000
.....	0111111
.....	1010101

[4]

10 Clive has a laptop computer that he uses for his business. He enters a username and password to log in to his laptop.

Clive is worried about spyware being used to find out his username and password.

(a) Describe how spyware could be used to find out Clive's username and password.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(b) The threat of spyware makes Clive concerned about typing a password to log in to his laptop.

Give an example of how Clive could log in securely without typing a password.

..... [1]

QUESTION 8.

(b) When data are transmitted from one device to another, a parity check is oft
each byte of data. The parity bit is often the leftmost bit in the byte.

(i) If a system uses even parity, give the parity bit for each of the following bytes:

parity bit

	1	**1**	**0**	**0**	**1**	**1**	**0**

parity bit

	0	**0**	**0**	**0**	**0**	**0**	**1**

[2]

(ii) A parity check can often detect corruption of a byte.

Describe a situation in which it **cannot** detect corruption of a byte.

.....

.....

.....[1]

8 The steps to print a document using a laser printer are shown in the table below.

Put each step in the correct order. The first step has been done for you.

Step	Order
As the printing drum rotates, a laser scans across it; this removes the positive charge in certain areas	
The printing drum is coated in positively-charged toner; this then sticks to the negatively-charged parts of the printing drum	
The paper goes through a fuser which melts the toner so it fixes permanently to the paper	
The printer driver ensures that the data is in a format that the laser printer can understand	**1**
A negatively-charged sheet of paper is then rolled over the printing drum	
Data is then sent to the laser printer and stored temporarily in the printer buffer	
The toner on the printing drum is now transferred to the paper to reproduce the required text and images	
The printing drum is given a positive charge	
Negatively-charged areas are then produced on the printing drum; these match exactly with the text and images to be printed	

[8]

QUESTION 9.

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.

.....

.....

.....

.....[2]

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

Security threat 1 .....

Description .....

.....

.....

Security threat 2 .....

Description .....

.....

.....

[4]

QUESTION 10.

2 Data files are stored in different file formats.

Complete the table by providing a suitable file format for each file type. The first one is done for you.

File type	File format
Pictures	.JPEG
Text	
Sound	
Video	

[3]

3 **(a)** An example of a Uniform Resource Locator (URL) is:

http://www.cie.org.uk/index.htm

Part 1 Part 2 Part 3

Identify the **three** parts that make up this URL.

Part 1 .....

Part 2 .....

Part 3 .....

[3]

(b) Describe what is meant by an Internet Protocol (IP) address.

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.....[4]

QUESTION 11.

8 Kamil correctly answers an examination question about a number of internet term

Six different terms have been removed from Kamil's answer.

Complete the sentences in Kamil's answer, using the list given. Not all terms in the list need used.

- browser
- connection
- domain name server (DNS)
- Internet
- Internet Service Provider (ISP)
- IP address
- MAC address
- network
- protocol
- uniform resource locator (URL)
- webpages
- hypertext mark-up language (HTML)

A ..... is a program that allows a user to view ..... .

An ..... is a company that provides a connection to access the ..... .

The main ..... that governs the transmission of data using the Internet is http.

The ..... is provided by the network, and given to each device on the network.

[6]

QUESTION 12.

9 **(a)** Computers can transmit data using different methods.

Describe the **three** data transmission methods given.

(i) Serial data transmission

.....

.....

.....

.....[2]

(ii) Parallel data transmission

.....

.....

.....

.....[2]

(iii) Duplex data transmission

.....

.....

.....

.....[2]

(b) Data can sometimes be corrupted when it is transmitted from one comp
causing errors to be present in the data.

Identify and describe **three** methods of error detection that could be used to see i
has occurred.

Error detection method 1 .....

Description .....

.....

.....

.....

Error detection method 2 .....

Description .....

.....

.....

.....

Error detection method 3 .....

Description.....

.....

.....

.....

[9]

QUESTION 13.

12 Explain the difference between a Musical Instrument Digital Interface (MIDI) file a

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.....[4]

13 State which types of storage device or media would be most suitable for these scenarios.

For each device or media, justify your choice.

(a) Creating a backup of 150 GB of data.

.....

Justification .....

.....

[2]

(b) Storing applications on a tablet device.

.....

Justification .....

.....

[2]

(c) Storing a 1200 MB high-definition promotional movie about a new car. The movie is to be given to people who are interested in buying a new car.

.....

Justification .....

.....

[2]

10 Data is valuable to a company.

(a) Companies use error detection methods to make sure that data is accurate.

One error detection method is the use of a check digit.

Explain what is meant by a check digit and how it is used to detect errors.

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..... [4]

(b) Companies can use a range of security methods to keep their data secure.

Identify **two** security methods that a company can use to keep their data secure **and** explain how each method can keep the data secure.

Security method 1 .....

.....

.....

.....

.....

.....

Security method 2 .....

.....

.....

.....

.....

.....

[6]

5 The contents of three binary registers have been transmitted from one computer to another. **parity** has been used as an error detection method.

The outcome after transmission is:

- **Register A** and **Register B** have been transmitted **correctly**.
- **Register C** has been transmitted **incorrectly**.

Write the appropriate **Parity bit** for each register to show the given outcome.

	Parity bit							
Register A		0	1	0	0	0	1	1
Register B		0	0	0	0	1	1	1
Register C		0	0	0	0	0	1	1

[3]

6 Jesse is taking his Computer Science examination. He answers **five** questions about ethics.

(a) For the first question, he writes the answer:

"This type of software can be copied and shared without the permission of the owner."

State what Jesse is describing.

..... [1]

(b) For the second question, he writes the answer:

"With this type of software, the owner still retains the copyright for the software, but he gives away copies of it for free."

State what Jesse is describing.

..... [1]

(c) For the third question, he writes the answer:

"This type of software is often a trial version of the full software. To use the full version the user normally needs to pay a fee."

State what Jesse is describing.

..... [1]