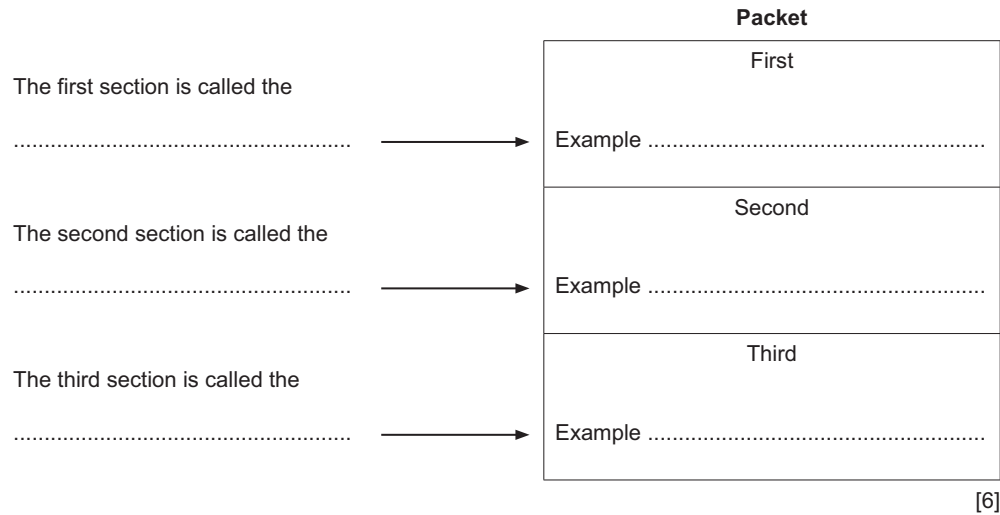


3 Data is split into packets before it is transmitted across a network.

(a) The diagram shows a packet with **three** sections.

Complete the diagram by writing the name of each section of the packet.

Write an example in each section of what would be stored in that part of the packet.



(b) Packets can be sent across a network using different methods of data transmission.

Explain how data is transmitted in the **two** given methods of data transmission.

(i) Serial full-duplex

[4]

(ii) Parallel half-duplex

..... [4]

4 Data packets are transmitted across a network from one computer to another computer.

(a) Describe the structure of a data packet.

.....

.....

.....

.....

.....

..... [3]

(b) Packet switching is used to transmit the data packets across the network.

Identify the device that controls which path is taken by each data packet.

..... [1]

(c) Serial data transmission is used to transmit the data packets across the network.

Explain why serial data transmission is used to transmit the data packets.

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..... [3]

2 Data can be transmitted from one device to another.

(a) Tick (✓) **one** box to show which of the terms is **not** a method for transmitting data.

- | | | |
|---|----------|--------------------------|
| A | serial | ☐ |
| B | simplex | ☐ |
| C | parallel | ☐ |
| D | parity | ☐ |

[1]

(b) Data is broken down into smaller units to be transmitted from one device to another.

Give the name of the unit that data is broken down into.

..... [1]



(c) Data is often encrypted when it is transmitted from one device to another.

(i) Explain how data is encrypted using symmetric encryption.

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.....

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.....

.....

..... [4]

(ii) Give the purpose of encryption.

.....

..... [1]

7 A company has a network that includes a web server.

Data is transmitted across the network using serial half-duplex data transmission.

- (a) Draw and annotate a diagram to show how the data is transmitted using serial half-duplex data transmission.

[4]

- (b) Give **two** benefits of the company using serial half-duplex data transmission for this purpose.

1

.....

2

.....

[2]

- (c) Give **one** drawback of the company using serial half-duplex data transmission for this purpose.

.....

..... [1]

- (d) The company uses a proxy server to help protect the web server and the network from cyber security threats.

- (i) Give **three** cyber security threats that the proxy server can help protect against.

1

2

3 [3]

- (ii) Identify **two** functions of the proxy server that can be used to help protect the web server and the network.

1

.....

2

..... [2]

- (e) Customers access the company's web pages that are stored on the web server.

Describe how the web pages are located, retrieved and displayed on a customer's computer.

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..... [6]

- 4 Data is transmitted between a computer and a printer.
- (a) The data is transmitted one bit at a time down a single wire. The computer can transmit data to the printer and the printer can transmit data to the computer, using the same connection.

Circle the **two** data transmission methods that will transmit data in this way.

parallel full-duplex

parallel half-duplex

parallel simplex

serial full-duplex

serial half-duplex

serial simplex

[2]

- (b) An odd parity check is used to detect errors in the data transmission.

Explain how the odd parity check detects errors.

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[4]

- (c) Another error detection method sends the data from the computer to the printer, then a copy of the data received is sent back from the printer to the computer. The two sets of data are compared to see if they match.

State the name of this type of error detection method.

.....

[1]

- 7 Complete the statements about data packets and packet switching.

Use the terms from the list.

Some of the terms in the list will **not** be used. You should only use a term once.

destination address

first

footer

header

last

main data

packets

payload

routers

servers

trailer

Data is broken down into packets. A data packet has a packet
that contains the packet number and the

Each packet could take a different path from the sender to the receiver; this is controlled by

Packets may arrive out of order. Once the packet has arrived,
the packets are reordered.

[4]

- 6 The table contains descriptions about data transmission methods.

Complete the table by identifying which data transmission methods are described.

Data transmission method	Description
.....	Data is transmitted down a single wire, one bit at a time, in one direction only.
.....	Data is transmitted down multiple wires, multiple bits at a time, in both directions, but only one direction at a time.
.....	Data is transmitted down a single wire, one bit at a time, in both directions at the same time.
.....	Data is transmitted down multiple wires, multiple bits at a time, in one direction only.

[4]

4 A student uses a mobile phone to take photographs for a school project.

The student needs to transmit the photographs to their computer. They could use serial data transmission or parallel data transmission to transmit the photographs.

(a) (i) Describe how the photographs would be transmitted using serial data transmission.

.....

.....

.....

..... [2]

(ii) Give **two** benefits of transmitting the photographs using serial data transmission.

1

.....

2

.....

[2]

(iii) State **one** benefit of the student using parallel data transmission instead of serial data transmission.

.....

..... [1]

(b) The photographs are also transmitted across a network to cloud storage. A device on the network forwards the data towards its correct destination.

(i) State the name of this device.

..... [1]

(ii) Describe what is meant by cloud storage.

.....

.....

.....

..... [2]

(iii) Give **one** disadvantage of storing the photographs in cloud storage instead of storing them locally.

.....