7 Data is sent from an employee's computer to a server. The data is correct when it is sent, but an error is detected when the data is received.

(a) Describe how an error can occur in the data during transmission.

.....

.....

.....

..... [2]

(b) Methods of error detection and correction can be added to make sure that errors are identified after data is transmitted.

Complete the statements about methods of error detection and correction.

Use terms from the list. **Not** all terms need to be used. You should only use each term once.

acknowledgement automatic repeat query (ARQ) binary bit

byte calculation check digit checksum correct

echo check error even incorrect negative

number odd positive timeout

A parity check is set to be ..... or

..... . A parity ..... is

added to each byte before transmission to make it match the set parity.

An ..... involves comparing the data sent to the data

received back from the receiving device.

An ..... uses acknowledgement and

..... . The acknowledgement system can be

..... or ..... .

[8]

5 A barcode scanning system uses a check digit to check for errors in data on input.

(a) Explain how the barcode scanning system operates to check for errors.

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.....

.....

..... [4]

(b) After a barcode is scanned, data is sent to a stock control system to update the stock value stored for that product.

The data is sent to the stock control system using serial simplex data transmission.

(i) Explain how the data is sent using serial simplex data transmission.

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.....

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..... [3]

(ii) Explain why serial simplex is the most appropriate method of data transmission for this purpose.

.....

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..... [3]

(iii) The data is checked for errors after it has been transmitted to the stock control system.

Give **two** error detection methods that could be used for this purpose.

1 .....

2 .....
[2]

9 A company owner has installed a new network. Data is correct before it is transmitted across the network.

The company owner is concerned that data might have errors after transmission.

(a) Explain how the data might have errors after transmission.

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.....

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..... [3]

(b) The company owner decides to introduce an error detection system to check the data for errors after transmission.

The error detection system uses an odd parity check and a positive automatic repeat query (ARQ).

(i) Describe how the error detection system operates to check for errors.

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(ii) Give **two** other error detection methods that could be used.

1 .....

2 .....
[2]

(c) The company owner also installs a firewall to help protect the network from hackers and malware.

(i) Explain how the firewall operates to help protect the network.

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..... [5]

(ii) Give **two** examples of malware that the firewall can help protect the network from.

1 .....

2 .....
[2]

6 The table contains statements about error detection methods.

Complete the table by giving the correct error detection method for each statement.

error detection method	statement
.....	An odd or even process can be used.
.....	A value is calculated from the data, using an algorithm. This happens before and after the data is transmitted.
.....	A copy of the data is sent back to the sender by the receiver.
.....	Acknowledgement and timeout are used.
.....	A value is appended to data that has been calculated using the data. This value is checked on data entry.

[5]