Data Transmission

2.3 Symmetric and asymmetric encryption
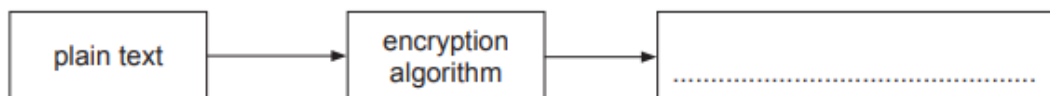
1 **(a)** State what is meant by encryption.

....

.... [1]

(b) State what is meant by symmetric encryption.

....

.... [1]

(c) Complete the diagram:

| plain text | → | encryption algorithm | → | .... |

[1]

2 Choose **five** correct terms from the following list to complete the spaces in the sentences below:

- cypher text
- encryption algorithm
- encryption key
- firewall
- plain text
- proxy server
- symmetric encryption

.... is a security system.

It uses the same .... to encrypt and decrypt a message.

Before encryption, the message is called ....

The .... processes the original message.

The output is known as ....   [5]

3 A company collects and stores data about its customers. The data is stored on a server in the company's office.

The data is transmitted to cloud storage to create a back-up.

The data is encrypted using symmetric encryption before it is sent to the cloud storage.

(a) Describe how the data is encrypted.

....

....

....

....

....

....

....

.... [4]

(b) Give **three other** methods that can be used to secure the data in the office.

Method 1 ....

....

Method 2 ....

....

Method 3 ....

....
                                                                                                                    [3]

4 A simple symmetric encryption system is used to encrypt messages. Each letter of the alphabet is substituted by another letter.

Plain text

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z

Cypher text

v	p	n	a	q	b	r	u	z	s	c	o	y	k	w	f	x	i	e	m	d	j	t	l	h	g

(a) Convert the following plain text to cypher text.

Plain text: **d a t a   s e c u r i t y**

Cypher text: ....[2]

(b) A new cypher text is created by shifting each letter of the alphabet **five** places to the right.

Show the new cypher text below.

Plain text

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z

New cypher text

[2]

(c) State, giving a reason, which cypher text would be more secure.

....

....

....

....[2]

5 Data is encrypted to keep it safe during transmission.

Complete the paragraph about asymmetric encryption.

Use the terms from the list.

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

<div align="center">

asymmetric   certificate   cipher text

decrypted   encrypted   parallel key   plain text   private key

protected   public key   serial key   symmetric

</div>

.... is encrypted into ....

using a .... The encrypted data is then transmitted from the

sender to the receiver. The encrypted data is then decrypted using a

....   [4]

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

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

  ....

  ....

  ....

  ....

  ....

  ....

  ....

  .... [4]

  (ii) Give the purpose of encryption.

  ....

  .... [1]