IGCSE COMPUTER SCIENCE • EXERCISE SHEET

2.3 Encryption

Name: _____ Class: _____ Date: _____ **Total: 21 marks**

KEY WORDS encryption 加密 • symmetric 对称 • symmetric encryption 对称加密 • asymmetric 非对称 • asymmetric encryption 非对称加密

Objective

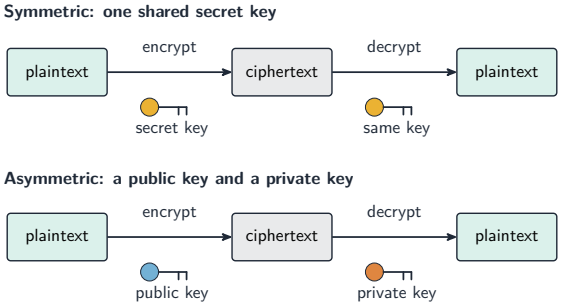
Build the skills to answer exam questions on **encryption** 加密 — why it is used, and **symmetric** 对称 and **asymmetric** 非对称 encryption.

You must be able to:

- explain the purpose of encryption (plaintext → ciphertext)
- describe symmetric encryption (one shared key)
- describe asymmetric encryption (public and private keys)

1 Worked examples

Symmetric vs asymmetric



Symmetric: one shared key. Asymmetric: a public key to encrypt, a private key to decrypt

- encryption scrambles data so it cannot be **understood** if intercepted (it does not stop interception).
- plaintext → (encrypt) → ciphertext.

2 Practice

2.1 State the purpose of encryption. [1]

2.2 Name the readable form of data before it is encrypted. [1]

3 Exam-style questions

3.1 In asymmetric encryption, data encrypted with a public key can be decrypted only with the: [1]

A same public key
B matching private key
C shared secret key
D checksum

3.2 A company chooses between symmetric and asymmetric encryption.

(a) State the main risk of symmetric encryption. [1]

(b) Explain why asymmetric encryption is more secure for sharing a key. [2]

3.3 State whether encryption stops data being intercepted, and explain. [2]

3.4 A company sends confidential files between two offices over the internet.

(a) Explain why encryption is needed, even though the data is already sent over a private connection. [2]

(b) Describe how **symmetric** encryption works, and state its main weakness. [4]

(c) Describe how **asymmetric** encryption works, naming both keys and explaining which one is used to encrypt and which to decrypt. [4]

(d) Explain the difference between *plaintext* and *ciphertext*, and state why encryption does not stop data being intercepted. [3]