6 Security, privacy and data integrity – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	**Write it 3 times** (English)		
secure			
malware			
phishing			
encryption			
firewall			
authentication			
validation			
verification			
check digit			
parity check			

Recall

At IGCSE you met online dangers and passwords. Bring this with you:

- Data needs to be kept **secure** from people who should not see or change it.
- You used passwords and antivirus software.

At AS we name the main threats, the ways to protect data, and how to check data is

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correct.

New ideas

Read these first. Each idea has a short worked example. Then do the Practice.

1 Threats

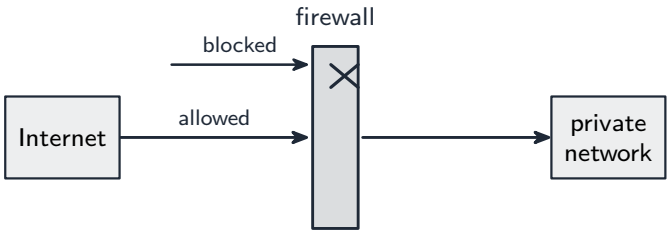
- **malware** is harmful software – viruses, worms and Trojans.
- **phishing** tricks people into giving away passwords using fake messages or websites.



Worked example. A phishing email pretends to be your bank and links to a fake login page; if you type your password there, the attacker captures it.

2 Protecting data

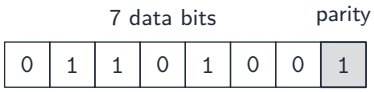
- **encryption** scrambles data so that only someone with the correct key can read it.
- a **firewall** controls which traffic may enter or leave a network.
- **authentication** checks who you are – a password, a fingerprint, or two-factor codes.



Worked example. Encryption turns a message like `HELLO` into scrambled text such as `XZ4PQ`; intercepted without the key, it means nothing.

3 Keeping data correct (integrity)

- **validation** checks that entered data is sensible (for example a range check or a type check).
- **verification** checks that data was copied or typed correctly (for example double entry).
- a **check digit** is an extra digit added to a number to catch typing errors; a **parity check** adds an extra bit so a single flipped bit is noticed.



data has three 1s; for **even parity** the parity bit is **1** (four 1s in total)

Worked example. For even parity, count the 1s in `0110100` – that is three (odd) – so the parity bit is `1`, which makes the total even.

Watch out: validation only checks data is *sensible*, not *true* – a valid-looking but wrong phone number can still pass a length check.

Practice

6.1 Give one method of authentication. [1]

6.2 Explain what encryption does. [1]

6.3 State what malware is, and give one example. [2]

6.4 State one difference between validation and verification. [2]

6.5 A system uses **even** parity. The seven data bits are 1010101. State the parity bit needed. [2]

6.6 Explain *why* a parity check can fail to notice an error if *two* bits are flipped. [2]

6.7 Challenge. A website wants to protect its users' passwords. Suggest two different measures and state what each one protects against. [2]