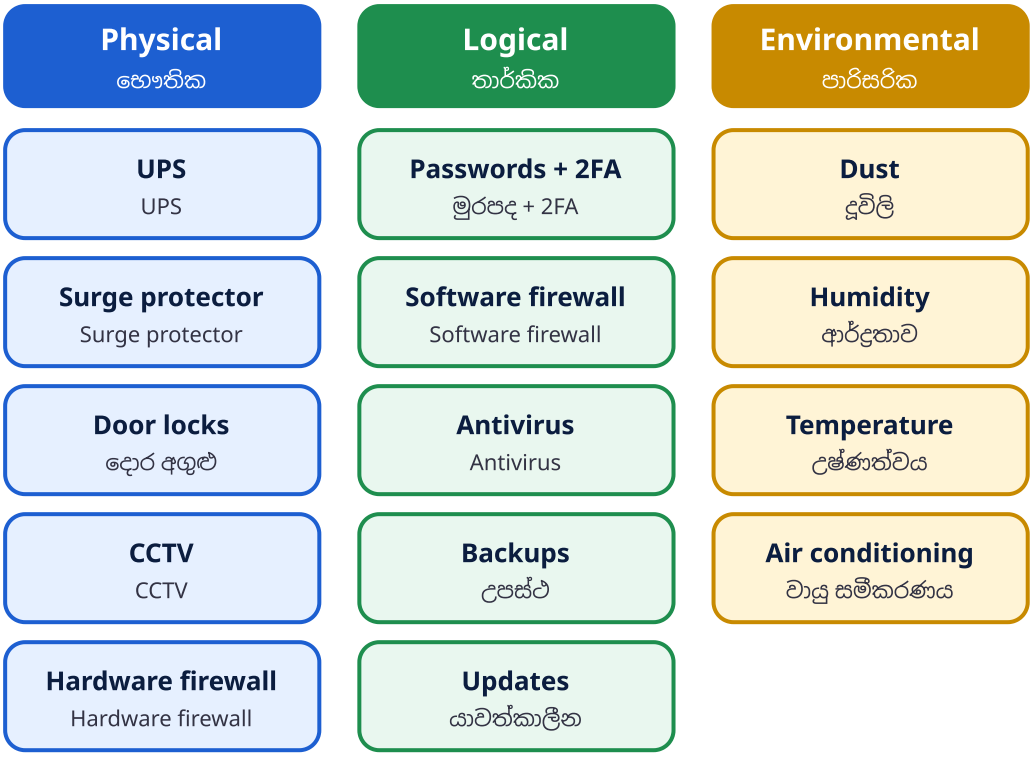
G.C.E. O/L Grade 11 ICT · Lesson 6

6.8 Protecting ICT Infrastructure: Physical, Logical and Environmental Security

Syllabus 15.8. Computers and data must be kept safe. We protect them in three ways: **physical security** (the machines), **logical security** (the data and programs) and control of **environmental factors** (dust, humidity and temperature). Sri Lanka also has **institutions** that help with information security.



Three ways to protect ICT infrastructure.

1. Physical security

Method	How it protects
UPS	A battery that keeps the computer on during a power cut so you can save work
Surge protector	Stops sudden high voltage (e.g. lightning) from damaging devices
Hardware firewall	A device that blocks unwanted network traffic before it reaches the computers
Door locks	Only allowed people can enter the computer room (keys, cards, fingerprints)
CCTV	Cameras watch and record who comes in

© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved

UPS example: a UPS stores **108 Wh**. The load is Computer 150 W + Monitor 30 W = **180 W**. Running time = 108 ÷ 180 × 60 ≈ **36 minutes** – enough to save and shut down.

2. Logical security

- **Passwords:** long (12+ characters), mixed letters, numbers and symbols; never share; turn on two-step verification.
- **Software firewall:** a program on the computer that allows or blocks network connections.
- **Backups:** extra copies of data in case it is lost.



The 3-2-1 backup rule.

> 💡 3-2-1 rule: keep **3** copies, on **2** different kinds of media, with **1** copy away from home or office (e.g. the cloud).

3. Protection against malware

Threat	What it does	Protection
Spam	Unwanted bulk e-mail, often with scams or bad links	Spam filter; do not reply or click
Virus	A program that copies itself and damages files	Antivirus, updates, scan USB drives
Key-logger	Secretly records keys you press to steal passwords	Antivirus; avoid public computers for banking

4. Environmental factors

Dust
Blocks fans and causes overheating – keep covers on and clean.

Humidity
Damp air rusts parts and causes short circuits – use AC or a dehumidifier.

Temperature
Heat damages chips – keep rooms cool and air flowing.

5. Information security institutions in Sri Lanka

Institution	Role
Sri Lanka CERT	National cyber security help and warnings.

© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved

ICTA	Government ICT agency; digital government.
TechCERT	Security services for organisations.
CID Cyber Crimes Division	Police investigation of computer crimes.
Data Protection Authority	Makes sure the PDPA is followed.

NEW 2026 2026: **ransomware** locks files and asks for money – offline backups are the best defence. Turn on **automatic updates** and **two-step verification**, and report cyber attacks to **Sri Lanka CERT**.

Key Words

Physical security – Protecting the hardware and the computer room.

Logical security – Protecting data and programs with software methods.

UPS – A battery unit that powers a computer during a power cut.

Surge protector – A device that stops sudden high voltage reaching equipment.

Firewall – Hardware or software that blocks unwanted network traffic.

CCTV – Cameras that watch and record an area.

Backup – An extra copy of data kept in case of loss.

Malware – Harmful software such as viruses and key-loggers.

Spam – Unwanted bulk e-mail messages.

Virus – A program that copies itself and damages files.

Key-logger – Malware that secretly records the keys you press.

Sri Lanka CERT – The national team that helps with cyber security problems.

Sample Q&A

1. What is the difference between physical and logical security?

Answer: Physical security protects the hardware; logical security protects data and programs.

2. Why do we use a UPS?

Answer: To keep the computer on during a power cut so work can be saved.

3. A 108 Wh UPS runs a 180 W load. About how long will it last?

Answer: 108 ÷ 180 × 60 ≈ 36 minutes.

© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved

4. What is the 3-2-1 backup rule?

> **Answer:** 3 copies, on 2 kinds of media, 1 copy off-site.

5. How does a key-logger steal passwords?

> **Answer:** It secretly records every key you press and sends it to the attacker.

6. Name three environmental factors that can damage computers.

> **Answer:** Dust, humidity and high temperature.

MCQ

1. Which device keeps a computer running during a power cut?

A. CCTV
B. router
C. UPS
D. scanner

2. Lightning causes a sudden high voltage. Which device helps?

A. surge protector
B. key-logger
C. spam filter
D. webcam

3. A 108 Wh UPS supplies a 180 W load. Running time is about

A. 72 minutes
B. 180 minutes
C. 18 minutes
D. 36 minutes

4. Which one is logical security?

A. a door lock
B. a strong password
C. CCTV
D. a UPS

5. Malware that secretly records every key you press is a

A. spam filter
B. key-logger
C. firewall
D. UPS

© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved

6. In the 3-2-1 backup rule, the “1” means

A. one copy kept off-site
B. one computer only
C. back up once a year
D. one password

7. Damp air in a computer room is a problem of

A. spam
B. piracy
C. humidity
D. plagiarism

8. Cyber attacks in Sri Lanka can be reported to

A. Met Department
B. CSE
C. Survey Department
D. Sri Lanka CERT

9. Which term means: “Protecting the hardware and the computer room”?

A. Physical security
B. Surge protector
C. CCTV
D. Spam

10. Which term means: “Protecting data and programs with software methods”?

A. Backup
B. Firewall
C. Virus
D. Logical security

11. Which term means: “A battery unit that powers a computer during a power cut”?

A. CCTV
B. UPS
C. Key-logger
D. Malware

12. Which term means: “A device that stops sudden high voltage reaching equipment”?

A. Backup
B. Sri Lanka CERT
C. Surge protector
D. Spam

© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved

13. Which term means: “Hardware or software that blocks unwanted network traffic”?

A. Physical security
B. Firewall
C. Malware
D. Virus

14. Which term means: “Cameras that watch and record an area”?

A. Key-logger
B. Spam
C. CCTV
D. Logical security

15. Which term means: “An extra copy of data kept in case of loss”?

A. Backup
B. UPS
C. Virus
D. Sri Lanka CERT

Structured Questions

1. Name three physical security methods and say how each helps. *(3 marks)*

> UPS keeps power on (1); door locks stop strangers (1); CCTV records who enters (1)

2. A UPS stores 108 Wh. A computer uses 150 W and a monitor 30 W. Calculate the running time. *(3 marks)*

> Total load 180 W (1); 108 ÷ 180 = 0.6 hours (1); × 60 ≈ 36 minutes (1)

3. Explain spam, virus and key-logger, with one protection for each. *(3 marks)*

> Spam: unwanted e-mail – spam filter (1); virus: damages files – antivirus (1); key-logger: records keys – antivirus and care on public PCs (1)

4. Explain the 3-2-1 backup rule. *(3 marks)*

> 3 copies (1); on 2 kinds of media (1); 1 copy off-site, e.g. the cloud (1)

5. How do dust, humidity and temperature harm computers? Give one precaution for each. *(3 marks)*

> Dust blocks fans – clean and cover (1); humidity rusts parts – AC or dehumidifier (1); heat damages chips – cool room (1)

© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved

Summary

- Three kinds of protection: physical, logical, environmental.
- Physical: UPS, surge protector, hardware firewall, locks, CCTV.
- UPS time = Wh ÷ W × 60 minutes.
- Logical: passwords, software firewall, backups.
- Backup rule 3-2-1.
- Malware: spam, virus, key-logger – use antivirus and care.
- Environment: control dust, humidity and temperature.
- Sri Lanka CERT, ICTA and the CID help with cyber security.

MCQ answer key – 6.8

1. **C** – Uninterruptible Power Supply.
2. **A** – It stops voltage spikes.
3. **D** – 108 ÷ 180 × 60.
4. **B** – Passwords protect data.
5. **B** – It steals passwords.
6. **A** – Off-site protects from fire or theft.
7. **C** – Use AC or a dehumidifier.
8. **D** – CERT handles cyber security.
9. **A** – Physical security – Protecting the hardware and the computer room.
10. **D** – Logical security – Protecting data and programs with software methods.
11. **B** – UPS – A battery unit that powers a computer during a power cut.
12. **C** – Surge protector – A device that stops sudden high voltage reaching equipment.
13. **B** – Firewall – Hardware or software that blocks unwanted network traffic.
14. **C** – CCTV – Cameras that watch and record an area.
15. **A** – Backup – An extra copy of data kept in case of loss.

© 2026 schoolict.net (Ruwan Mangala Suraweera). All rights reserved.