



Unit 2 • Information and Communication Technology: ICT tools and the internet

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Key words

1. input device
2. PIN
3. toner
4. fuser
5. router
6. IP address
7. set-top box
8. URL

K • 4

Each carries 0.5 mark.

2 Label the diagram

1. display screen shows messages, choices, balance
2. keypad PIN, amount, Enter, Cancel
3. cash dispenser counts out the notes
4. speaker spoken help, beeps
5. card reader reads the card's stripe or chip
6. receipt printer prints a slip of the transaction

K • 3

Each carries 0.5 mark.

3 Multiple choice

i. b. URL

K • 1

The URL (Uniform Resource Locator) is a website's unique address. WWW is the World Wide Web itself; a browser is the program that opens websites; a web page is one page of a site.

ii. c. the keypad

U • 1

Through the keypad, information goes into the machine: your PIN and the amount. The receipt printer, cash dispenser and screen all give something out to you.

iii. d. all of the above

K • 1

A set-top box receives the digital signal, decodes it into pictures and sound, and sends it to the TV to be displayed: all three.

iv. b. light from the white parts of the page removed the drum's charge there, so only the letter shapes stay charged and attract the toner

U • 1

The drum holds charge only in the dark. White paper reflects light onto the drum and the charge leaks away there; the dark letters reflect almost no light, so their shapes stay charged. The toner has the opposite charge, and opposite charges attract.

v. b. that the site is registered in Nepal

A • 1

.np is Nepal's country code, as .in is India's and .jp is Japan's. The .gov before it says it belongs to the government. The s in https is what tells you the connection is secure (coded).

4 Very short answers

a. MARKING SCHEME

K • 1

- ✓ Scanner.



- b. MARKING SCHEME K · 1
✓ Internet service provider.
- c. MARKING SCHEME U · 1
✓ The fuser's hot rollers melt the toner into the paper (heat fixes the toner).

5 Short answers

- a. MARKING SCHEME U · 2
✓ Any one difference, e.g. a printer is an output device; a scanner is an input device.
✓ Any second difference, e.g. a printer turns a soft copy into a hard copy; a scanner turns a hard copy into a soft copy.
- b. MARKING SCHEME U · 2
✓ Any one difference, e.g. a search engine is a software system that finds information on the internet; a website is a collection of related web pages under one address.
✓ Any second difference, e.g. a search engine searches pages on billions of websites; a website holds the information of one person or organization (e.g. Google against www.moecdc.gov.np).
- c. MARKING SCHEME K · 2
✓ Any one feature, e.g. it provides a high-speed internet connection.
✓ Any second feature, e.g. it gives email addresses; protects customers from phishing and malware; provides web hosting.
- d. MARKING SCHEME A · 2
✓ A hidden camera or a person nearby may be watching the keys.
✓ Anyone who learns the PIN (with a copied card) can take money from the account.

6 Long answers

- a. ANSWER K · 4
An ATM (automated teller machine) is an **electromechanical** machine, a computer-controlled device with moving parts, that gives automated **banking services** without a bank teller. It is connected to the bank's server and works with input devices (card reader, keypad) and output devices (screen, speaker, receipt printer, cash dispenser). Its functions: withdrawing cash, depositing cash, checking the account balance, giving a short account statement, paying bills, transferring money between accounts, and changing the PIN, at any time of day or night.
- MARKING SCHEME
- ✓ An electromechanical machine that does a bank teller's work automatically, connected to the bank's server.
 - ✓ Any one function, e.g. withdrawing cash at any time.
 - ✓ Any second function, e.g. depositing cash; checking the balance or getting a short statement.
 - ✓ Any third function, e.g. paying bills; transferring money; changing the PIN.



b. ANSWER

U • 4

A search engine is a software system that searches the information on the internet and shows the web pages most useful for the keywords the user types. Examples: Google, Bing, Yahoo, DuckDuckGo.

We need them because:

- There are billions of web pages, and we usually don't know which website has the information we need, or its address. Typing a few keywords is enough.
- They save time: results come in under a second.
- They give more exact results, best first, and help us find official sources.

For example, to find the Curriculum Development Centre's textbooks without knowing its address, we search "Curriculum Development Centre" on Google and choose moecdc.gov.np from the results.

MARKING SCHEME

- ✓ A software system that searches the information on the internet and shows the pages most useful for the keywords typed (e.g. Google, Bing).
- ✓ There are billions of web pages, and we usually don't know which website has what we need, or its address.
- ✓ It saves time and gives exact results, best first, including official sources.
- ✓ A suitable example, e.g. searching "Curriculum Development Centre" and choosing moecdc.gov.np from the results.

7 Numerical problems**a. ANSWER**

A • 2

Pages = $30 \times 6 = 180$. Time = $180 \div 20 = 9$ minutes.

MARKING SCHEME

- ✓ Total pages = $30 \times 6 = 180$.
- ✓ Time = $180 \div 20 = 9$ minutes.

b. ANSWER

A • 2

$30 \div 0.5 = 60$ hours.

MARKING SCHEME

- ✓ Hours = data in the package $\div$ data used per hour = $30 \text{ GB} \div 0.5 \text{ GB}$.
- ✓ 60 hours.

8 Think**MARKING SCHEME**

HA • 2

- ✓ Not in the phones or the radio link: full bars on both mean the router's radio waves reach them.
- ✓ In the wired part: the cable (optical fiber) bringing the ISP's network to the router, or the ISP's service itself.

9 Activity: ICT in my day (Activity 2.1)

(not marked)

WHAT STUDENTS SHOULD FIND

For example: a mobile phone (both: the touchscreen and camera take information in, the screen and speaker give it out) for calls, messages and online classes; a television with a set-top box (output) for news and programs; a radio (output) for news and music; a printer (output) for printing homework; a Wi-Fi router (both: it passes data in and out) for connecting devices to the internet; an ATM (both) for taking out cash.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	17	11	7	2	37





Unit 2 • Information and Communication Technology: staying safe online and new technologies

ANSWER KEY • FOR TEACHERS

Full marks 37

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Key words

1. blog
2. phishing
3. hacking
4. malware
5. firewall
6. robotics
7. virtual reality
8. cloud computing

K • 4

Each carries 0.5 mark.

2 Match the columns

1. identity theft → e. using someone's personal information to pretend to be them
2. cyberbullying → a. threatening or humiliating someone through social media or messages
3. botnet → f. a network of computers secretly taken over by malware
4. two-factor authentication → c. asking for a code sent to your phone as well as the password
5. narrow AI → d. artificial intelligence made for one particular task
6. chatbot → g. a program that chats with you in ordinary language

K • 3

Each carries 0.5 mark.

3 Multiple choice

i. b. cyberbullying

K • 1

That is **cyberbullying**. Identity theft is pretending to be someone; hacking is getting into a system without permission.

ii. c. identity theft

A • 1

They are **pretending to be you**, using your personal information to cheat others: identity theft. (If they had broken into your real account, that would be hacking too.)

iii. b. artificial intelligence

K • 1

Artificial intelligence makes machines that can do tasks that need human intelligence. Robotics builds machines that act; VR builds made-up worlds; Google Plus was a social network (closed in 2019).

iv. a. narrow (weak) AI

A • 1

It does **one task**, recognizing plants, so it is **narrow AI**, like every AI in use today. General AI would be able to learn any task a human can.

v. b. global scale

U • 1

Global scale: a cloud service can grow to serve users anywhere in the world by simply using more servers. Unexpected costs are a disadvantage; migration (moving to the cloud) and governance (managing it) are jobs to be done, not advantages.



4 Very short answers

- a. MARKING SCHEME K · 1
✓ Computer virus.
- b. MARKING SCHEME K · 1
✓ Electronic Transactions Act, 2003.
- c. MARKING SCHEME U · 1
✓ It pretends to be from a trusted source (the bank) to trick you into giving away private information (the PIN).

5 Short answers

- a. MARKING SCHEME U · 2
✓ Any one difference, e.g. a code of conduct is a set of ethical guidelines; cyber law is made by the government.
✓ Any second difference, e.g. a code of conduct says what is right and wrong and breaking it is not always punished; cyber law says what is legal and illegal, and breaking it is punished with prison or fines.
- b. MARKING SCHEME K · 2
✓ Using remote servers in data centers, reached over the internet, to store, manage and process data and programs, so they can be used from anywhere.
✓ Any one service, e.g. storage of files and photos (Google Drive, iCloud); software over the internet (Gmail, Google Docs).
- c. MARKING SCHEME U · 2
✓ Screens give out a lot of blue light.
✓ Blue light holds back the making of melatonin, the hormone that makes us feel sleepy at night.
- d. MARKING SCHEME A · 2
✓ A radio signal takes about 3 to 22 minutes to travel between Earth and Mars.
✓ By the time the driver saw a rock, the rover would have hit it; so it is sent a program and finds its own path.



6 Long answers

a. ANSWER

K · 4

Cybercrime is any crime committed through computers, phones, networks or the internet that harms a person, group or government, for example their money, reputation or mental health. It is also called computer crime.

Its forms:

- **Identity theft:** using someone's personal information to pretend to be them and steal from them.
- **Cyber terrorism:** attacks through computers to cause serious harm or fear, or to extort money.
- **Cyberbullying:** threatening, harassing or humiliating someone through electronic means.
- **Hacking:** getting into or shutting down a computer, website or network without permission.
- **Defamation:** posting false statements that harm someone's reputation.
- **Others:** spreading obscene content, online harassment, spreading hatred, encouraging terrorism, and crimes against children.

MARKING SCHEME

- ✓ A crime done through computers, phones, networks or the internet that harms a person, group or government.
- ✓ Any one form, explained, e.g. identity theft: using someone's personal information to pretend to be them.
- ✓ Any second form, e.g. cyberbullying: threatening, harassing or humiliating someone by electronic means.
- ✓ Any third form, e.g. hacking: getting into a computer or network without permission; or cyber terrorism; or defamation.

b. ANSWER

U · 4

Dangers:

- **Malware** (viruses, worms, Trojan horses, spyware) that steals information, damages files or takes control of a computer.
- **Phishing:** fake messages that trick people into giving away passwords, PINs or card numbers.
- **Identity theft:** stealing personal information to cheat in someone's name.
- **Hacking:** getting into a computer or network without permission.
- **Botnets:** networks of hijacked computers used for large attacks.

Ways to avoid them:

- Use strong, different passwords, and turn on two-factor authentication.
- Keep the operating system and apps up to date.
- Use trusted antivirus software and a firewall.
- Back up important data regularly.
- Don't open suspicious emails, links or attachments, and never share a PIN or OTP.

MARKING SCHEME

- ✓ Any one danger, e.g. malware (viruses, worms, Trojan horses, spyware) that steals information or damages files.
- ✓ Any second danger, e.g. phishing; identity theft; hacking; botnets.
- ✓ Any one way to avoid them, e.g. strong, different passwords with two-factor authentication.
- ✓ Any second way, e.g. keeping software up to date; antivirus and a firewall; backups; not opening strange links or attachments.



7 Numerical problems

a. ANSWER

A - 2

$10 \times 10 \times 10 \times 10 = 10,000$ PINs. A thief could try 3 out of 10,000, that is $3/10,000$ (0.03%).

MARKING SCHEME

✓ $10 \times 10 \times 10 \times 10 = 10,000$ possible PINs.

✓ 3 out of 10,000 ($3/10,000$, or 0.03%).

b. ANSWER

A - 2

Time = $54,000,000 \div 300,000 = 180$ s = 3 minutes.

MARKING SCHEME

✓ Time = distance $\div$ speed = $54,000,000$ km $\div$ $300,000$ km/s.

✓ 180 s, which is 3 minutes.

8 Think

ANSWER

HA - 2

No. A chatbot puts together answers that **sound** right from patterns in what it has read, and it sometimes states things that are false, even inventing facts and sources. Check important facts in a trusted source (a textbook, a teacher, an official website). And using AI to write your homework for you means you don't learn; use it, if at all, to explain something you are stuck on, then do the work yourself.

MARKING SCHEME

✓ No: a chatbot builds answers that sound right from patterns, and sometimes states false facts or invents sources.

✓ Important facts should be checked in a trusted source (a textbook, a teacher, an official website).

9 Activity: Dos and don'ts (Activity 2.10)

(not marked)

WHAT STUDENTS SHOULD FIND

For example: use a strong password and keep it secret / don't use someone else's account or read their messages; name the source of pictures and text you use / don't spread rumors or post anything hurtful; log out on a shared computer / don't open attachments or links from strangers; keep the antivirus on and software updated / don't make, spread or install viruses or pirated software.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	17	10	8	2	37

