5.1 – 5.3 The Internet and its uses
QUESTIONS

5 – The internet and its uses

5.1 The internet and the world wide web				
1	Understand the difference between the internet and the world wide web			
2	Understand what is meant by a uniform resource locator (URL)			
3	Describe the purpose and operation of hypertext transfer protocol (HTTP) and hypertext transfer protocol secure (HTTPS)			
4	Explain the purpose and functions of a web browser			
5	Describe how web pages are located, retrieved and displayed on a device when a user enters a URL			
6	Explain what is meant by cookies and how they are used, including session cookies and persistent cookies			

More Guidance:

5.1 The internet and the world wide web	
Candidates should be able to:	Notes and guidance
1 Understand the difference between the internet and the world wide web	• The internet is the infrastructure • The world wide web is the collection of websites and web pages accessed using the internet
2 Understand what is meant by a uniform resource locator (URL)	• A URL is a text-based address for a web page; it can contain the protocol, the domain name and the web page/file name
3 Describe the purpose and operation of hypertext transfer protocol (HTTP) and hypertext transfer protocol secure (HTTPS)	
4 Explain the purpose and functions of a web browser	• The main purpose of a web browser is to render hypertext markup language (HTML) and display web pages • Functions include: – storing bookmarks and favourites – recording user history – allowing use of multiple tabs – storing cookies – providing navigation tools – providing an address bar
5 Describe how web pages are located, retrieved and displayed on a device when a user enters a URL	• Including the role of: – the web browser – IP addresses – domain name server (DNS) – web server – HTML
6 Explain what is meant by cookies and how they are used, including session cookies and persistent cookies	• Cookies are used for functions, including: – saving personal details – tracking user preferences – holding items in an online shopping cart – storing login details

5.1 – 5.3 The Internet and its uses
QUESTIONS

5.2 Digital Currencies				
1	Understand the concept of a digital currency and how digital currencies are used			
2	Understand the process of blockchain and how it is used to track digital currency transactions			

More Guidance:

5.2 Digital currency

Candidates should be able to:	Notes and guidance
1 Understand the concept of a digital currency and how digital currencies are used	• A digital currency is one that only exists electronically
2 Understand the process of blockchain and how it is used to track digital currency transactions	• Blockchain, in its basic form, is a digital ledger, that is a time-stamped series of records that cannot be altered

5.3 Cyber security				
1	Describe the processes involved in, and the aim of carrying out, a range of cyber security threats			
2	Explain how a range of solutions are used to help keep data safe from security threats			

More Guidance:

5.3 Cyber security

Candidates should be able to:	Notes and guidance
1 Describe the processes involved in, and the aim of carrying out, a range of cyber security threats	• Including: – brute-force attack – data interception – distributed denial of service (DDoS) attack – hacking – malware (virus, worm, Trojan horse, spyware, adware, ransomware) – pharming – phishing – social engineering
2 Explain how a range of solutions are used to help keep data safe from security threats	• Including: – access levels – anti-malware including anti-virus and anti-spyware – authentication (username and password, biometrics, two-step verification) – automating software updates – checking the spelling and tone of communications – checking the URL attached to a link – firewalls – privacy settings – proxy-servers – secure socket layer (SSL) security protocol

5.1 – 5.3 The Internet and its uses
QUESTIONS

6 Draw and annotate a diagram to demonstrate how a firewall works.

[4]

1 Malware can be used to corrupt data stored on a computer.

(a) Tick (✓) **one** box to show which cyber security threat is **not** a type of malware.

A Phishing ☐

B Ransomware ☐

C Virus ☐

D Worm ☐

[1]

(b) Identify **one** other example of malware than those given in **part 1(a)**.

..... [1]

(c) Identify the type of software that is used to find and remove malware from a computer.

..... [1]

8 **(a)** Draw and annotate a diagram that demonstrates the cyber security threat of data interception.

[4]

(b) Identify **one** security solution that will help keep data safe from data interception and state why it will help keep the data safe.

.....

.....

.....

..... [2]

5.1 – 5.3 The Internet and its uses
QUESTIONS

9 The table contains terms and descriptions about the internet.

Complete the table with the missing terms and descriptions.

Term	Description
.....	the collective name for all the web pages available
.....	a small text file, stored by the web browser, that can store a user's personal data
uniform resource locator (URL)	....
web server	....
.....	the language used to create a website. Example tags are <head> and <body>
.....	a protocol that is used to request and send web pages

[6]

12 Digital currency can be used to pay for products and services.

Digital currencies are often tracked using digital ledgers.

(a) Give **two** other features of digital currency.

1 .....

.....

2 .....

.....
[2]

(b) Identify the process that uses a digital ledger to track the use of digital currency.

..... [1]

4 An employee uses a web browser on their computer.

(a) Describe the main purpose of a web browser.

.....

.....

.....

..... [2]

(b) The employee wants his payment details to be automatically filled in when he buys products using the internet.

Identify the function of a web browser that could be used for this purpose.

..... [1]

(c) The employee wants to be able to quickly access websites that he regularly uses.

Identify the function of a web browser that could be used for this purpose.

..... [1]

(d) The web browser uses the secure socket layer (SSL) protocol to transmit personal data securely over the internet.

State how the SSL protocol secures the data for transmission.

.....

..... [1]

8 A manager at a company is concerned about a brute-force attack on its employee user accounts.

(a) Describe how a brute-force attack can be used to gain access to the employee user accounts.

.....

.....

.....

.....

.....

..... [3]

(b) One possible aim for carrying out a brute-force attack is to install malware onto the company network.

(i) State **two** other aims for carrying out a brute-force attack to gain access to the employee user accounts.

1 .....

.....

2 .....

.....

[2]

(ii) Identify **three** types of malware that could be installed.

1 .....

2 .....

3 .....

[3]

(c) Give **two** security solutions that could be used to help prevent a brute-force attack being successful.

1 .....

.....

2 .....

.....

[2]

10 A student uses the internet for their schoolwork to research what is meant by pharming.

(a) State the aim of pharming.

.....

..... [1]

(b) Draw and annotate a diagram to represent the process of pharming.

[4]

(c) The student uses a web browser to access data on the internet.

Explain the purpose of the web browser.

.....

.....

.....

..... [2]

(d) Storing cookies is one function of the web browser.

Give **three** other functions of the web browser.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(e) A student visits a website that uses session cookies, instead of persistent cookies.

Explain the difference between session cookies and persistent cookies.

.....

.....

.....

.....

.....

.....

.....

..... [4]

5.1 – 5.3 The Internet and its uses
QUESTIONS

6 **(a)** Complete the statements about cookies.

Use the terms from the list.

Some of the terms in the list will **not** be used. Some terms may be used more than once.

compression	executable	hypertext markup language (HTML)
hypertext transfer protocol (HTTP)	image	internet protocol (IP) address
persistent	session	sound	text
uniform resource locater (URL)	web browser	web server

Cookies are small ..... files that are sent between a ..... and a ..... .

..... cookies are stored in memory and **not** in the user's secondary storage.

When the web browser is closed a ..... cookie is lost, whereas a ..... cookie is **not** lost.

[6]

(b) Give **three** functions of a cookie.

1 .....

2 .....

3 .....

[3]

5.1 – 5.3 The Internet and its uses
QUESTIONS

7 A distributed denial of service attack (DDoS) is a cyber security threat.

(a) Draw and annotate a diagram to represent the process of a DDoS.

[6]

(b) State **two** aims of carrying out a DDoS attack.

1 .....

.....

2 .....

.....

[2]

(c) Give **two** security solutions that can be used to help prevent a DDoS attack being successful.

1 .....

.....

2 .....

.....

[2]

6 A student is writing a help guide about how to recognise and avoid the cyber-security threat of pharming.

(a) Give **three** appropriate solutions he could include.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(b) The student also wants to include information in the help guide about the use of social engineering as a cyber-security threat.

Describe what is meant by social engineering.

Include **one** example of social engineering in your answer.

.....

.....

.....

.....

.....

..... [3]

(c) The student includes information about the security solution of access levels.

Describe what is meant by access levels.

.....

.....

.....

.....

.....

..... [3]

5.1 – 5.3 The Internet and its uses
QUESTIONS

8 Complete the statements about a distributed denial of service (DDoS) attack.

Use the terms from the list.

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

anti-virus	bot	botnet	hacker
internet	malware	secondary storage	
spyware	web browser	web server	website

The attacker encourages people to download ..... onto their computer. This will turn each computer into a ..... , creating a network called a ..... .

When the attacker wants the DDoS to take place, repeated requests are simultaneously sent from the computers to a ..... . This causes it to crash, meaning that users can no longer access the ..... that is stored on this hardware.

[5]

1 Computers can be infected with malware. Spyware is one example of malware.

(a) Tick (✓) **one** box to show a correct definition of spyware.

A Software that activates a webcam and transmits the video to a third party that outputs it live on a website. ☐

B Software that detects when a password is being entered and then emails the password to a third party. ☐

C Software that records all data entered into a computer, analyses this data to find email addresses and passwords, then posts these to a website. ☐

D Software that records all key presses and transmits these to a third party. ☐

[1]

(b) Complete the table by identifying and describing **two** other examples of malware.

	Malware	Description
1	....	....
2	....	....

[6]

(c) Proxy-servers and firewalls have some similar functions.

Identify **two** similarities and **one** difference between proxy-servers and firewalls.

Similarity 1 .....

.....

.....

Similarity 2 .....

.....

.....

Difference .....

.....

.....

[3]

(d) The website allows the user to set up an account to log on and purchase items. The website is accessed and displayed using a web browser.

(i) Two functions of the web browser are to render hypertext markup language (HTML) to display web pages and to store cookies.

Identify **two** other functions of a web browser.

1 .....

2 .....

[2]

(ii) Identify **two** ways that cookies can be used to enhance the user's experience of this website.

1 .....

.....

2 .....

.....

[2]

4 Rebekah discovers that her bank details have been used fraudulently.

She thinks her bank details were stolen electronically, whilst she was using the Internet.

(a) Identify and describe **two** methods that could have been used to steal Rebekah's bank details electronically.

Method 1 .....

.....

.....

.....

.....

.....

Method 2 .....

.....

.....

.....

.....

.....

[6]

(b) Rebekah decides to encrypt the data that she transmits whilst using the Internet. She does this to keep the data safe.

(i) State why encryption helps keep the data safe.

.....

..... [1]

(ii) The data is encrypted using symmetric encryption.

Describe how the data is encrypted using symmetric encryption.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(iii) Identify **three** other methods Rebekah could use to help keep her data safe.

Method 1 .....

Method 2 .....

Method 3 .....

[3]

8 Eleanor has a website that she uses to advertise the cakes that she bakes.

Question 8(a) removed.

(b) Eleanor uses a secure connection to allow customers to buy the cakes from her website.

Describe how the secure connection is created.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

(c) Eleanor's website uses cookies.

Explain what is meant by the term cookies and give **two** examples of how cookies can be used.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(d) Eleanor is worried about a denial of service (DoS) attack on her web server.

She wants to help prevent a DoS attack reaching the web server.

Identify a security method that she could use to help prevent a DoS attack.

Explain how the method you identify helps to prevent the attack.

Security method .....

Explanation .....

.....

.....

.....

.....

.....

.....

[4]

6 Jian has a website that uses the Secure Socket Layer (SSL) protocol to make sure that data is kept secure during transmission.

(a) Give **two** ways that a user could check that a website uses the SSL protocol.

1 .....

.....

2 .....

.....

[2]

(b) State the name of the updated version of the SSL protocol.

..... [1]

(c) Jian's system for his website has a proxy server.

Explain why Jian uses a proxy server as part of the system for his website.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(d) Jian sells products using his website. He wants to create a secure login system for user accounts.

He is worried that a user's login details may be gathered by malware when they are logging into their account.

(i) State the type of malware that could be used to gather a user's login details.

..... [1]

(ii) Give **three** methods that could be used to help prevent a user's login details being gathered by malware, when they are logging into their account.

Describe how each method can help prevent this happening.

Method 1 .....

.....

.....

.....

Method 2 .....

.....

.....

.....

Method 3 .....

.....

.....

.....

[6]

(e) The paragraph describes how the web pages are obtained and displayed for the user.

Complete the paragraph using the list of terms. **Not** all terms in the list need to be used.

- browser
- Hypertext Markup Language (HTML)
- Internet Protocol (IP) address
- Internet Service Provider (ISP)
- Media Access Control (MAC) address
- presentation
- protocols
- structure
- Uniform Resource Locator (URL)
- web pages
- web server

The browser sends the ..... to the

Domain Name Server (DNS) that looks up the corresponding

..... . This is returned to the browser, which

then sends a request to the ..... where the

..... are stored. The website is written in

..... that is rendered by the

..... .

[6]

10 Mario has a website that he uses to sell his artwork.

(a) The website uses HTTPS to transmit data.

(i) Describe what is meant by HTTPS.

.....

.....

.....

.....

.....

..... [3]

(ii) One way a user can check a website uses HTTPS is to check whether the Uniform Resource Locator (URL) begins with HTTPS.

Give **one** other way a user can check if a website uses HTTPS.

.....

..... [1]

(b) There is a risk that people that use the Internet to access websites can have their stored data maliciously damaged.

State **three** ways that stored data can be maliciously damaged.

1 .....

2 .....

3 .....

[3]

9 Three Internet terms are browser, Internet Protocol (IP) address and Uniform Resource Locator (URL).

Five statements are given about the Internet terms.

Tick (✓) to show which statements apply to each Internet term. Some statements may apply to more than **one** Internet term.

Statement	Browser (✓)	IP address (✓)	URL (✓)
it contains the domain name			
it is a type of software			
it converts Hypertext Markup Language (HTML) to display web pages			
it is a type of address			
it stores cookies			

[5]

3 Joelle is a student who uses the Internet.

(a) The table contains **five** terms or definitions that relate to the Internet.

Complete the table by writing each missing term or definition.

Term	Definition
browser	....
.....	this is the company that provides a user with a connection to the Internet
.....	this is a protocol that is used to send data for web pages across the Internet
Uniform Resource Locator (URL)	....
cookie	....

[5]

(b) Joelle uses a firewall to keep her data safe when she uses the Internet.

Tick (✓) to show which statement about firewalls is true.

	Tick (✓)
Firewalls can only be hardware-based	☐
Firewalls can only be software-based	☐
Firewalls can be hardware-based or software-based	☐

[1]

(c) Joelle's parent also uses the firewall to limit the websites that Joelle can access.

Explain how the firewall is used to limit the websites that Joelle can access.

.....

.....

.....

.....

.....

.....

.....

..... [4]

6 Millions of emails are sent between users on a daily basis.

(a) Identify **two** online security attacks that can be carried out using email.

Describe how email is used to enable the attack.

Online security attack 1 .....

Description .....

.....

.....

.....

.....

Online security attack 2 .....

Description .....

.....

.....

.....

.....

[6]

11 The table contains descriptions relating to web pages and the Internet.

Complete the table with the correct terms for the given descriptions.

Term	Description
	the language used to create a web page
	the type of software application used to display a web page
	an address given to a computer, by a network, to allow the computer to be uniquely identified
	a text file sent by a web server to collect data about a user's browsing habits
	the company that provides a connection to the Internet

[5]

10 **(a)** A denial of service (DoS) attack is a type of Internet security risk.

State the purpose of a denial of service attack.

.....

..... [1]

(b) Phishing and pharming are also types of Internet security risk. They have the same purpose.

State the purpose of phishing and pharming.

.....

..... [1]

(c) Identify **three** other types of Internet security risk.

1 .....

2 .....

3 .....

[3]

3 A firewall can be used to help keep the data secure that is stored on a computer.

(a) The given paragraph describes how the firewall operates to help keep the data secure.

Complete the paragraph using the most appropriate terms from the given list. **Not** all of the terms on the list need to be used.

- Accept
- Criteria
- Hacking
- Input
- Network
- Outgoing
- Output
- Processor
- Reject
- Software
- Store
- Storage

A firewall can be ..... or hardware based. It monitors traffic between the computer and the ..... The user sets ..... for the traffic. The firewall will ..... or ..... the traffic based on this. It can help prevent ..... and malicious software that could be a threat to the security of the data.

[6]

4 Spencer finds out that his online music account has been accessed by an unauthorised person.

He believes his personal details for the account were obtained using phishing.

(a) Explain how the personal details could have been obtained using phishing.

.....

.....

.....

.....

.....

..... [3]

(b) Give **two** other Internet security risks that could have been used to obtain the personal details.

1 .....

2 .....

[2]