



Name:

Index:

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Class:

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5.1 The internet and the world wide web

Candidates should be able to:

- 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

Notes and guidance

- The internet is the infrastructure
- The world wide web is the collection of websites and web pages accessed using the internet
- 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
- 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
- Including the role of:
 - the web browser
 - IP addresses
 - the domain name server (DNS)
 - the web server
 - HTML
- Cookies are used for functions, including:
 - saving personal details
 - tracking user preferences
 - holding items in an online shopping cart
 - storing login details

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(d) Priya has a URL for her website.

State what is meant by a URL.

.....

..... [1]

- (d) Customers will use a web browser to access Victoria's website.

Victoria writes a paragraph of text to explain how the website will be displayed on a customer's computer.

Use the list given to complete Victoria's paragraph by inserting the correct **six** missing terms. Not all terms will be used.

- browser
- domain name
- firewall
- hexadecimal
- HTML
- https
- MAC address
- search engine
- Uniform Resource Locator (URL)
- web server

The user enters the website into the address bar.

The protocol that is used is The URL contains

the for the website. This is used to look up the

IP address of the company. A DNS server stores an index of IP addresses.

The browser sends a request to the as this is

where the files for the website are stored. The files are sent back to the

..... as files.

This is interpreted by the browser and the web page is displayed.

[6]

- (b) Priya uses cookies in her website.

Five statements are given about cookies.

Tick (✓) to show if the statement is **True** or **False**.

Statement	True (✓)	False (✓)
Cookies can be used to store a customer's credit card details		
Cookies can be used to track the items a customer has viewed on a website		
Cookies will corrupt the data on a customer's computer		
Cookies are downloaded onto a customer's computer		
Cookies can be deleted from a customer's computer		

[5]

- (e) When customers access Victoria's website they will be given the message:

This website uses cookies. An explanation of their purpose can be found in our cookies policy.

- (i) Explain what is meant by cookies.

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..... [2]

- (ii) Explain why Victoria would use cookies as part of her website.

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..... [4]

- (b) Ishan shares the program with community members over the Internet, using Secure Socket Layer (SSL).

- (i) Explain how Ishan will know he is on a secure website.

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..... [1]

(b) State **three** functions of a browser.

1

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2

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3

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[3]

(c) The website Gerald visits uses https.

Explain what is meant by https.

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[3]

(ii) Describe how a browser checks that a website is secure.

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[4]

6 Cookies can be used to store a user's personal data and online browsing habits.

- (a) A cookie could be used to automatically enter a user's payment details when the user makes a purchase online.

Describe how cookies can be used to store and automatically enter a user's payment details.

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..... [3]

- (b) Explain why a user may be concerned about their personal data and online browsing habits being stored in cookies.

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..... [4]

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]

4 Freddie types a Uniform Resource Locator (URL) into the address bar of his browser.

(a) A URL is a text-based version of a website address. It is made up of several different parts.

State the names of **three** different parts of a URL.

Part 1

Part 2

Part 3 [3]

(b) Explain how the URL is converted into an Internet Protocol (IP) address for the website.

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.....
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..... [2]

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

Explain the difference between session cookies and persistent cookies.

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..... [4]

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]

4 An employee uses a web browser on their computer.

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

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..... [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]

4 A student enters a uniform resource locator (URL) into their web browser.

Draw and annotate a diagram to show the process from the user entering the URL to the web browser displaying the web page.

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11 A company has a website. Users use the internet and the world wide web to access the website.

(a) Describe the difference between the internet and the world wide web.

[2]

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(e) Customers access the company's web pages that are stored on the web server.

Describe how the web pages are located, retrieved and displayed on a customer's computer.

ON2024/13

4 Complete the table to give the missing term or description for the internet terms.

Internet term	Description
.....	the collection of web pages accessed using the internet

.....	the address given to a device when it connects to the internet
.....	the hardware that stores a database of matching website and IP addresses

6 (a) Complete the statements about cookies.

Use only terms from the list.

Not all terms need to be used. Some terms may be used more than once.

binary close denary expire
 hexadecimal image malware operating system
 permanent persistent session sound
 temporary web browser

Cookies are small text files that are stored by a

..... cookies are text files
that are deleted when the is closed.

..... cookies are text files
that are stored on a user's secondary storage device until they are manually deleted or they
.....

[7]

(b) Give **three** examples of the use of cookies.

1

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2

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3

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[3]

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(c) A user accesses the world wide web using a web browser.

(i) Define the term world wide web.

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..... [1]

(ii) The uniform resource locator (URL) for a website includes the protocol hypertext transfer protocol secure (HTTPS).

Explain how HTTPS makes the transmission of data secure.

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..... [4]

5.2 Digital currency

Candidates should be able to:

- 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

Notes and guidance

- A digital currency is one that only exists electronically
- Blockchain, in its basic form, is a digital ledger, that is a time-stamped series of records that cannot be altered

ON2023/12

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]

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5 Complete the description of digital currencies using the terms provided.

blockchains changed datachains decentralised
deleted encryption passport physical address
physically records time-stamp traced
transaction-chains virtually

A digital currency does **not** exist, it can only be accessed electronically.

Some digital currencies have digital ledgers called

These are decentralised databases where each transaction is stored as a new set of data with a and is linked to the previous set of data. This means that transactions cannot be altered, only new transactions added, which allows the location of the data to be

[4]



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- 8 Draw and annotate a diagram to show how a payment transaction is made using digital currency and blockchain.

[4]

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- (c) The company uses a digital currency to purchase a new car.

- (i) State what is meant by a digital currency.

.....
..... [1]

- (ii) The digital currency uses a process that involves a digital ledger. The ledger has time stamped transactions that cannot be altered.

Give the name of this process.

..... [1]



5.3 Cyber security

Candidates should be able to:

- 1 Describe the processes involved in, and the aim of carrying out, a range of cyber security threats

Notes and guidance

- 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
- 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

- 2 Explain how a range of solutions are used to help keep data safe from security threats

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- 4 (a) Lola is concerned about the risks to her computer when using the Internet.

She wants to use some security methods to help protect her computer from the risks.

Identify a security method she could use for each of the following risks. Each security method must be different.

Describe how each security method will help protect Lola's computer.

- (i) Computer virus

Security method

Description

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.....

[3]



(ii) Hacking

Security method

Description

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[3]

(iii) Spyware

Security method

Description

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[3]

6 A law company holds a lot of sensitive data about its clients.

- (a) It currently requires employees to enter a username and a password to log-in to an account. Each password must be 8 letters.

The company wants to increase the security of the log-in system.
Identify **two** improvements the company could use to make the log-in system more secure.

Explain how each improvement increases security.

Improvement 1

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Explanation

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Improvement 2

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Explanation

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[4]

8 An art gallery has a website that is used to display and sell art.

(a) The gallery uses Secure Socket Layer (SSL) to provide a secure connection when selling art.

Describe the process of SSL and how it provides a secure connection.

[6]

(b) The art gallery also uses a firewall.

Six statements are given about firewalls.

Tick (✓) to show if the statement is True or False.

Statement	True (✓)	False (✓)
Firewalls are only available as hardware devices		
Firewalls allow a user to set rules for network traffic		
Firewalls will automatically stop all malicious traffic		
Firewalls only examine traffic entering a network		
Firewalls encrypt all data that is transmitted around a network		
Firewalls can be used to block access to certain websites		

[6]

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- 5 A music company wants to send a new music file to many radio stations. It will send the music file the day before the release date so that the radio stations can store the file ready for release.

The music company does not want the radio stations to be able to open the music file until 09:00 on the release date.

Identify **two** security measures **and** describe how each measure can be used to make sure the music file cannot be opened until the release date.

Security measure 1

Description

.....

.....

Security measure 2

Description

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[4]

MJ2019/13

- 3 A finance company is concerned that its employees are being distracted by using gaming websites at work.

(a) Explain how a firewall could help prevent this distraction.

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[4]



- 8 A company discovers malware on its network.

Explain **two** ways that the malware could have been introduced to the company's network.

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..... [4]

- 10 Uma is concerned about risks that she may encounter when using the Internet.

Two of the risks she is concerned about are phishing and pharming.

- (a) Give **one** similarity and **two** differences between phishing and pharming.

Similarity

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Difference 1

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Difference 2

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[3]

- (b) Identify **two** other risks that Uma could encounter when using the Internet.

Risk 1

Risk 2

[2]

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

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.....

Online security attack 2

Description

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[6]

(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

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Similarity 2

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Difference

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[3]

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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.

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[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

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2

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[2]

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

1

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2

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[2]

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

[4]

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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]

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(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.

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[3]



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

Describe what is meant by access levels.

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..... [3]

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

[4]



- 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.

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..... [2]

- (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.

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..... [1]

- (d) The company uses a proxy server to help protect the web server and the network from cyber security threats.

- (i) Give **three** cyber security threats that the proxy server can help protect against.

2

[3]

- (ii) Identify **two** functions of the proxy server that can be used to help protect the web server and the network.

[2]

- (ii) A patient is making a payment through a secure connection.

The secure connection is created using the secure socket layer (SSL) protocol.

Explain how a secure connection is created using the SSL protocol.

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.....[6]

[6]