5 The internet and cyber security

1 a Explain the fundamental differences between the internet and the world wide web (www).

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A user typed in: **https://www.hoddereducation.com/comp_science_sample**

Identify:

i the protocol being used: .....

ii the domain host: .....

iii the domain type: .....

iv the file name: .....

c Describe **three** of the features of web browsers.

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2 A user wishes to locate a website so they can download some documents. The following sequence shows six steps in the location of the website and the download of the required documents. However, the sequence of steps shown is not in the correct order.

By writing the numbers 1 to 6, put each step in its correct order.

Order	Description of step
	The DNS server 1 cannot find the required website in its database or cache and sends out a request to DNS server 2
	The IP address is then sent back to the user's computer
	The computer now sets up a communication with the website server and the required pages are downloaded
	User opens their web browser and types in the URL; the web browser asks DNS server 1 for the IP address
	User's browser interprets HTML and displays the web pages on the user's computer
	DNS server 2 finds the URL and sends the IP address back to DNS server 1 which puts the IP address and URL into its database and cache

3 **a** Explain what is meant by a session cookie.

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b Explain what is meant by a persistent cookie.

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c Give **three** uses of cookies.

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4 a Indicate whether the following six statements about blockchaining are true or false by placing a tick (✓) in the correct box.

Blockchaining statement	True (✓)	False (✓)
All digital currency systems use blockchaining		
Blockchaining uses a decentralised database		
The last block in a blockchain is known as the 'genesis block'		
New hash values are only generated when data in a block is altered		
Tampering of data in a block by a hacker would cause the hash value to change		
Blocks are 'policed' by network users called 'miners'		

b When a new transaction in cryptocurrency takes place, a new block is created.

Name **three** values that would be created for this new block.

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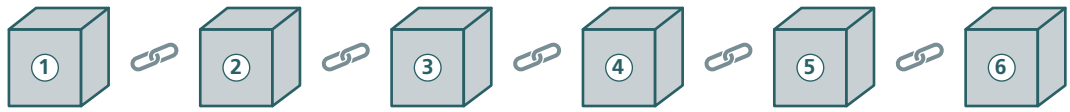
c A blockchain has six blocks.

i Complete the diagram below to show how the six blocks are connected to form a blockchain network. Use arrows to show any hash value links.



A4BF	6AB1	34EE	FF12	AA00	BBB1	**Hash value of block**
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ii Describe what happens if block '4' was hacked and the hash value was changed to DD22.

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d Explain the difference between digital currency and cryptocurrency.

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5 Eight security terms are shown on the left and eight descriptions are shown on the right in the following diagram.

Draw lines to connect each security term to its correct description.

Brute force attack	Legitimate-looking emails sent out to users; once a link is clicked on, the user's web browser is sent to a fake website
Virus	Attempt at preventing users from accessing a website by flooding it with useless spam traffic which causes the website to become overloaded
Denial of service attack	A process that attempts to crack a password by systematically trying out all combinations of letters, numbers and symbols to find the password
Hacking	When a cybercriminal creates a situation that can lead to a potential victim dropping their guard and getting them to break normal security procedures
Worm	Malicious code installed on a user's computer or on a website; code redirects user's browser to a fake website without user's knowledge
Phishing	Program code that replicates with the intention of deleting or corrupting files; they need an active host to initiate the attack
Pharming	Malware that self-replicates; they do not need to target an active host program to initiate an attack
Social engineering	Act of gaining illegal access to a computer system without the owner's permission or knowledge

6 **a** Explain what is meant by the following **three** types of malware.

i Trojan horse:

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ii Adware:

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iii Ransomware:

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b i Explain what is meant by social engineering.

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ii The following table contains four methods used by social engineering to target a victim. Complete the table by describing how each method is used. Include examples in your description.

Threat used by cybercriminals	**How the threat is used (include examples)**
Instant messaging	.....
Scareware	.....
Baiting	.....
Phone calls	.....

c Describe the steps taken by a cybercriminal when targeting their victim through social engineering.

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7 a i Explain what is meant by anti-spyware.

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ii Give **three** of the features of typical anti-spyware software.

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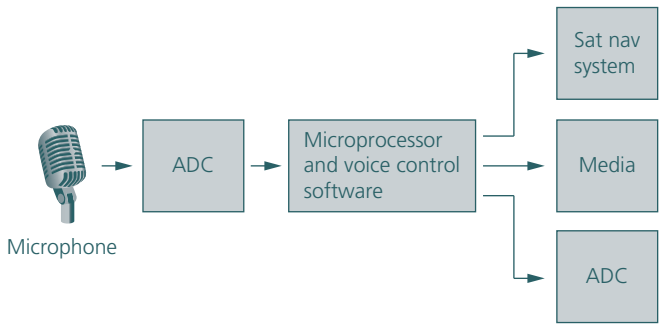
b Complete the table below to show the benefits and drawbacks of the **three** named biometric techniques.

Biometric technique	Benefits	Drawbacks
Fingerprint or thumbprint scans	.....	.....
Retina scans	.....	.....
Voice recognition	.....	.....

c The diagram shows the use of voice control in a car. A microphone picks up the voice of the driver and carries out their commands. For added security, the system only responds to people authorised to drive the car.

Explain how the microphone and microprocessor are used to control the following functions using verbal input from the driver:
- operation of the satellite navigation system
- media (radio, streaming and telephone)
- security (window and door control).



8 a Brayan uses two-step verification when buying items from a website using his tablet. There are six stages in the two-step verification process. The stages are listed in the table below, but they are not written in the correct order. By writing the numbers 1 to 6, put each of the stages in their correct order.

Order of stage	Description of stage
	User takes note of the one-time authentication code (OTP)
	User enters the one-time authentication code into the tablet logged on to website
	User enters their website username and password on the tablet
	User is authenticated and allowed access to the website to make a purchase
	One-time authentication code is sent to user's registered smartphone
	Brayan registers his smartphone number on the website before using it to purchase any goods

b Explain the benefits to a user of allowing automatic updates to software on, for example, a smartphone.

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9 One of the ways of checking the authenticity of emails and website links is to look out for spelling mistakes in the URL. Describe **four** other ways that can be used to identify potential fake emails and URL links. Include examples wherever possible in your answer.

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10 a Explain what is meant by SSL.

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b The table below shows what happens when a user wants to access a secure website and receive and send data.

The statements are not in the correct order. By writing the numbers 1 to 5, put each statement in its correct order.

Correct order	Statements
	The web browser then requests that the web server identifies itself
	If the web browser can authenticate the SSL certificate, it sends a message back to the web server to allow communication to begin
	The user's web browser sends a message requesting a connection with the required website which is secured by SSL encryption
	Once the message is received, the web server acknowledges the web browser, and the SSL-encrypted two-way data transfer can begin
	The web server responds by sending a copy of its SSL certificate to the users web browser

c Give **three** examples of where SSL would be used.

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11 a Explain why firewalls are used.

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b Give **four** of the tasks carried out by a firewall.

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