

2	One mark for each correct line <table border="1"> <thead> <tr> <th>Description</th><th>Programming Technique</th></tr> </thead> <tbody> <tr> <td>adding a set of numbers</td><td>output</td></tr> <tr> <td>displaying the result of a calculation</td><td>selection</td></tr> <tr> <td>executing a set of instructions based on a condition</td><td>totalling</td></tr> <tr> <td>executing the same set of instructions multiple times</td><td>iteration</td></tr> <tr> <td></td><td>counting</td></tr> </tbody> </table>	Description	Programming Technique	adding a set of numbers	output	displaying the result of a calculation	selection	executing a set of instructions based on a condition	totalling	executing the same set of instructions multiple times	iteration		counting
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1(a)	Any one from: - ROM - Cache
1(b)	Any one from: - It is volatile storage // Data is lost when the power is turned off. - It needs to be regularly replaced by other data // The data regularly changes // Data needs to be constantly updated
1(c)	10011 11100110
1(d)	0011 0101 1000 1010 1101
1(e)	One mark for each correct nibble (MAX 2) One mark for a correct method of working e.g. showing carries. <pre> 1 1 0 1 1 0 0 1 0 1 + 0 1 1 1 0 0 0 0 ----- 1 1 0 1 0 1 0 1 </pre>
1(f)	Any two from: - The result is greater than 255 // The result is too large. - Cannot be stored in 8 bits // Cannot be stored in the number of bits available for the register
1(g)	One mark for a correct working method e.g. flip and add One mark for correct answer 11101010

5(a)	Three from: - The inference engine is used to decide which questions to ask the user based on the previous data input. - Symptoms input are located in/compared to knowledge base. ... then applies the rule base to the knowledge base (to decide the diagnosis)
5(b)(i)	Any two from: Examples: - Sensors - Microprocessors - Actuators
5(b)(ii)	Any four from: Examples: - a doctor doesn't need to travel to the hospital to do the surgery. ... so it can be done by any specialist/doctor in the world. ... so it can be done immediately without needing to wait for travel time // reduces the waiting time for the patient. ... so the doctor may be better at the surgery as they won't be tired from travel. ... so travel costs are saved. - Surgery with robots enhances precision/accuracy. ... so a smaller incision can be made. ... so the recovery time may be shorter. ... as the components used to enter the body can be much smaller than a human hand. ... so the surgery is safer/ more hygienic // by example e.g. can stop the doctor needing to be near an infectious patient. - The surgery may have a higher rate of success
5(b)(iii)	Two from (one for a point and one for the matching expansion): Examples: - The internet connection could be lost/delayed so the surgery may not be able to continue. - The robot will be expensive to buy/maintain this money could have been spent on other causes. - The robot could be hacked and endanger the patient's life. - Data could be corrupted in transmission changing the nature of the instruction for the robot. - The robot's hardware could malfunction so the surgery cannot continue

5(c)(i)	One mark for each correct part of the diagram. The diagram: - Web browser identified as software used to send URL/requests or receives IP address/web page data - URL/domain sent to DNS - DNS searches for matching IP address - If not found sent to another DNS - IP address sent from DNS to patient's computer - Request sent from patient's computer to web server (for web page) - Web page/HTML data sent from web server to patient's computer <pre> graph LR PC[Patient's computer www.cihospital.com] -- URL --> DNS1[DNS 1] DNS1 -- "searches for matching IP" --> DNS2[DNS 2] DNS2 -- "If URL not found, sent to another DNS" --> DNS1 DNS1 -- IP address --> PC PC -- Request --> WS[Web server] WS -- "Web page data" --> PC </pre> URL input into patient's computer
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5(c)(ii)	Any six from: - Encrypted connection established using asymmetric encryption ... to make any data sent meaningless - The web browser asks the web server to identify itself. ... by sending its digital certificate. - The digital certificate is authenticated/validated by the web browser. - If the certificate is authenticated/valid, the connection is secure/the transaction can begin. - If the certificate is not authenticated/invalid, the connection is not secure/the transaction is cancelled/rejected/user is notified
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5(a)	Any two from: storing a database of URLs and matching IP addresses search its database for the matching IP address. - send the URL to another DNS if URL cannot be found. - return the IP address to the web browser
5(b)	D

5(c)(i)	One mark for each part of the diagram that shows: - A perpetrator/third party sending malware // user downloads/installs malware - Each computer is turned into a bot to create a botnet. - Third party initiates the attack. All the bots send a request at once to the web server. ... crashing the web server. Example: <pre> graph LR TP[third party Third party sends malware.] --> Botnet subgraph Botnet B1[Bot] B2[Bot] B3[Bot] B4[Bot] end Botnet -- "Requests" --> WS[web server] WS -- "Web server cannot handle all the requests and crashes." --> WS </pre> Malware turns computers into bots.
5(c)(ii)	- Hide a public IP address - Caching
5(d)(i)	B
5(d)(ii)	Any three from: Examples: - Store user's login details. - Store user's payment details. - Store user's preferences. - Use for targeted advertising.
5(d)(iii)	Any two from: Examples: - Storing bookmarks/favourites - Recording user history - Allowing use of multiple tabs - Providing navigation tools - Providing an address bar

1(a)	B
1(b)(i)	• Lossy • Lossless
1(b)(ii)	Any three from: • The file requires less storage space • Takes less time to transmit • A lower bandwidth can be used to transmit the file • Less data usage for data allowance • More likely to meet file size limits set by email clients/apps

2(a)	One mark for each correct part of the fee, in the correct order: – 17 – 70 (Correct fee \$17.70)
2(b)	One mark for each correct binary value: Register 1 – 00001110 Register 2 – 01100010
2(c)	One mark for each correct hexadecimal value, in the correct order. – A – 0 – 3 – D (Ticket number A03D)
2(d)	Two from: – It contains logic gates/switches ... – ... that process the values 1 and 0 // have two states
2(e)	Any four from: – Compares the ticket number received to stored data – ... that is a database/file of ticket numbers – ... checks the ticket number is listed as paid – If the data matches/cost is paid it sends a signal to raise the barrier – If the data does not match/cost is not paid, the barrier remains down