

7(a)	1 mark for a correct method: 1 mark each to max 2 for a corresponding description Method: Encryption Description: • Data is encoded/scrambled using a key to create cipher text • if intercepted it cannot be understood • without being decrypted using a key
7(b)	1 mark each to max 5 • The sender hashes the document / message • to produce a digest • The sender encrypts the digest to create the digital signature • The message and the signature are sent to the banker / receiver • The receiver decrypts the signature to reproduce the digest • The receiver uses the same hashing algorithm on the document received to produce a second digest • The receiver compares this digest with the one from the digital signature • If both of the receiver's digests are the same the document has not changed
7(c)	1 mark each to max 3 • The data is put through an algorithm to create a checksum value • The data and checksum are sent to the receiver • The receiver performs the same algorithm on the data • if both checksums match the data is verified

5(a)	1 mark each: • Identification of server in the bank scenario • Description e.g. Receives requests, processes the requests • Identification of client in bank scenario • Description e.g. Sends request to the server, waits and outputs the response
5(b)	1 mark for each correctly completed term: • odd or even • 7-bits • odd • block • byte Computer A and Computer B agree on whether to use odd or even parity. Computer A divides the data into groups of 7-bits. The number of 1s in each group is counted. If the agreed parity is odd and the group has an even number of 1s a parity bit of 1 is appended, otherwise a parity bit of 0 is appended. In a parity block check the bytes are grouped together, for example in a grid. The number of 1s in each column (bit position) is counted. A bit is assigned to each column to make the column match the parity. These parity bits are transmitted with the data as a parity byte.
5(c)(i)	1 mark each to max 3: • Compares all incoming and outgoing transmissions • ... against set criteria/whitelist/blacklist • Blocks all transmissions that do not meet rules • Blocks data entering from specific ports • Blocks unauthorised/unknown internal software transmitting data
5(c)(ii)	1 mark each to max 4: e.g. • Captures an image of the face • Uses image recognition • Trained to identify the features of a face in an image • ... using a large number of images • Analyse images for facial features • Uses the probability of a match

3(a)(i)	1 mark for security measure 1 mark each to max 2 for how the chosen measure works: • Firewall • Checks incoming connections • ... against criteria • Blocks data from entering specific ports • Blocks data that does not meet whitelist that meets blacklist • Proxy server • Prevents devices accessing the web server directly • Intercepts any requests • Forwards the request using its own IP address • Screens returning data before sending it to the user
3(a)(ii)	1 mark for security measure 1 mark each to max 2 for description of the chosen measure: • Encryption • Encodes/scrambles data • ... so if it is intercepted it cannot be understood • Algorithm/key is required to decode the data

3(b)	1 mark for characteristic 1 mark for description of application to examination software: <table border="1"> <thead> <tr> <th>Thin-client characteristic</th><th>Description of use in this software</th></tr> </thead> <tbody> <tr> <td>Data is not stored on the client computer</td><td>Exam papers are stored on the server and not on the examiner's computer // exam papers are not permanently stored on the examiners' computers</td></tr> <tr> <td>Client computer is reliant on access to server</td><td>Examiners cannot mark if their device cannot access the server / the server 'goes down'</td></tr> <tr> <td>Client computer heavily reliant on network/internet connection</td><td>The marking software will not operate without network/internet access</td></tr> <tr> <td>Client computer requires few local resources/memory</td><td>Examiners can use devices with low resources and the marking software will still function</td></tr> <tr> <td>Client computer performs minimal functions/processes</td><td>The marking software transmits requests, the server responds and sends the response to the user</td></tr> </tbody> </table>	Thin-client characteristic	Description of use in this software	Data is not stored on the client computer	Exam papers are stored on the server and not on the examiner's computer // exam papers are not permanently stored on the examiners' computers	Client computer is reliant on access to server	Examiners cannot mark if their device cannot access the server / the server 'goes down'	Client computer heavily reliant on network/internet connection	The marking software will not operate without network/internet access	Client computer requires few local resources/memory	Examiners can use devices with low resources and the marking software will still function	Client computer performs minimal functions/processes	The marking software transmits requests, the server responds and sends the response to the user
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3(c)(i)	1 mark each to max 2: • Receives packets from internet • Analyses the destination IP address of each packet • Forwards the packet towards its destination • ... using the routing table • Maintains/updates the routing table • Finds the most efficient route to the destination												
3(c)(ii)	1 mark each to max 2: • The PSTN consists of many different types of communication lines • ... therefore the digital data may need to be converted into a different form/analogue signal • Data is transmitted in both directions at the same time // duplex data transmission • Using a PSTN the communication passes through different switching centres/ISPs												