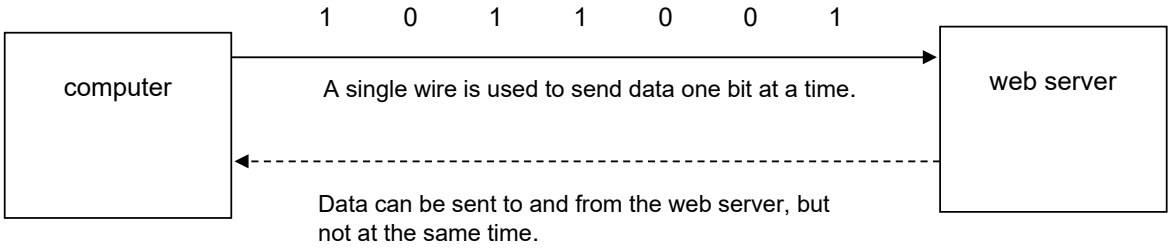


3(a)	One mark for each correct section One mark for each correct example of what it stores First section - Header - Originators/senders (IP) address - Destination/receivers (IP) address - Packet number Second section - Payload - The data itself Third section - Trailer - End of packet notification - Error checking data
3(b)(i)	Four from: - Data is sent one <u>bit</u> at a time ... down a single wire - Data can be sent in both directions at the same time
3(b)(ii)	Any Four from: - Data is sent multiple <u>bits</u> at the same time ... down multiple wires - Data can be sent in both directions not at the same time

4(a)	Any three from: - A packet is split into three different sections ... the header ... the payload ... the trailer
4(b)	Router
4(c)	Any three from: - The network may be spread over a long distance so it is more reliable <u>Bits</u> will be sent/arrive in sequence ...so <u>bits</u> less likely to be skewed - Less crosstalk/interference ... so less likely to have errors - The data may not need to be transmitted at a fast speed // data transmission speed of serial is adequate - The cables in the network only use serial transmission

2(a)	D
2(b)	Packet
2(c)(i)	Data is encrypted and decrypted using the same key (1 mark) Any three from: • Plain text is encrypted into cipher text // cipher text is decrypted into plain text • Data is encrypted using an algorithm ... • ... that uses a key • The key can be generated using an algorithm • The key is transmitted to the receiver
2(c)(ii)	Any one from: • To help keep the data secure • To make the data meaningless

7(a)	One mark for each correct part of the diagram. The diagram shows: • Bits being sent one at a time • Bits being sent over a single wire • Data can be sent to and from the web server/network component/computers ... • ... not at the same time For example: 
7(b)	Any two from: • <u>Bits</u> will not be skewed // <u>Bits</u> are sent in order • Less chance of error • Less crosstalk/interference • Data can be sent over a long distance (if needed) • It is possible to download and upload data to the web server • Higher bandwidth than full duplex
7(c)	Any one from: • The transmission of data may be relatively slow • Data cannot be sent and received at the same time • May be more data collisions

7(d)(i)	Any three from: • DDoS // DoS • Hacking • Malware // by example • Brute-force attack NOTE: three different examples of malware can be awarded.
7(d)(ii)	Any two from: • Can limit the number of requests sent to the web server at a time • Can process common requests that will not need to enter the network • Act as a firewall • Examine incoming data to the webserver/network • Can have set rules/criteria for data to meet • Can have a blacklist/whitelist/list of IP addresses to block • Blocks traffic that doesn't meet criteria • Closing certain ports
7(e)	Any six from: • The users type the URL into the address bar/web browser • The web browser sends the URL to the DNS • The DNS searches for the matching IP address • The DNS returns the IP address to the web browser • If the DNS cannot find the IP address it sends the URL to the next DNS • The web browser sends a request to the IP address/web server • The web server sends the data for the web page to the web browser • The web browser renders the HTML data to display the web page

4(a)	One mark for each correct transmission method: – Serial half-duplex – Serial full-duplex
4(b)	Any four from: – The number of 1 s/0 s are counted – A parity bit is added to each byte/7 bits before transmission – ... to make the sum of the bits/1 or 0 s in each byte odd – After transmission, if the number is odd no error is detected – After transmission, if the number is even an error is detected
4(c)	– Echo (check)
7	One mark for each correct term, in the correct order: – header – destination address – routers – last

6	One mark for each correct data transmission method: <table border="1"> <thead> <tr> <th>Data transmission method</th><th>Description</th></tr> </thead> <tbody> <tr> <td>serial simplex</td><td>Data is transmitted down a single wire, one bit at a time, in one direction only.</td></tr> <tr> <td>parallel half-duplex</td><td>Data is transmitted down multiple wires, multiple bits at a time, in both directions, but only one direction at a time.</td></tr> <tr> <td>serial full-duplex</td><td>Data is transmitted down a single wire, one bit at a time, in both directions at the same time.</td></tr> <tr> <td>parallel simplex</td><td>Data is transmitted down multiple wires, multiple bits at a time, in one direction only.</td></tr> </tbody> </table>	Data transmission method	Description	serial simplex	Data is transmitted down a single wire, one bit at a time, in one direction only.	parallel half-duplex	Data is transmitted down multiple wires, multiple bits at a time, in both directions, but only one direction at a time.	serial full-duplex	Data is transmitted down a single wire, one bit at a time, in both directions at the same time.	parallel simplex	Data is transmitted down multiple wires, multiple bits at a time, in one direction only.
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4(a)(i)	Two from: - Data is sent one bit at a time - A single wire is used
4(a)(ii)	Any two from: - Data won't be skewed - Less chance of interference/crosstalk/corruption/error - Transmission speed is adequate
4(a)(iii)	The data may be transmitted quicker
4(b)(i)	Router
4(b)(ii)	Any two from: - A collection of servers ... that store data in a remote location // that allows data to be accessed remotely ... that are (normally) accessed using an internet connection
4(b)(iii)	Any one from: e.g. - May be less secure // by example - May lose access to them if internet connection lost/not available - Reliant on a third party maintaining the hardware // by example - Could incur an extra/ongoing fee/cost