Question	Answer	Marks
4(a)	**1 mark** per bullet point to **max 2** • All computers are of equal status • Each computer provides access to resources and data // data is distributed • Computers can communicate and share resources • Each computer is responsible for its own security	**2**
4(b)	**1 mark** per bullet point to **max 2** per drawback • Reduced security // no central management of security • … only as secure as the weakest computer on the network • … each computer is at risk from viruses from other computers • No central management of backup • ... if the data from one computer is not backed up it is lost to all of them • No central management of files/software • … consistency may be difficult to maintain • … each computer may have different software from the others • Individual computers may respond slower • … because they are being accessed by other computers • In order to share files etc. all the computers involved need to be switched on • ... so the files etc. may not be always available	**4**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>4(c)(i)</td><td>1 mark for first 2 ticks, 1 mark for last 2 (shaded)

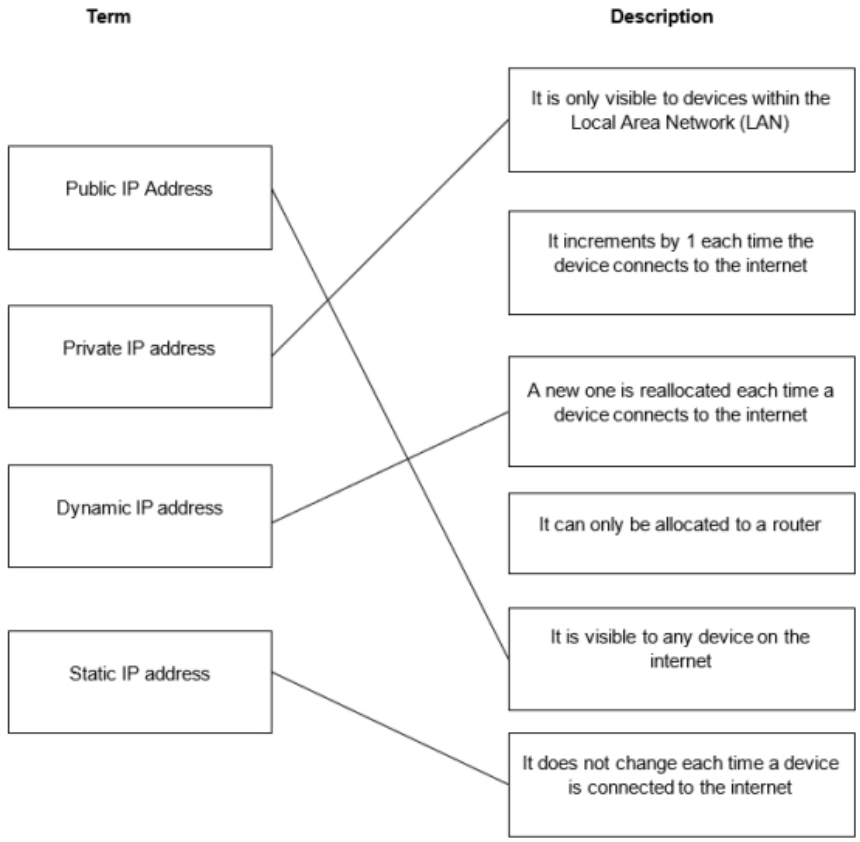
<table>
<tr><th>Task</th><th>Performed by router</th><th>Not performed by router</th></tr>
<tr><td>Receives packets from devices</td><td>✓</td><td></td></tr>
<tr><td>Finds the IP address of a Uniform Resource Locator (URL)</td><td></td><td>✓</td></tr>
<tr><td>Directs each packet to all devices attached to it</td><td></td><td>✓</td></tr>
<tr><td>Stores the IP and/or MAC address of all devices attached to it</td><td>✓</td><td></td></tr>
</table></td><td>2</td></tr>
<tr><td>4(c)(ii)</td><td>1 mark per bullet point for justification up to max 3

No mark for identification of wired/wireless

Wired
• Faster connection // higher bandwidth
• …. needed as she is downloading/streaming large files
• … less time waiting / less latency / fewer delays
• More reliable / stable connection
• … is less susceptible to issues with distance/walls/interference
• More secure

Wireless
• Freedom of movement
• … can move between different rooms with a mobile device and still receive/transmit data
• … no need of a physical connection
• Easily expanded if friends want to access the same network
• Less cabling / expertise is needed
• ... making the initial setup less expensive</td><td>3</td></tr>
<tr><td>4(d)</td><td>1 mark for identifying that she is using both.
1 mark per bullet point for justification

• using internet because sending data on the infrastructure
• using WWW because accessing a website (that is stored on a web server operated by the webmail) that is part of the WWW</td><td>3</td></tr>
</table>

5(d)	**1 mark** for each correct line  	**4**

Question	Answer	Marks
8(a)	**1 mark** per bullet point • LAN • Small geographical area • No leasing external infrastructure / transmission media // does not use internet to transmit within the building	**3**
8(b)	**1 mark** per item • router • switch • hub	**2**
8(c)	**1 mark** per bullet point to **max 4** • Provide interface to wireless network • … as an antenna • Receives analogue radio waves • … convert them to digital / binary • Checks incoming transmissions for correct MAC / IP address • … ignore transmissions not intended for it • Encrypts / encodes the data • Decrypts / decodes the data • Takes digital/binary input and converts to analogue waves • … sends the radio waves via the antenna	**4**

Question	Answer	Marks
9(a)	**1 mark** per difference • Private IP is only known within the LAN // Public IP is known outside of the LAN/ on Internet • Public is allocated by ISP // Private is allocated by the router • Public addresses are unique throughout the Internet, private addresses are unique only within the LAN • Private IP addresses are more secure than public IP addresses	**2**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>9(b)</td><td>1 mark for each correct term

<table>
<tr><th>Description</th><th>Term</th></tr>
<tr><td>Receives data packets from a network and forwards them onto a similar network</td><td>Router</td></tr>
<tr><td>Manages access to a centralised resource</td><td>Server</td></tr>
<tr><td>Joins networks that use different sets of rules to transmit data</td><td>Gateway</td></tr>
<tr><td>Monitors and controls incoming and outgoing network traffic based on set criteria</td><td>Firewall</td></tr>
</table>
</td><td>4</td></tr>
</table>

Question	Answer	Marks
11(a)	**One mark** per bullet point to **max 2** • Web pages/files are saved on servers • Clients send requests to the web servers • Web servers process the requests • …and return the results to the client • ... client displays the results to the user	**2**
11(b)	**One mark** per bullet point to **max 3** IPv4 • Four groups of (denary or Hexadecimal integers • Numbers between 0 and 255 / 0 and FF • Each stored in 1 byte / 8 bits // the whole is stored in 32 bits / 4 bytes • Separated by full stops • Correct example **OR** IPv6 • Eight groups of (Hexadecimal) digits • Numbers between 0 and FFFF • Each stored in 2 bytes/16 bits // the whole stored in 128 bits / 16bytes • Separated by colons • The first instance of multiple groups of zero can be replaced by a double colon • correct example	**3**

Question	Answer	Marks
5(a)(i)	1 mark for **real-time** **1 mark** per bullet point for justification to **max 2** • It is being watched **live** • It is not being downloaded to watch later // not already stored online	**3**
5(a)(ii)	**1 mark** per bullet point to **max 3** • Insufficient bandwidth // slow internet connection • … experiencing problems with buffering • Video is too high quality to stream in real-time • Congestion on the home network • Too much demand for the video from the supplier • Too many applications running on Oscar's computer • Oscar is trying to watch the video in High Definition, his friend is watching the video at a lower resolution	**3**

Question	Answer	Marks
8(a)	**1 mark** per bullet point to **max 4** • The router needs a public IP address so it can be identified on the Internet • The router needs a private IP address so it can be identified on the home network • The router has a public and a private IP address so that it can route data between the two networks (home and Internet) • The laptop needs a private IP address so it can be identified on the home network // so the router knows where to send data • The laptop does not have a public IP address because it does not connect directly to the Internet • ... this is more secure because it hides the laptop from the outside world • … all data from the Internet must be transmitted via the router	**4**
8(b)	**1 mark** per bullet point to **max 3** • The browser **parses** the Uniform Resource Locator (URL) to obtain the Domain Name • The domain name is looked-up in the locally cached list of corresponding IP addresses. If it is not found… • The domain name is sent to the closest Domain Name Server (DNS) • The DNS stores a table of Domain Names and corresponding IP addresses // searches its database of Domain Names and corresponding IP • If the DNS finds the Domain Name, it returns the IP address • If it cannot find the Domain Name, it sends the request to a higher DNS / upstream server • If the Domain Name is not found, an error is returned	**3**
8(c)	**1 mark** for any valid example e.g. 192.168.0.1	**1**