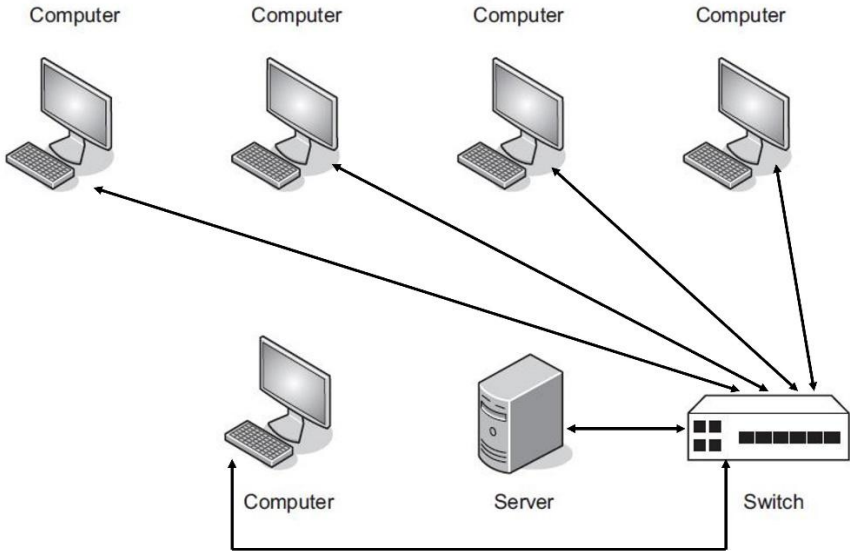


7(a)	1 mark for each correct description, max 2 marks <table border="1"> <thead> <tr> <th data-bbox="368 185 549 282">Type of IP address</th><th data-bbox="549 185 1390 282">Description</th></tr> </thead> <tbody> <tr> <td data-bbox="368 282 549 383">Static</td><td data-bbox="549 282 1390 383">IP address that does not change each time a device connects to the network</td></tr> <tr> <td data-bbox="368 383 549 483">Public</td><td data-bbox="549 383 1390 483">IP address assigned to a device on a network to allow the device to be visible on the internet</td></tr> </tbody> </table>	Type of IP address	Description	Static	IP address that does not change each time a device connects to the network	Public	IP address assigned to a device on a network to allow the device to be visible on the internet
Type of IP address	Description						
Static	IP address that does not change each time a device connects to the network						
Public	IP address assigned to a device on a network to allow the device to be visible on the internet						
7(b)	1 mark per bullet point for justification, max 2 marks Choice: Invalid (no mark for the choice) Justification: - It is not IPv4 because the maximum denary value should be 255, this uses 256 - It is not IPv6 because it uses a full stop to separate sections and not colon // It is not IPv6 because there are not enough groups						
7(c)	1 mark per bullet point, max 4 marks - The browser checks its cache for the URL - The browser parses the URL and splits it into its component parts - The browser finds the IP address for the domain name by querying a DNS server - The browser receives the matching IP address from the DNS server - The browser creates connection with the web server with the matching IP address - A request for the resource is sent to the web server with that IP address - The browser renders and displays the result - The IP address is stored in the browser cache for future use						
7(d)(i)	1 mark for the working 1 mark for the correct answer Working: $(512 * 2048 * 8) / (8 * 1024) // (512 * 2048) / 1024$ $// (2^9 * 2^{11} * 2^3) / (2^3 * 2^{10}) // (2^9 * 2^{11}) / 2^{10}$ Answer: 1024 kibibytes // 2^{10} kibibytes						
7(d)(ii)	1 mark per bullet point, max 2 marks - The file will contain metadata - The file will have a header						
7(d)(iii)	1 mark per bullet point, max 2 marks - Sequences of consecutive identical colours / pixels ... are stored as the colour value and the number of times it occurs consecutively						

5(a)	1 mark per bullet point, max 2 marks - Covers a small geographical area - Normally privately owned / dedicated infrastructure - Can use wired or wireless communication
5(b)	1 mark per bullet point, max 2 marks - All computers directly connected to switch and no other connections - Switch connected directly to server 
5(c)	1 mark per bullet point, max 3 marks - The sending device sends the packets to the switch - The switch checks the destination address on each packet ... and sends them only to the intended receiver
5(d)	1 mark per bullet point, max 3 marks - The use of <u>CSMA/CD</u> // Carrier Sense Multiple Access with Collision Detection - The workstations listen to the communication channel ... and send data only when there is no data being transmitted / the line is idle - If a collision is detected, transmission is aborted ...and a jamming signal is sent - The workstation calculates a random wait time before trying to re-transmit - The random time is increased if there are multiple collisions

5(e)

1 mark for correct threat
1 mark corresponding description
1 mark for correct method of prevention

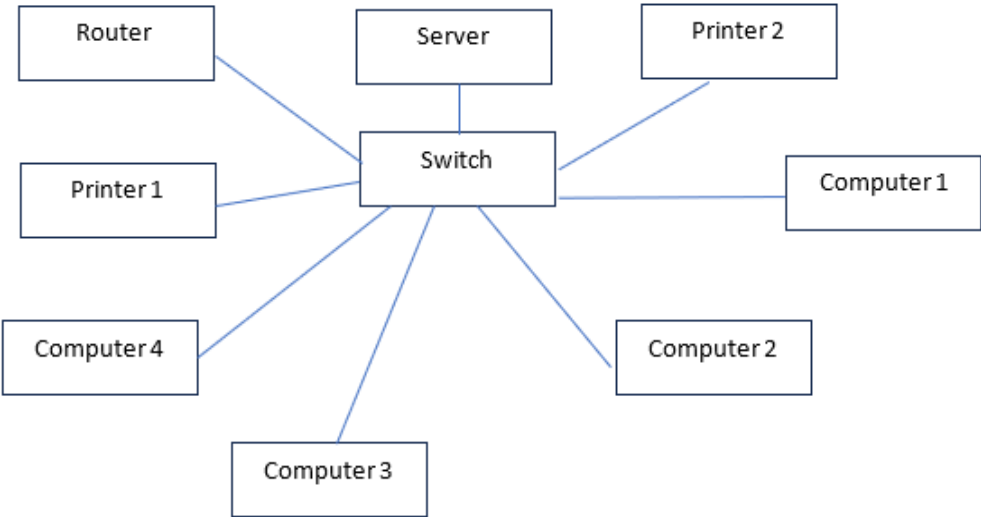
Threat	Description	Prevention
Malware / Virus	Malicious code that can alter/delete files	Anti-virus // Anti-malware // Firewall
Spyware	Records keystrokes which are sent to third party	Anti-spyware // Firewall // Anti-malware
Hacking	Gaining <u>unauthorised</u> access to a computer network / device	Authentication // Firewall
Phishing	<u>Emails</u> supposedly from reputable companies are sent to trick people into revealing personal information	Use a spam filter // Do not open emails from unknown sources
Pharming	Users are directed to a bogus <u>website</u> that looks legitimate to obtain personal information	Use a VPN // Anti-malware// Do not open links or download attachments

8(a)(i)	1 mark per bullet point, max 2 marks • Cloud storage can be free of charge for a limited amount • There is no need for personal storage devices • The data can be accessed from any computer with an internet connection • Cloud data services usually include data backup and recovery services • It is easier to share data / collaborate with colleagues • Cloud storage capacity can be quickly and easily increased if needed
8(a)(ii)	1 mark per bullet point, max 2 marks • The storage/cloud can only be accessed with an internet connection • There may be no backups // possibly no control over backups // reliance on third party for backups • Uploading / downloading data could take a long time • Potential issues with the cloud storage company impacting access e.g. downtime or technical problems • Potential compatibility issues if wanting to move the data • Limited storage availability without paying extra • ... meaning (possibly) more expensive in the long term • Possibly security issues
8(b)(i)	1 mark per bullet point, max 4 marks Methods to determine point of touch (Max 2) • Resistive // two layers of material make contact and complete a circuit • Capacitive // contact with the screen creates a change in charge • Infrared // the beams are broken by the pointing device • Optical imaging // a shadow is created when the surface is touched • Acoustic pulse // the acoustic wave is absorbed by the pointing device • Selection from the menu (Max 2) • The point of touch is used to determine the x and y coordinates • The menu item corresponding to the coordinate position is recognised and the menu item is added to the order
8(b)(ii)	1 mark per bullet point, max 2 marks • Disk repair / disk contents analysis • Back-up software

4(a)	1 mark for each benefit, max 3 • Devices can be more mobile as no physical connection is required • No cabling is needed so easier to set up • Easier to add additional devices • Multiple different device types can be connected
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4(b)	1 mark for a drawback • Can be less secure • Transmission speed can be slow • Interference is possible • The signal degrades quickly without repeaters/boosters								
4(c)	One mark for each correct row <table><tr><th>Description</th><th>Memory Technology</th></tr><tr><td>A read only memory where the contents can be erased using a voltage pulse. The contents can be changed multiple times without physically removing the memory.</td><td>EEPROM</td></tr><tr><td>A read only memory where the contents are erased using ultraviolet (UV) light. The memory must be physically removed to be reprogrammed.</td><td>EPROM</td></tr><tr><td>A read only memory where the contents can be written only once after manufacture.</td><td>PROM</td></tr></table>	Description	Memory Technology	A read only memory where the contents can be erased using a voltage pulse. The contents can be changed multiple times without physically removing the memory.	EEPROM	A read only memory where the contents are erased using ultraviolet (UV) light. The memory must be physically removed to be reprogrammed.	EPROM	A read only memory where the contents can be written only once after manufacture.	PROM
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6(a)	1 mark each to max 2 • In a WAN devices can connect over a larger geographical area in a LAN devices connect over a smaller geographical area • A WAN may use non-dedicated hardware the hardware in a LAN is usually dedicated • A WAN uses external / not company owned transmission media // the transmission media for a LAN is usually company owned
6(b)	1 mark each to max 4 e.g. • Land is split into cells designed for maximum line of sight • Each cell has a tower with an antenna which receives and transmits data • Data is transmitted between the tower and the phone • Data transmission is wireless using low power radio signals/frequencies • Multiple devices can communicate simultaneously with the same tower
6(c)	1 mark for each correct word • full stops • hexadecimal • zeros • 128 • dynamic • private IPv4 is made of four groups of 8-bit numbers separated by full stops. Each IPv4 address is 32 bits. IPv6 is made of eight groups of 4 hexadecimal numbers separated by colons. Multiple consecutive groups of zeros can be replaced with a double colon. Each IPv6 address is 128 bits. A dynamic IP address can change each time the computer connects to a network. A private IP address can only be accessed by other devices in the same LAN and is assigned by the router within the LAN.

6(d)	1 mark each • Server directly connected to the switch • Four labelled computers all connected directly to the switch • Two printers each directly connected to the switch / server / a computer • Router / modem directly connected to the switch / server for internet access e.g. Example only  <pre>graph TD; Router --- Switch; Server --- Switch; Printer1[Printer 1] --- Switch; Printer2[Printer 2] --- Switch; Computer1[Computer 1] --- Switch; Computer2[Computer 2] --- Switch; Computer3[Computer 3] --- Switch; Computer4[Computer 4] --- Switch;</pre>
6(e)	1 mark each to max 3 e.g. • To store the MAC addresses of devices connected to it • To receive packets from devices • To forward packets directly to the intended recipient • To provide a central point of connection for the network • to enable connected devices to communicate

9(a)	1 mark for each bullet point (max 2) • A WAN covers a large geographical area • External/public infrastructure is used • Non-dedicated hardware
9(b)	1 mark for correct media 1 mark for matching description e.g. • Fibre optic • Transmits data as pulses of light • Radio waves / microwaves • Transmits electromagnetic waves on different frequencies
9(c)	1 mark for each bullet point (max 4) • Data is compressed before transmitting • The video and audio are transmitted continuously as a series of bits • The video is uploaded to a media server • On download, the media server sends the data to a buffer • The buffer stores data from server until the receiving device can process it • The receiving device receives the bit stream from the buffer
9(d)(i)	1 mark for public IP address and 1 mark for private IP address: Public IP address: • So that the router is visible to the Internet/external network/WAN Private IP address: • So that the router is identified to computers within the LAN
9(d)(ii)	1 mark for each bullet point (max 2) • It allows the network to be divided into smaller networks • ... which reduces traffic in some parts of the network // reduces congestion • ... because traffic only travels through the parts necessary • ... which hides the complexity of network • ... and allows for easier maintenance of the network

8(a)	1 mark for each correct row: <table><tr><th>Statement</th><th>Bus</th><th>Star</th><th>Mesh</th></tr><tr><td>all devices connect to one central device</td><td></td><td>✓</td><td></td></tr><tr><td>all devices connect to a central cable</td><td>✓</td><td></td><td></td></tr><tr><td>multiple paths for the packets to travel</td><td></td><td></td><td>✓</td></tr><tr><td>robust against damage because if any line fails, the rest of the network retains full functionality</td><td></td><td>✓</td><td>✓</td></tr><tr><td>most likely to lose data through collisions</td><td>✓</td><td></td><td></td></tr></table>	Statement	Bus	Star	Mesh	all devices connect to one central device		✓		all devices connect to a central cable	✓			multiple paths for the packets to travel			✓	robust against damage because if any line fails, the rest of the network retains full functionality		✓	✓	most likely to lose data through collisions	✓		
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8(b)(i)	1 mark for: to be visible to and accessible by other devices on the internet																								
8(b)(ii)	1 mark each: • IPv4 has 4 groups of digits whilst IPv6 has 8 groups • IPv4 is usually represented in denary whilst IPv6 is usually represented in hexadecimal • IPv4 groups are between 0 and 255 whilst IPv6 is between 0 and FFFF • IPv4 is 32 bits whilst IPv6 is 128 bits																								