7 Web browsers use Internet Protocol (IP) addresses.

(a) Complete the table by describing the following types of IP address.

Type of IP address	Description
Static	....
Public	....

[2]

(b) Consider the following IP address:

256.0.0.A

Circle whether this IP address is IPv4, IPv6 or an invalid IP address.

IPv4 IPv6 Invalid

Justify your choice.

.....

.....

.....

..... [2]

(c) A user types a Uniform Resource Locator (URL) into the address bar of a web browser to access a web page.

Explain how the web browser uses the URL to access the web page.

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[4]

(d) A bitmap file is downloaded. The image has a maximum of 256 colours and measures 512 pixels wide by 2048 pixels high.

(i) Calculate an estimate of the file size of the bitmap in kibibytes.

Show your working.

Working .....

.....

.....

.....

File size of bitmap ..... kibibytes

[2]

(ii) Explain why the actual file size may be larger than the one calculated in **(d)(i)**.

.....

.....

.....

..... [2]

(iii) Explain how a bitmap image is compressed using run-length encoding (RLE).

.....

.....

.....

..... [2]

5 A local area network (LAN) has five computers, one switch and one server.

(a) Describe the characteristics of a LAN.

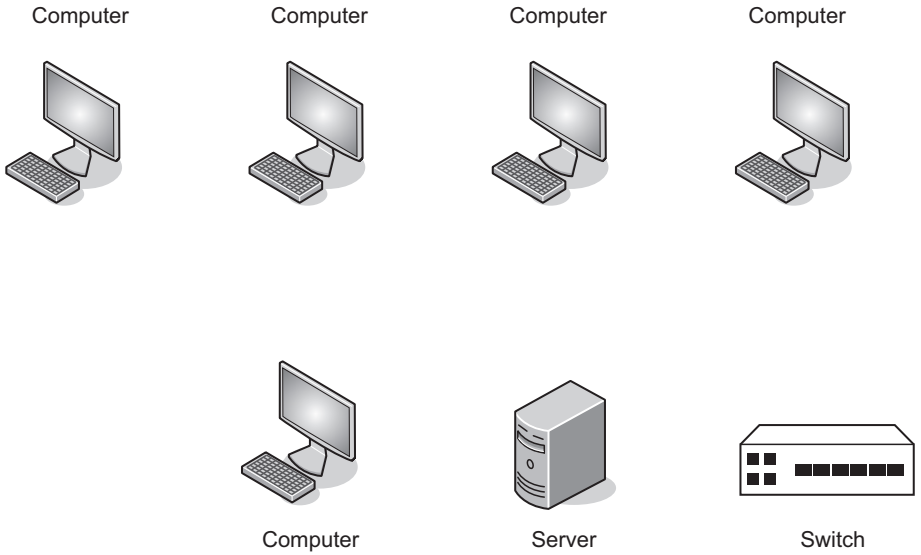
.....

.....

.....

..... [2]

(b) Complete the following diagram to show how these devices are connected in a star topology.



[2]

(c) Describe how packets are transmitted between two hosts using a star topology.

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.....

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..... [3]

(d) Another type of network is a bus network.

Ethernet is used to transmit and receive data between the devices on the bus network.

Describe how collisions are detected and managed on this network.

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.....

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..... [3]

(e) Complete the table by identifying **one** threat to computer and data security posed by networks and the internet.

Describe the threat and give a method of prevention.

Threat	Description	Prevention
.....	.....	.....
.....	.....	.....

[3]

8 A restaurant accesses software and stores data using cloud computing.

(a) (i) Give **two** benefits of storing data using cloud computing.

1 .....

.....

2 .....

..... [2]

(ii) Give **two** drawbacks of using cloud computing.

1 .....

.....

2 .....

..... [2]

(b) The restaurant uses touchscreens as input devices to allow staff to select items from a menu.

(i) Explain how a touchscreen converts the point of touch to a selection from the menu.

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..... [4]

(ii) The image files that are displayed on the touchscreen have been corrupted.

Identify **two** examples of utility software that could be used to recover the images.

1 .....

2 .....

[2]

4 A network engineer is setting up a Local Area Network (LAN) in an office. The network uses both wired and wireless connectivity.

(a) Give **three** advantages of a wireless network compared to a wired network.

1 .....

.....

2 .....

.....

3 .....

..... [3]

(b) Give **one** drawback of using a wireless network.

.....

..... [1]

(c) Complete the table by writing the name of the type of memory technology for each description.

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.	
A read only memory where the contents are erased using ultraviolet (UV) light. The memory must be physically removed to be reprogrammed.	
A read only memory where the contents can be written only once after manufacture.	

[3]

6 A company has multiple sites in different cities.
The company has drivers who deliver products to customers. Each driver can connect to the company's WAN (Wide Area Network) whilst out of the office using a smartphone.

(a) State **two** ways that a WAN is different to a LAN (Local Area Network).

1 .....

.....

2 .....

.....

[2]

(b) The smartphones use the cell phone network to connect to the WAN.

Explain how data is transmitted using the cell phone network.

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..... [4]

(c) Devices that connect to the WAN have an IP address.

Complete the following description of IP addresses by writing the missing words.

IPv4 is displayed as four groups of 8-bit numbers separated by ..... .

Each IPv4 address is 32 bits.

IPv6 is made of eight groups of 4 ..... numbers separated by colons.

Multiple consecutive groups of ..... can be replaced with a double colon.

Each IPv6 address is ..... bits.

A ..... IP address can change each time the computer connects to a network.

A ..... IP address can only be accessed by other devices in the same LAN and is assigned by the router within the LAN.

[6]

(d) The main office for the company has four wired computers, one server, two printers, one central switch and a device providing a single point of access for the internet. The network is set up as a star topology.

Draw the topology for the main office network. Label all devices.

[4]

(e) Describe the role of a switch in a network.

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..... [3]

9 A computer is connected to a Local Area Network (LAN) that connects to a Wide Area Network (WAN).

(a) Describe the characteristics of a WAN.

.....

.....

.....

..... [2]

(b) Copper cable can be used to transmit data in a network.

Complete the table by identifying **and** describing **two other** transmission media that can be used to transfer data in the WAN.

Transmission medium	Description
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

[4]

(c) The computer on the LAN is used for real-time video conferences, where people connected to the internet communicate in real-time using video and audio.

Explain how bit streaming is used in a real-time video conference.

.....

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.....

..... [4]

(d) The LAN has a router. The router has a public IP address and a private IP address.

(i) State the purpose of a public IP address and a private IP address.

Public IP address .....

.....

Private IP address .....

.....

[2]

(ii) The LAN uses subnetting.

Describe the purpose of subnetting in a network.

.....

.....

.....

..... [2]

8 A business is creating a local area network (LAN) in its office.

(a) The business is deciding which topology to use.

Tick (✓) **one or more** boxes in each row to identify the topology, or topologies, each statement describes.

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 along			
robust against damage because if any line fails, the rest of the network retains full functionality			
most likely to lose data through collisions			

[5]

(b) The LAN will connect to the internet through a router. The router has a public IPv6 address.

(i) State why the router has a public IP address.

.....

..... [1]

(ii) One difference between an IPv4 and IPv6 address is that the numbers in an IPv4 address are separated by full stops and in an IPv6 address they are separated by colons.

Identify **two other** differences between an IPv4 and IPv6 address.

1 .....

.....

.....

2 .....

.....

.....

[2]