

1. Question part 1/2 | 9618 May-June 2021 P1 V1 Q4

4 Melinda and her friends set up a peer-to-peer network between their computers to share data.

(a) Describe the key features of a peer-to-peer network.

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(b) Describe **two** drawbacks to Melinda and her friends of using a peer-to-peer network.

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(c) Melinda connects her laptop to the internet through her router.

(i) Tick (✓) **one** box in each row to identify whether the task is performed by the router or not.

Task	Performed by router	Not performed by router
Receives packets from devices		
Finds the IP address of a Uniform Resource Locator (URL)		
Directs each packet to all devices attached to it		
Stores the IP and/or MAC address of all devices attached to it		

[2]

(ii) Melinda mainly uses the internet to watch films and play computer games.

Tick (✓) **one** box to identify whether Melinda should connect to the router using a wired or wireless network **and** justify your choice.

Wired	
Wireless	

Justification
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..... [3]

(d) Melinda sends emails from her webmail account (email account accessed through a website).

Explain whether Melinda is using the internet, or the World Wide Web (WWW), or both.

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2. Question part 1/2 | 9618 May-June 2021 P1 V3 Q4

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Explain whether Melinda is using the internet, or the World Wide Web (WWW), or both.

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8 A school is setting up a network within one of its buildings.

(a) State whether the network will be a LAN (local area network) or a WAN (wide area network). Justify your choice.

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(b) One classroom in the building has 30 computers. The computers need to be connected to the network. Each computer has a network interface card (NIC).

Identify **two** possible devices that can be used to physically connect the 30 computers to the rest of the network.

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2 [2]

(c) The school has several laptops. Each laptop has a Wireless Network Interface Card (WNIC).

Describe the functions of a Wireless Network Interface Card.

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1

2 [2]

(c) The school has several laptops. Each laptop has a Wireless Network Interface Card (WNIC).

Describe the functions of a Wireless Network Interface Card.

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..... [4]

5. Question part 1/2 | 9618 Specimen 2021 P1 Q2

2 Yvette runs a company that books walking holidays for groups of people. She has a website that customers use to book the holidays.

(a) The website has a URL and an IPv6 address.

Describe, using an example, the format of an IPv6 address.

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(b) An IP address can be static or dynamic. Describe static and dynamic IP addresses.

Static

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Dynamic

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..... [4]

(c) Yvette’s company has a LAN (Local Area Network) that has hybrid topology.

(i) Describe the characteristics of a LAN.

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..... [2]

- (ii) The LAN has a range of different topologies. One subnetwork connects four computers and one server set up as a star topology.

Describe how packets are transmitted between two of the computers in this subnetwork.

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..... [3]

- (d) The LAN has both wired and wireless connections.

- (i) Ethernet cables connect the computers to the server.

Identify **three** other hardware components that might be used to set up the LAN.

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- (ii) Describe how Carrier Sense Multiple Access/Collision Detection (CSMA/CD) manages collisions during data transmission.

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9 (a) The following incomplete table contains four network devices and their descriptions.

Complete the table by writing the missing devices and missing descriptions.

Device	Description
.....	Receives and sends data between two networks operating on the same protocol
Wireless Network Interface Card (WNIC)	
.....	Restores the digital signal so it can be transmitted over greater distances
Wireless Access Point (WAP)	

[4]

(b) Describe **three** differences between fibre-optic cables and copper cables.

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- 2
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- 3
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[3]

Describe CSMA/CD.

[4]

[4]

8 A company uses cloud computing.

(a) Define cloud computing.

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..... [1]

(b) State what is meant by a public cloud and a private cloud.

Public cloud
.....
Private cloud
..... [2]

(c) Give **two** benefits and **one** drawback of using cloud computing.

Benefit 1
.....
Benefit 2
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Drawback
..... [3]

8 A Local Area Network (LAN) uses a bus topology.

Describe how Carrier Sense Multiple Access/Collision Detection (CSMA/CD) is used in a bus network.

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..... [4]

6 (a) A student uses a networked laptop computer to send an email to a colleague.

(i) Explain how a digital signature ensures the email is authentic.

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..... [2]

(ii) Describe how a firewall protects the data on the computer.

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..... [3]

(b) The student records a sound file.

(i) Explain the effect of increasing the sampling rate on the accuracy of the sound recording.

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..... [2]

(ii) Explain the effect of decreasing the sampling resolution on the file size of the sound recording.

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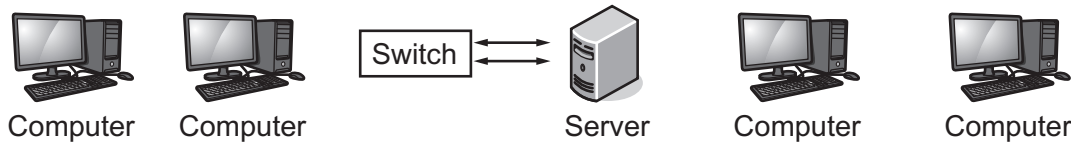
..... [2]

10. Question | 9618 Oct-Nov 2022 P1 V2 Q10

10 A Local Area Network (LAN) consists of four computers, one server and a switch.

The LAN uses a star topology.

(a) Complete the following diagram to show how the hardware is connected.



[1]

(b) A router is attached to one of the devices on the LAN shown in **part (a)** to connect the LAN to the internet.

(i) Identify the device. Give a reason for your choice.

Device

Reason

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.....

[2]

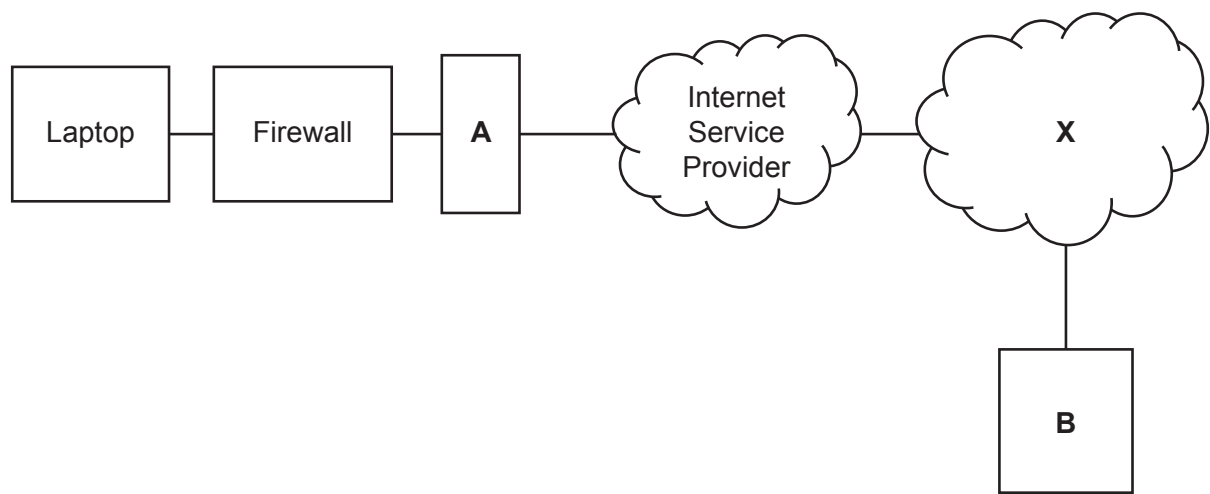
(ii) Describe the role **and** function of the router in the network.

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[3]

11. Question part 1/2 | 9618 Oct-Nov 2022 P1 V3 Q7

7 (a) The diagram shows the hardware and software used to retrieve files stored on the cloud.



Complete the following table by writing the answer for each row.

Answer	
The name of device A that allows the laptop to connect to the internet	
A type of cloud, X	
An example of an application, B , that can run on the cloud	

[3]

(b) Give **one** advantage and **two** disadvantages of transmitting data using satellites instead of copper cables.

Advantage 1

.....

Disadvantage 1

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Disadvantage 2

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[3]

(c) Local Area Networks (LANs) can be made up of several subnetworks.

(i) Give **two** benefits of dividing a network into subnetworks by subnetting the LAN.

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[2]

(ii) A subnet mask is used when subnetting a LAN.

Two devices on the LAN are located in different subnetworks.

The IP addresses and corresponding subnet masks are shown:

Device IP address	Subnet mask
10.10.12.1	255.0.0.0
192.168.12.4	255.255.255.0

Identify the following network ID and host ID.

The network ID for the device with the IP address 10.10.12.1

.....

The host ID for the device with the IP address 192.168.12.4

.....

[2]

12. Question part 1/3 | 9618 May-June 2023 P1 V2 Q1

1 A company has a LAN (local area network).

(a) Give **two** benefits of connecting computers to a LAN.

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2

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[2]

(b) Give **two** characteristics of a LAN.

1

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[2]

(c) One of the company’s offices has one server and four computers connected in a star topology.

Draw a diagram to show the layout of the office’s star topology.

[2]

(d) Computers can be connected using Ethernet.

Describe what is meant by **Ethernet**.

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..... [3]

(e) The network runs as a thick-client model.

Describe what is meant by a **thick-client** model.

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..... [2]

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13. Question part 1/2 | 9618 May-June 2023 P1 V3 Q2

2 A university has two sites. Each site has several computer rooms. The computers are all connected as a WAN (wide area network).

(a) Identify **two** differences between a WAN and a LAN (local area network).

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[2]

(b) The network uses different topologies in different areas of the sites. In one building there are five computers connected in a mesh topology.

(i) Describe what is meant by a mesh topology.

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..... [2]

(ii) Give **two** advantages of using a mesh topology instead of a bus topology.

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[2]

(c) The computers in one room are set up as thin-clients in a client-server model.

Describe the role of the different computers in this model.

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..... [2]

(d) Students can connect their devices to the university network using cables or a wireless connection.

Explain the benefits to the students of allowing them to use **both** wired and wireless connections.

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..... [4]

(e) One site has split the network into several subnetworks.

An IP address in a subnetwork is divided into two parts.

Identify **and** describe the **two** parts of an IP address in a subnetwork.

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..... [3]

14. Question part 1/2 | 9618 Oct-Nov 2023 P1 V1 Q2

2 A school has a Local Area Network (LAN).

(a) The LAN connects to the internet using a router.

Describe the function of a router in a network.

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..... [3]

(b) Complete the following table by writing the purpose of each of these other hardware devices used to support the LAN.

Hardware device	Purpose
switch	
Wireless Access Point (WAP)	
bridge	

[3]

(c) The students can save their school files on a public cloud.

Identify **two** drawbacks of the students storing their files on the public cloud.

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[2]

(d) A new classroom is being set up with 20 computers and a switch.

Explain **one** advantage of implementing a star topology instead of a bus topology in the new classroom.

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..... [2]

15. Question part 1/3 | 9618 Oct-Nov 2023 P1 V2 Q7

7 A Local Area Network (LAN) contains four devices:

- a router
- two laptop computers
- a server.

(a) The server has the IP address 192.168.3.2

Explain why this is **not** an IPv6 address.

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..... [2]

(b) (i) The LAN is set up as a star topology.

Draw a diagram of the topology of the LAN.

[2]

(ii) Explain how data is transmitted between the two laptops in the LAN.

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..... [2]

(iii) Subnetting can be used to separate a network into logical segments.

Describe **two other** reasons why subnetting is used in a network.

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[4]

(c) State **three** tasks performed by devices to deal with collisions when using the Carrier Sense Multiple Access/ Collision Detection (CSMA/CD) protocol in a network.

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[3]

(d) The following incomplete table contains types of IP addresses and their descriptions.

Complete the table by writing the missing types of IP addresses and the missing descriptions.

Type of IP address	Description
.....	an IP address that is assigned to a device to allow direct access on the internet
static IP address	
.....	an IP address used for internal LAN communication only
dynamic IP address	

[4]

3 A company sells online Computer Science courses to students in different countries.

The courses are stored on a public cloud.

(a) (i) Explain why the company uses a public cloud to store these courses.

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..... [2]

(ii) Describe **two** disadvantages of storing data on a public cloud compared to storing data on a server in a Local Area Network (LAN).

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(iii) State how the following security measures can be used to protect computer systems.

Firewall

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Encryption

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Passwords

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..... [3]

(b) The company uses a database, COURSES, to store data about the courses and their tutors.

Each course starts at different times of the year and may have a different tutor.

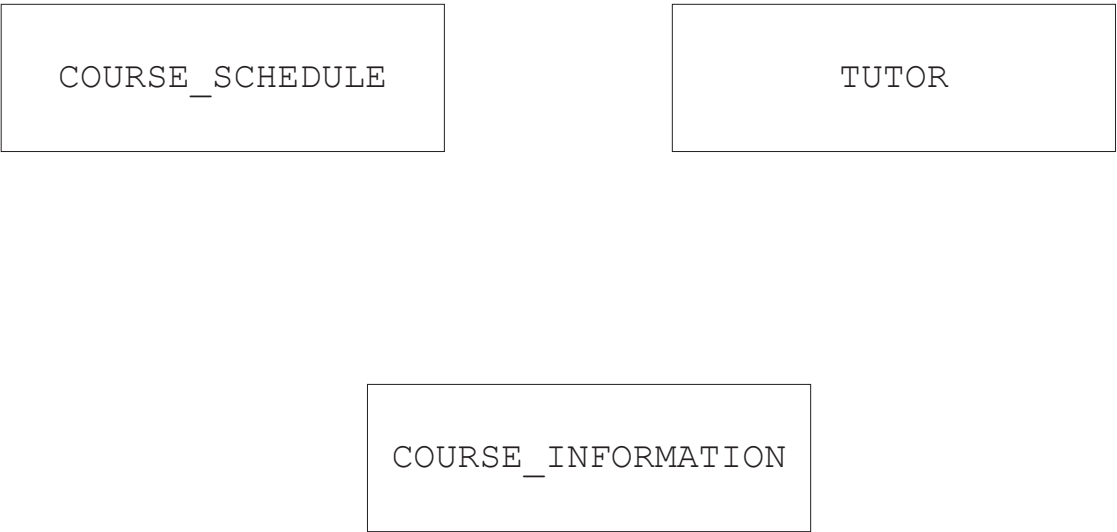
The database has the following structure:

COURSE_INFORMATION(CourseID, Description, Cost)

TUTOR(TutorID, TelephoneNumber, EmailAddress, TutorName)

COURSE_SCHEDULE(CourseID, DateStarted, TutorID)

(i) Complete the entity-relationship (E-R) diagram for the database COURSES.



[1]

(ii) Write the Structured Query Language (SQL) script to return the total number of courses that have started after 9 September 2023.

The value returned must have an appropriate field name.

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..... [4]

Explain how data verification can be used when the tutor ID is entered.

[4]

[4]

17. Question part 1/2 | 9618 May-June 2024 P1 V1 Q5

- 5** A bank allows customers to access their accounts using an application that they can download onto a device such as a smartphone.
- (a)** The system that allows customers to access their accounts using the application is a client-server model.

Describe the roles of the different devices in this model.

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..... [4]

- (b)** The bank wants to protect the integrity of its data while transferring the data to other banks. Parity check is one example of data verification.

Complete the description of parity check when Computer A is transmitting data to Computer B.

Computer A and Computer B agree on whether to use parity. Computer A divides the data into groups of The number of 1s in each group is counted. If the agreed parity is 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 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

[5]

(c) The bank also needs to keep its customers’ data private and secure.

(i) The bank’s network has a firewall.

Explain how a firewall can help protect the customers’ data.

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..... [3]

(ii) Customers need to use biometric authentication to access their accounts.
One biometric authentication method is facial recognition.

Facial recognition uses Artificial Intelligence (AI).

Describe how AI is used in facial recognition.

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..... [4]

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.

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..... [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.

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[2]

5 A multimedia design company has an office with a LAN (local area network). The LAN can have up to 20 devices connected with cables and other devices connected using wireless access.

(a) The company has private cloud storage for its employees to store their work.

(i) Define the term **private cloud**.

..... [1]

(ii) Describe the benefits to the company of using private cloud storage instead of public cloud storage.

..... [3]

(b) Part of the internal structure of the wired LAN is a star topology.

Explain how packets are transmitted between two devices in a star topology.

..... [2]



(c) A different part of the network uses the Ethernet protocol.

(i) A collision is detected.

Describe how the collision is managed using Carrier Sense Multiple Access/Collision Detection (CSMA/CD).

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..... [2]

(ii) Identify **two** drawbacks of using CSMA/CD.

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..... [2]

(d) The devices in the office have static private IP addresses.

State what is meant by a **static private IP address**.

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..... [1]

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.

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..... [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
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[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

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Private IP address

..... [2]

- (ii) The LAN uses subnetting.

Describe the purpose of subnetting in a network.

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..... [2]

21. Question part 1/2 | 9618 May-June 2025 P1 V1 Q2

2 Programmers in a software development company take part in live video conferences to discuss their work.

The live video conferences take place using real-time bit streaming. The video is compressed before it is transmitted.

(a) Explain how data is transferred using real-time bit streaming.

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..... [4]

(b) (i) Explain the reasons why a video is compressed before it is transmitted using real-time bit streaming.

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..... [4]

21. Question part 2/2 | 9618 May-June 2025 P1 V1 Q2



(ii) Identify whether the lossy or lossless compression method is more appropriate for real-time bit streaming. Justify your answer.

Compression method

Justification

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[3]

(c) The video conference is accessed over the internet.

Complete the table by stating how modems **and** dedicated lines are used when data is transmitted over the internet.

Hardware	Use
modems	
dedicated lines	

[2]

22. Question part 1/3 | 9618 May-June 2025 P1 V2 Q6

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).

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[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]

22. Question part 2/3 | 9618 May-June 2025 P1 V2 Q6



- (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]

22. Question part 3/3 | 9618 May-June 2025 P1 V2 Q6



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7 Web browsers use Internet Protocol (IP) addresses.

[2]

Type of IP address	Description
Static	
Public	

(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.

..... [4]

23. Question part 2/2 | 9618 Oct-Nov 2025 P1 V1 Q7



(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

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File size of bitmap kibibytes [2]

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

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..... [2]

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

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..... [2]

24. Question | 9618 Oct-Nov 2025 P1 V2 Q1

- 1 Draw **one** line from each verification method to indicate whether it is used during data transfer or data entry.

Verification Method	Use
Parity byte check	
Checksum	Data transfer
Visual check	
Parity block check	Data entry

[2]

25. Question part 1/2 | 9618 Oct-Nov 2025 P1 V2 Q5

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

(a) Describe the characteristics of a LAN.

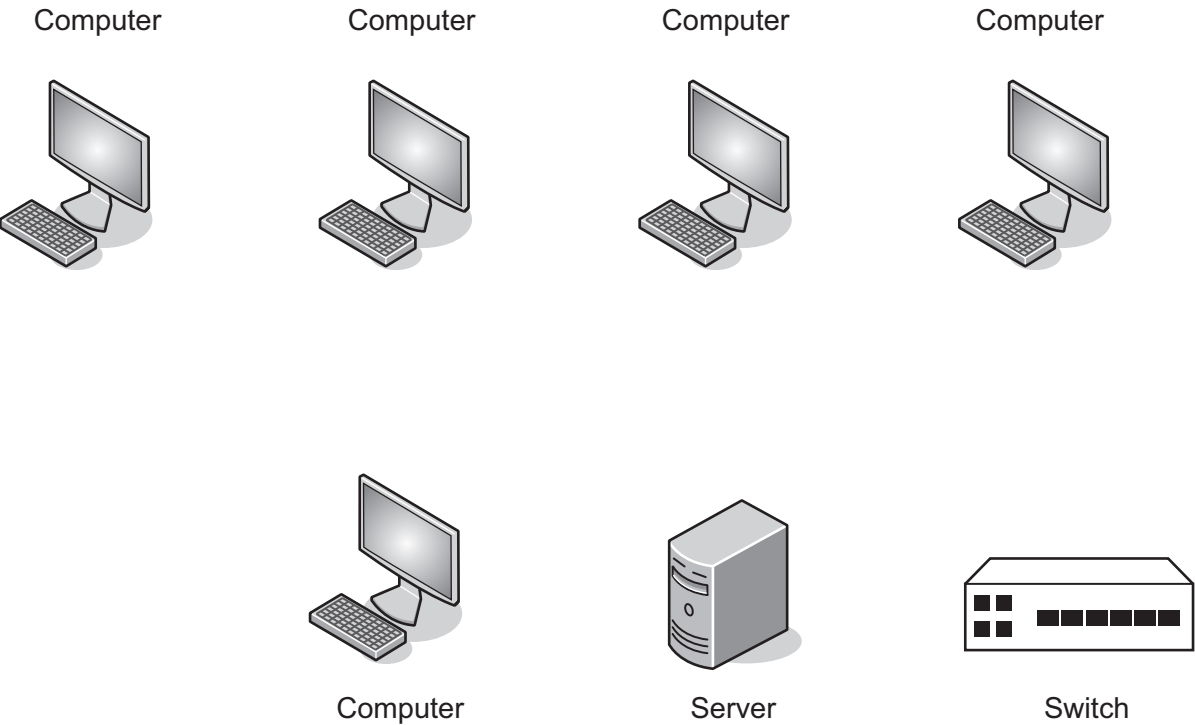
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..... [2]

(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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..... [3]

25. Question part 2/2 | 9618 Oct-Nov 2025 P1 V2 Q5



(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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..... [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]

26. Question | 9618 Oct-Nov 2025 P1 V2 Q8

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

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

1

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2

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[2]

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

1

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[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]

27. Question | 9618 Oct-Nov 2025 P1 V3 Q4

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

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3

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[3]

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

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..... [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]