

# QUESTION 3.

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3 An email is sent from one email server to another using packet switching.

(a) State **two items** that are contained in an email packet apart from the data.

- 1 .....
- 2 ..... [2]

(b) Explain the role of routers in sending an email from one email server to another.

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.....  
..... [3]

(c) Sending an email message is an appropriate use of packet switching.

Explain why this is the case.

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..... [2]

(d) Packet switching is not always an appropriate solution.

Name an alternative communication method of transferring data in a digital network.

..... [1]



(e) Name an application for which the method identified in **part (d)** is an app. Justify your choice.

Application .....

Justification .....

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.....[3]

# QUESTION 4.



3 (a) Explain what is meant by circuit switching.

.....[2]

(b) There are many applications in which digital data are transferred across a network. Video conferencing is one of these.

For this application, circuit switching is preferable to the use of packet switching.

Explain why this is so.

.....[6]

(c) A web page is transferred from a web server to a home computer using the Internet.

Explain how the web page is transferred using packet switching.

.....[3]

## QUESTION 5.



5 (a) A web browser is used to request and display a page stored on an internet website.

Explain how each of the following items is used in this event.

(i) Packet: .....  
.....  
.....  
.....[2]

(ii) Router: .....  
.....  
.....  
.....[2]

(iii) TCP/IP: .....  
.....  
.....  
.....[2]

(b) The Internet can be used for video conferencing. Data can be transmitted over the Internet using either packet switching or circuit switching.

(i) State **two** problems that could arise if video conferencing were to use packet switching.  
Problem 1 .....  
.....  
Problem 2 .....  
.....[2]

(ii) Explain what is meant by **circuit switching**.  
.....  
.....  
.....  
.....[2]



**(iii)** Explain how the use of circuit switching overcomes the problems you mentioned in **part (i)**.

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## QUESTION 6.



5 (a) A web browser is used to request and display a page stored on an internet website.

Explain how each of the following items is used in this event.

(i) Packet: .....  
.....  
.....  
.....[2]

(ii) Router: .....  
.....  
.....  
.....[2]

(iii) TCP/IP: .....  
.....  
.....  
.....[2]

(b) The Internet can be used for video conferencing. Data can be transmitted over the Internet using either packet switching or circuit switching.

(i) State **two** problems that could arise if video conferencing were to use packet switching.  
Problem 1 .....  
.....  
Problem 2 .....  
.....[2]

(ii) Explain what is meant by **circuit switching**.  
.....  
.....  
.....  
.....[2]



**(iii)** Explain how the use of circuit switching overcomes the problems you mentioned in **part (i)**.

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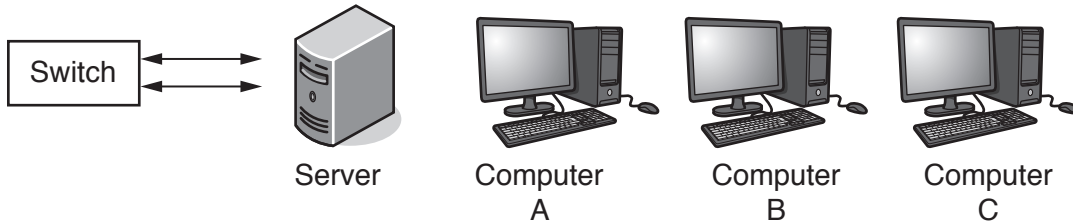
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# QUESTION 7.



1 A Local Area Network (LAN) consists of three computers, one server and a switch, all connected in a star topology.

(a) Complete the following diagram to show how the computers, the server and the switch should be connected.



[1]

(b) There are four statements in the following table. For each statement, place a tick (✓) in the appropriate column to indicate whether it is true or false.

| Statement                                                                                                         | True | False |
|-------------------------------------------------------------------------------------------------------------------|------|-------|
| The server can send packets to Computer B and Computer C at the same time.                                        |      |       |
| The network software on each computer needs to include collision detection and avoidance.                         |      |       |
| Computer B can read a packet sent from the server to Computer C.                                                  |      |       |
| Computer A can send a packet to Computer B and at the same time the server can be sending a packet to Computer C. |      |       |

[4]

(c) The LAN shown in **part (a)** will be connected to the Internet.

(i) A router will be attached to one of the devices on the LAN.

State the device used. Give a reason for your choice.

Device .....

Reason .....

.....

..... [2]





(ii) Explain why a router is required.

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.....

.....

..... [2]

(iii) After the router has been connected, Computer A sends several packets to an internet web server.

Explain how the packets are transmitted from the router to the web server.

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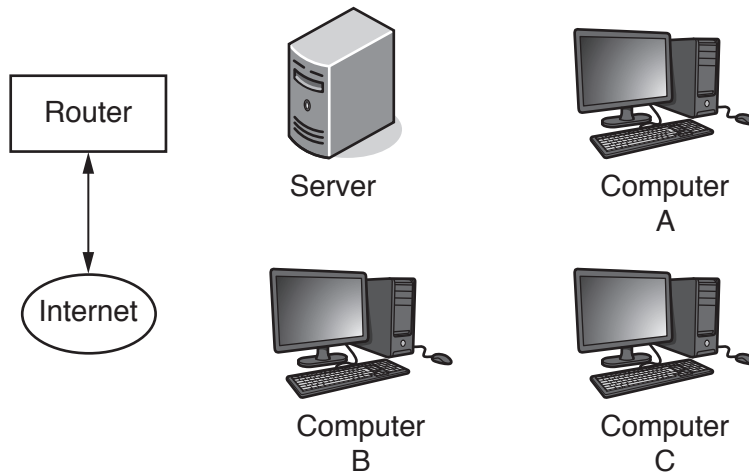
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# QUESTION 8.



- 1 A Local Area Network (LAN) consists of three computers, one server and a router connected to the Internet. The LAN uses a bus topology.
- (a) Complete the following diagram to show how the computers, the server and the router are to be connected.



[2]

- (b) There are four statements in the following table. For each statement, place a tick (✓) in the appropriate column to indicate whether it is true or false.

| Statement                                                                                          | True | False |
|----------------------------------------------------------------------------------------------------|------|-------|
| The server can send packets to Computer B and the router at the same time.                         |      |       |
| Computer C uses the IP address of a web server to send a request for a web page on the web server. |      |       |
| Computer B can read a packet sent from Computer A to Computer C.                                   |      |       |
| The server can read all incoming packets from the Internet.                                        |      |       |

[4]

- (c) The user on Computer A and the user on Computer B are both using the Internet at the same time. On a few occasions, Computer A and Computer B start transmitting packets to the router at exactly the same time. This causes a problem called a collision.

- (i) Explain what is meant by a **collision** in this context.

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.....

.....[2]



- (ii) As a result of the collision, both Computer A and Computer B stop transmitting their packets. Computer A must carry out a number of steps to ensure the successful transmission of its packet.

Give **two** of the steps.

Step 1 .....

Step 2 .....

[2]

- (d) The LAN topology is redesigned.

- (i) Describe the changes that could be made to the LAN topology to overcome the problem identified in **part (c)**.

.....  
.....  
.....  
.....[2]

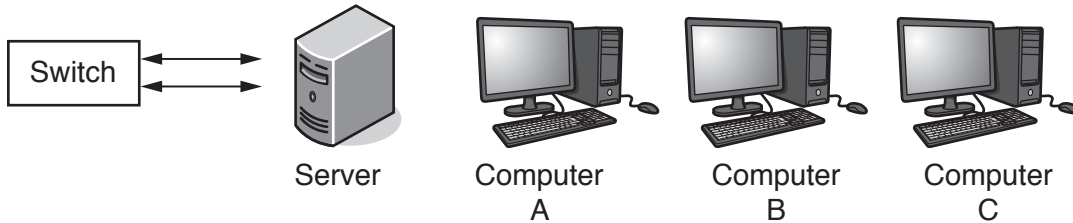
- (ii) Explain how the redesign has overcome the problem.

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.....  
.....  
.....[2]

# QUESTION 9.



- 1 A Local Area Network (LAN) consists of three computers, one server and a switch, all connected in a star topology.
- (a) Complete the following diagram to show how the computers, the server and the switch should be connected.



[1]

- (b) There are four statements in the following table. For each statement, place a tick (✓) in the appropriate column to indicate whether it is true or false.

| Statement                                                                                                         | True | False |
|-------------------------------------------------------------------------------------------------------------------|------|-------|
| The server can send packets to Computer B and Computer C at the same time.                                        |      |       |
| The network software on each computer needs to include collision detection and avoidance.                         |      |       |
| Computer B can read a packet sent from the server to Computer C.                                                  |      |       |
| Computer A can send a packet to Computer B and at the same time the server can be sending a packet to Computer C. |      |       |

[4]

- (c) The LAN shown in **part (a)** will be connected to the Internet.

- (i) A router will be attached to one of the devices on the LAN.

State the device used. Give a reason for your choice.

Device .....

Reason .....

.....

..... [2]



**(ii)** Explain why a router is required.

.....

.....

.....

..... [2]

**(iii)** After the router has been connected, Computer A sends several packets to an internet web server.

Explain how the packets are transmitted from the router to the web server.

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# QUESTION 10.



2 (a) A network can be set up using a star topology.

Give **three** features of a star topology.

1 .....

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2 .....

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3 .....

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[3]

(b) (i) Describe what is meant by **circuit switching**.

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[2]

(ii) The table shows statements that relate to circuit switching, packet switching or both.

Tick (✓) **one or more** boxes in each row to show whether the statement applies to circuit switching, packet switching or both.

| Statements                       | Circuit switching | Packet switching |
|----------------------------------|-------------------|------------------|
| Shares bandwidth                 |                   |                  |
| Data may arrive out of order     |                   |                  |
| Data can be corrupted            |                   |                  |
| Data are less likely to get lost |                   |                  |

[4]

# QUESTION 11.



2 Packet switching can be used to transmit data across the Internet.

Packet switching is not always the most appropriate method of transferring data.

(a) Name an alternative method of transferring data across the Internet.

..... [1]

(b) Give an example of a situation where the method you identified in **part (a)** is more appropriate.

Justify your choice.

Example .....

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Justification .....

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.....

[3]

# QUESTION 12.

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7 (a) Identify the **four** layers of the TCP/IP protocol suite.

- 1 .....
- 2 .....
- 3 .....
- 4 ..... [4]

(b) The TCP/IP protocol suite is responsible for transmitting data across the Internet using packet switching.

- (i) Explain why packet switching is used when sending data across the Internet.  
.....  
.....  
.....  
..... [2]

- (ii) Each packet requires a header.  
Describe the purpose of a packet header.  
.....  
.....  
.....  
..... [2]

- (iii) Identify **three** items that should be contained in a packet header.  
Item 1 .....  
.....  
Item 2 .....  
.....  
Item 3 .....  
..... [3]