

Communication And Network

Question 1

- 3 A mobile phone company uses circuit switching for voice calls and packet switching to send and receive other data.

(a) (i) Describe circuit switching.

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..... [3]

(ii) Explain why the company uses circuit switching for voice calls.

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..... [2]

(b) (i) Describe packet switching.

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..... [3]

(ii) Explain why the company uses packet switching to send and receive other data.

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..... [2]

Question 2

3 The use of the TCP/IP protocol suite is essential for successful communication over the Internet.

(a) (i) Describe the TCP/IP protocol suite.

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..... [5]

(ii) A group of over 100 students has produced a movie. The size of the movie file is very large.

The students would like to use peer-to-peer file sharing to share this file with friends and family.

Identify the **most appropriate** TCP/IP protocol for sharing this file over the Internet **and** describe the way this protocol works.

Protocol

Description

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[5]

- (b) (i) Files shared over the Internet are sent using packet switching or circuit switching methods.

Identify **and** describe the **most suitable** method for the large movie file from **part (a)(ii)**.

Method

Description

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[4]

- (ii) State **one** benefit and **one** drawback of the method you identified in **part (b)(i)**.

Benefit

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Drawback

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[2]

Question 3

- 3 The use of protocols is essential for successful communication between computers.

- (a) Define the term **communication protocol**.

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..... [2]

- (b) Identify **two** protocols that are used in the transfer of emails **and** state the purpose of each protocol.

Protocol 1

Purpose

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Protocol 2

Purpose

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[4]

(c) Manav and Miora want to have a video conversation over the Internet using a dedicated connection.

(i) Identify **and** describe the switching method used to implement this connection.

Method

Description

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[3]

(ii) State **one** benefit and **one** drawback of the method you identified in **part (c)(i)**.

Benefit

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Drawback

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[2]

Question 4

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 5

3 Protocols are essential for communication between computers.

(a) Explain why protocols are essential for communication between computers.

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..... [2]

Question 6

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.

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..... [2]

(ii) Each packet requires a header.

Describe the purpose of a packet header.

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..... [2]

(iii) Identify **three** items that should be contained in a packet header.

Item 1

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Item 2

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Item 3

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[3]

Question 7

(b) The sequence of steps 1 to 7 describes what happens when the LAN transmits data from Computer X to Computer Y using circuit switching. Four statements (4 to 7) are missing from the sequence.

A	Computer X sends the data.
B	The sender signals node to deallocate resources.
C	Computer Y sends a receipt signal.
D	If available, Computer X sets up path between nodes.

Write **one** letter (**A** to **D**) in the appropriate space to complete the sequence.

1 Computer X sends a connection request to Computer Y.

2 Computer Y sends ready or busy signal.

3 If busy, Computer X waits and then resends the connection request to Computer Y.

4

5

6

7

[3]

(c) (i) Protocols are essential for successful transmission of data over a network. The TCP/IP protocol suite operates on many layers.

State the appropriate layer for each protocol in the following table.

Protocol	Layer
TCP	
IP	
SMTP	

[3]

- (ii) Peer-to-peer (P2P) file sharing uses the BitTorrent protocol.

Explain how the BitTorrent protocol allows files to be shared.

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.....[3]

Question 8

- 4 The TCP/IP protocol suite is used on the Internet.

- (a) The table has statements about transmitting data across the Internet.

Put a tick (✓) in each row to identify whether the responsibility belongs to TCP or IP.

Responsibility	TCP	IP
Correct routing		
Host to host communication		
Communication between networks		
Retransmitting missing packets		
Reassembling packets into the correct order		

[5]

- (b) Identify **two** other internet protocols. State a use for each protocol.

Protocol 1

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Use

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Protocol 2

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Use

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[4]

(c) State the name of the TCP/IP layer that uses IP addresses.

.....[1]

(d) Emails are transmitted across the Internet using packet switching and routing tables.

(i) Give **four** items of data in an IP data packet.

1

2

3

4

[4]

(ii) Describe **two** benefits of using packet switching.

Benefit 1

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Benefit 2

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[4]

(iii) Give **two** items of data stored in a routing table.

1

2

[2]

Question 9

(b) The network uses the TCP/IP protocol to transfer files across the network.

(i) State **three** functions of the **TCP** part of this protocol.

- 1
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 - 2
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 - 3
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- [3]

(ii) State **two** functions of the **IP** part of this protocol.

- 1
 - 2
- [2]

(iii) Identify **one** other common protocol that could be used to transfer files across the college network.

.....[1]

(c) Protocols are essential for successful transmission of data over a network. The TCP/IP protocol suite operates on many layers.

Give an appropriate protocol for each layer in the table.

Layer	Protocol
Application	
Transport	
Internet	

[3]

- (d) The TCP/IP protocol is used to send an email message from one node on a LAN to a node on a different LAN.

State the steps that take place when the email message is sent and received.

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.....[4]

Question 10

- (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

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

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

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

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

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

- (ii) Explain what is meant by **circuit switching**.

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.....[2]

- (iii) Explain how the use of circuit switching overcomes the problems you have identified in part (i).

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.....[3]

Question 12

- 5 The TCP/IP protocol suite can be viewed as a stack with four layers.

- (a) Complete the stack by inserting the names of the three missing layers.

Application layer

[3]

- (b) BitTorrent is a protocol used at the Application layer for the exchange of data.

- (i) State the network model used with this protocol.

.....[1]

- (ii) State the use of BitTorrent.

.....[1]

- (iii) Explain how the exchange of data is achieved using BitTorrent.

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.....[4]

- (c) State **two** additional protocols that are also used at the Application layer for the exchange of data.

For each protocol, give an example of an appropriate exchange of data.

Protocol 1

Example

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Protocol 2

Example

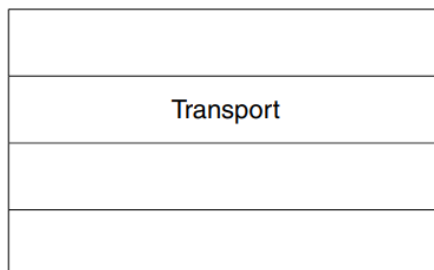
.....

[4]

Question 13

- 5 The TCP/IP protocol suite can be viewed as a stack with four layers.

- (a) (i) Complete the stack by inserting the names of the three missing layers.



[3]

- (ii) State how each layer of the stack is implemented.

..... [1]

- (b) A computer is currently running two processes:

- Process 1 is downloading a web page.
- Process 2 is downloading an email.

- (i) Describe **two** tasks that the Transport layer performs to ensure that the incoming data is downloaded correctly.

1

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2

 [4]

(ii) Name a protocol that will be used by Process 1.
 [1]

(iii) Name a protocol that will be used by Process 2.
 [1]

Question 14

6 (a) Four descriptions and three protocols are shown below.

Draw a line to connect each description to the appropriate protocol.

Description	Protocol used
email client downloads an email from an email server	HTTP
email is transferred from one email server to another email server	POP3
email client sends email to email server	SMTP
browser sends a request for a web page to a web server	

[4]

(b) Downloading a file can use the client-server model. Alternatively, a file can be downloaded using the BitTorrent protocol.

Name the model used.

.....[1]

(c) For the BitTorrent protocol, explain the function of each of the following:

(i) Tracker
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.....[2]

(ii) Seed
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.....[2]

(iii) Swarm
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.....[2]

Question 15

(b) A user downloads a file using the FTP protocol.

Explain the function played by each of the following:

(i) Server
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.....[2]

(ii) Command
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.....[2]

(iii) Anonymous
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.....[2]

Question 16

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 appropriate solution.
Justify your choice.

Application

Justification

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.....[3]

Question 17

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

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.....[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.

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- (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.

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