

3 (a) Explain why protocols are essential for communication between computer systems.

[2]

(b) POP3 is an email communication protocol.

Identify and describe **two** other communication protocols that are used when sending or receiving emails.

Protocol 1

Description

Protocol 2

Description

[4]

(c) Describe **two** ways in which packet switching ensures a complete message is received when passing messages across a network.

1

2

[4]

3 (a) HTTP and IMAP are examples of protocols used in the Application Layer of the TCP/IP protocol suite.

State the purpose of the HTTP and IMAP protocols.

HTTP

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IMAP

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[2]

(b) Describe how files are shared using the BitTorrent protocol.

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[4]

4 (a) Identify **one** benefit of circuit switching **and one** benefit of packet switching.

Circuit switching
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Packet switching
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[2]

(b) Identify **two** differences between circuit switching and packet switching.

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[2]

3 Describe how packet switching is used to pass messages across a network. Do **not** include checking for completeness and resending packets in your answer.

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[4]

4 Identify **and** describe **three** protocols that are used in the Application Layer of the TCP/IP protocol suite.

Protocol 1

Description

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Protocol 2

Description

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Protocol 3

Description

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[6]

4 The TCP/IP protocol may be viewed as a stack that contains four layers: Application, Transport, Internet, Link.

Describe how the layers of the TCP/IP protocol stack interact with each other.

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[4]