

1(a). A company wants more customers to be able to find their website on the internet.

When customers contact the company, their computers will use a number of protocols such as TCP/IP and HTTP to make connections with other devices over the internet.

Explain what a protocol is and why they are important in network communications.

[2]

(b). Describe **three** different pieces of networking hardware in a client-server network apart from the clients and servers themselves.

1

2

[6]

2. A small manufacturing business uses networked computers with closed source application software installed.

All computers owned by the business are connected together into a Local Area Network (LAN). Various network protocols are used in this network.

i. Give **three** advantages to the business of connecting computers together in a LAN.

1

2

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[3]

- ii. Explain what is meant by a network protocol.

----- [2]

- iii. Give the names of **two** protocols that may be used in a LAN.

1

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----- [2]

- iv. Explain why protocol layering is used.

----- [3]

3(a). Zac has an accountancy business. He is moving into an office that has enough space for up to five members of staff. Zac would like to install a Local Area Network (LAN) to allow his staff to work together.

- i. A LAN uses packet switching.

Describe **one** difference between packet switching and circuit switching.

----- [2]

[2]

Discuss how Zac could set up a peer-to-peer network and a client-server network.

- how the computers in each type are connected
- the benefits of each type
- the drawbacks of each type
- the suitability of each type.

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[9]

4. Anika's computer runs a multi-tasking operating system. She has access to a printer and a broadband internet connection through a wireless connection. The operating system uses scheduling algorithms such as first come first served and round-robin.

Anika uses an encrypted messaging program to communicate with her friends. The computer uses the TCP/IP stack.

- i. Explain what happens at the application layer of the TCP/IP stack when using this program.

[5]

- ii. Explain what happens at the link layer (sometimes referred to as the "network interface layer", "network access layer" or simply the "network layer") of the TCP/IP stack when using this program.

[2]

5(a). Modern computer systems use networking in order to share hardware, software and data.

Networking uses protocols such as TCP/IP.

State what is meant by the term 'protocol'.

[1]

(b). The protocol TCP/IP uses a 4-layer stack.

- i. Complete the table below to show the 4 layers in the TCP/IP stack.

Application
Link

[2]

- ii. Explain **one** advantage of using layers in the protocol TCP/IP.

[2]

6(a). A hotel uses a computer system to keep track of room bookings. The hotel staff are able to query a database to discover which rooms are booked or which rooms are free.

The hotel's computer network uses a client-server model.

- i. Describe what is meant by the term 'client-server' in this context.

[3]

- ii. Give **two** advantages of client-server compared to peer-to-peer.

1

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[2]

Explain the purpose of a network switch.

[3]

Discuss the threats which potentially exist to the hotel's computer network and how these threats could be eliminated or reduced.

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[9]

(d). The hotel stores data about rooms, customers and bookings in a database. Each customer can book multiple rooms and each room can be booked multiple times.

- i. Draw an Entity Relationship Diagram for this database.



[4]

- ii. Define what is meant by the term 'foreign key', giving **one** example of where a foreign key would be used in the hotel booking database.

Definition

Example

[3]

iii. Describe **two** different ways that hashing could be used in this database.

1

2

[4]

(e). The hotel booking database enforces referential integrity.

Explain what is meant by the term 'referential integrity' and how this could potentially be broken.

[2]

7. In order to view a website, a user enters a website address into their web browser such as <http://www.ocr.org.uk>. The website will then be displayed onto the user's screen.

Explain how the Domain Name System (DNS) plays a role in websites being loaded.

[4]

