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Modern computers often come with hard disks and solid-state disks (SSD) but no optical disk drives.

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Explain why computers often have both of these types of storage rather than just having a hard disk or just having an SSD.

[2 marks]

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2

Explain why it is faster to access data from solid state storage than from an optical disk.

[2 marks]

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The life-blogging device contains a solid-state disk (SSD). It stores its data on this in addition to uploading the data to a server.

Explain **two** reasons why an SSD is a better choice than a magnetic hard disk for this application.

[4 marks]

Reason 1 _____

Reason 2 _____

0	3
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A company needs to keep a file server in a secure room. The file server will need to be accessible for routine maintenance and in emergencies. All company staff carry an ID card but not all staff should be allowed into the secure room.

The company has replaced the keypad controlling an electronic door lock on the room with an RFID reader and replaced all staff ID cards with ones containing an RFID tag to control access.

State **three** characteristics of RFID technology **and** explain why each of these makes it a suitable choice in this scenario.

[3 marks]

0 4 . 1 RFID tags can be read by an RFID reader.

Describe how data is read from an RFID tag.

[3 marks]

0 4 . 2 An RFID tag can be active or passive. A passive tag must be moved within a few centimetres of an RFID reader to be read. An active tag will have its own power source, which allows it to be read from a greater distance.

It is decided that RFID tags will be used in passports to store personal information.

Explain why passive tags are likely to be a more appropriate choice than active tags for use in passports.

[2 marks]

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A smartphone company has designed a device that can be put into items such as luggage to help locate these items if they are lost. The device works by sending an encrypted signal containing its current location to nearby smartphones. The smartphones relay the signal to the company's servers via the Internet, allowing a user to see the device's exact location using a mobile phone app.

The company expects to sell hundreds of millions of devices. The data collected from each device will be permanently kept in secondary storage on the company's servers. The company is planning to use solid-state drives in the servers that will hold device location data but is unsure whether using solid-state drives is a good idea.

Discuss a range of moral, ethical, legal and cultural issues raised by the new device **and** explain the properties of solid-state drives that the company should consider when deciding on a secondary storage technology.

In your answer you will be assessed on your ability to follow a line of reasoning to produce a coherent, relevant and structured response.

[12 marks]

[illegible]

[illegible]

0 6

A warehouse stores products that are waiting to be delivered to supermarkets. The products are packed onto pallets. For example, a pallet might hold 120 boxes of washing powder. All of the products on one pallet are of the same type.

The individual products on the pallets could be identified by labelling them individually with barcodes or by attaching RFID (radio-frequency identification) tags to them.

Each barcode/RFID tag would store a representation of a ProductID number that uniquely identifies the type of product (eg 102546 might represent a specific brand and box size of washing powder) together with an ItemID number that is unique to the specific item (eg box number 1 of the washing powder, box number 2 of the washing powder etc).

Figure 9 shows an example of five boxes of washing powder loaded onto a pallet and their ProductID and ItemID values.

Figure 9

ProductID: 102546 ItemID: 1	ProductID: 102546 ItemID: 2	ProductID: 102546 ItemID: 3	ProductID: 102546 ItemID: 4	ProductID: 102546 ItemID: 5
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Figure 10 shows an excerpt from the simple database table that stores the details of the products that the warehouse has in stock.

Figure 10

ProductID	Description	QuantityInStock
102546	Washing Powder 1kg box	10 000
398352	Baked Beans 455g tin	1450
293820	Large Dishcloths	300

Some pallets delivered to the warehouse will be of products that already exist in the database table. Other deliveries will be of pallets of items that don't exist in the table because the warehouse has not stocked them before.

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Explain why the warehouse owners might prefer the individual products to be identified using RFID tags.

[2 marks]

0	6	.	2
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Explain why the product manufacturers or supermarket owners might prefer the individual products to be identified using barcode labels.

[2 marks]

0	6	.	3
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Describe how an RFID reader would read the ProductID and ItemID values from RFID tags as pallets are delivered and explain how this data could be used to update the database table that stores details of the products that the warehouse has in stock.

You should include in your description references to the type(s) of SQL statements (eg INSERT, SELECT, UPDATE) that could be used and their purpose, but you do **not** need to write any SQL code.

[6 marks]

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Explain why a laser printer with a built-in wireless network adapter is likely to be a suitable choice of printer for a small office.

[3 marks]

Describe the principles of operation of a laser printer.

[6 marks]

0	8
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Supermarkets often gather information about their customers and the purchases that they make. This information can be analysed by the supermarket and other companies for a range of purposes.

Some of the information is collected at the checkout, where the identity of the person is read from a loyalty or payment card using RFID (radio-frequency identification) and a barcode reader is used to identify the products being purchased.

By analysing the purchases that a shopper has made, it might be possible to identify such things as whether the shopper has children, is pregnant, or lives in a house with a garden. Other types of analysis might include the amount of money a customer spends, the times that they choose to shop at and the differences in shopping habits of different groups of shoppers.

Describe the principles of operation of the hardware used to collect the information **and** discuss some of the ethical and legal issues that might arise as a result of the capture and processing of this data.

In your answer you will be assessed on your ability to follow a line of reasoning to produce a coherent, relevant and structured response.

[12 marks]

[illegible]

[illegible]

0 9 . 1 Explain why desktop computers usually have secondary storage devices.

[2 marks]

Describe the principles of operation of an SSD.

[illegible]

1 0 . 1

A company uses a file server that stores files on magnetic hard disk drives. These files can be accessed by other computers through a network.

Describe:

- how the data for a file would be stored on a magnetic hard disk **and** read from it by the file server
- how the individual layers of the TCP/IP stack in the file server would be used to transmit the file onto the network.

In your response, you do **not** need to describe how the file would be transmitted across the network or how the TCP/IP stack would be used in the computer that has requested the file. You only need to write about how the data would be put onto the network by the file server.

[12 marks]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

[illegible]

1 0 . 2 The company needs to purchase a second file server.

It is considering whether to purchase a file server with magnetic hard disk drives installed or a file server with solid-state disks (SSDs) instead. Each of the file servers has the same total storage capacity.

State **one advantage** and **one disadvantage** of purchasing the file server that uses SSDs.

[2 marks]

Advantage _____

Disadvantage _____
