



4.7.4 External Hardware Components

1) Optical disk drives and USB flash drives are two ways of transferring files from one computer to another.

- a) Describe the principles of operation of an optical disk drive that is used to read data from an optical disk such as a CD-ROM or DVD-ROM.

[6 marks]

- b) USB Flash Drives (a type of SSD) are a more popular choice for transferring files such as images and word processed documents than CD-Rs (a type of optical disk).

Explain why this is the case.

[1 mark]

2) 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 the uniquely identifies the type of product (e.g. 102546 might represent a specific brand and box size of washing powder) together with an ItemID number that is unique to the specific item (e.g. box number 1 of the washing powder, box number 2 of the washing powder etc).

Figure 1 shows an example of five boxes of washing powder loaded onto a pallet and their ProductID and ItemID values.

Figure 1

ProductID: 263456 ItemID: 1	ProductID: 112485 ItemID: 2	ProductID: 892844 ItemID: 3	ProductID: 421111 ItemID: 4
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Figure 2 shows an excerpt from the simple database table that stores the details of the products that the warehouse has in stock.

Figure 2

ProductID	Description	QuantityInStock
263456	Tomato Soup 455g tin	1250
112485	Small Dishcloths	500
892844	Digital Scales	200

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.

- a) Explain why the warehouse owners might prefer the individual products to be identified using RFID tags.
- [2 marks]**
- b) Explain why the product manufacturers or supermarket owners might prefer the individual products to be identified using barcode labels.
- [2 marks]**
- c) 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 types(s) of SQL statements (e.g. INSERT, SELECT, UPDATE) that could be used and their purpose, but you do **not** need to write any SQL code.

[6 marks]





- 3) 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]

- 4) Describe the principles of operation of a laser printer.

[6 marks]

- 5) 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.

Describe the principles of operation of the hardware used to collect the information

[6 marks]

- 6) A computer is fitted with a solid-state disk (SSD).

- a) Explain why desktop computers usually have secondary storage devices.

[2 marks]

- b) Describe the principles of operation of an SSD.

[4 marks]





7) 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.

- a) Describe how the data for a file would be stored on a magnetic hard disk and read from it by the file server.

[4 marks]

- b) 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]

8) The organisers of a marathon race have installed checkpoints at regular intervals along the course. The time at which each competitor passes a checkpoint is recorded.

- a) Three input devices that could be used at each checkpoint to capture data automatically as competitors pass by are:
- Barcode reader
 - Digital camera
 - RFID reader

The race organisers decide to use RFID readers. Evaluate the suitability of all three devices and explain why RFID is the most appropriate choice.

[6 marks]

The computer used by the race organisers has a built-in magnetic hard disk drive, a built-in solid-state disk and an optical disk drive.

- b) State **two** reasons why the computer has a magnetic hard disk and a solid-state drive instead of using only solid-state storage.

[2 marks]

- c) State **two** hardware components of a solid-state drive..

[2 marks]

