Name: _____

IAL IT Topic 4 Questions

Date:

Time:

Total marks available:

Total marks achieved: _____

Questions

Q1.

A company that sells flowers has replaced its paper-based transaction system with an IT system.

In the paper-based system orders were taken by phone and recorded on order pads.

At the end of each day the manager reviewed the orders that had been placed and purchased new stock.

Explain **one** advantage **to the company** of changing from a paper-based system to an IT system.

(2)

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(Total for question = 2 marks)

Q2.

Maira organises a video-gaming league, where teams of players compete against each other in online battles. Each team plays every other team twice, once in a defending role and once in an attacking role.

Each player belongs to one team.

Each player may create and own multiple characters.

Maira is creating a database to store the information needed.

These four entities will be used in the database:

Team (Team_ID, Team_name, Team_email, League_position, Points, Battles_fought)

PlayerPersonal (Player_ID, Team_ID, Player_name, Player_email)

PlayerCharacter (Character_ID, Player_ID, Character_name, Character_role, Gender, Species, Level)

Battle (Battle_ID, Defence_team_ID, Attack_team_ID, Battle_date, Battle_time)

When a player wants to play the online game they must log in to their account.

If a player has forgotten their password, they must start a 'change password' process.

Clicking on the 'forgot my password' button starts the process.

The player must then:

- enter their email address
- enter their date of birth
- click the 'change password' button.

The system then checks the email address and date of birth against stored records.

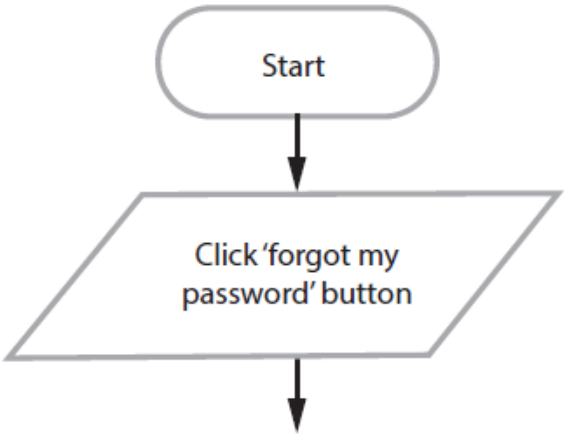
If a match is found a random password is generated and emailed to the player.

If a match is **not** found an error message is generated and the player must try again.

Here is a partially completed flowchart.

Complete the flowchart to show how the 'change password' process works.

(6)



(Total for question = 6 marks)

Q3.

A transport company runs bus services on several routes in a large town.

The company has an IT system that provides passenger services at bus stops including:

- a scrolling display that gives details of the next three buses that are due to arrive
- a contactless card terminal with a touch screen that allows a passenger to add credit to and/or check the credit remaining on a card and displays the transactions.

Displays and transactions are handled by the company's server.

Real time information for each bus's location is produced by:

- buses connecting to the company by 3G signals
- buses reporting their current location as they pass each bus stop.

Explain why a dataflow diagram is useful when planning an information system.

(3)

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(Total for question = 3 marks)

Q4.

A small business needs a new IT system.

The design of the new system needs to specify the hardware, software, and processes required.

Figure 1 is a diagram of the network for the new IT system.

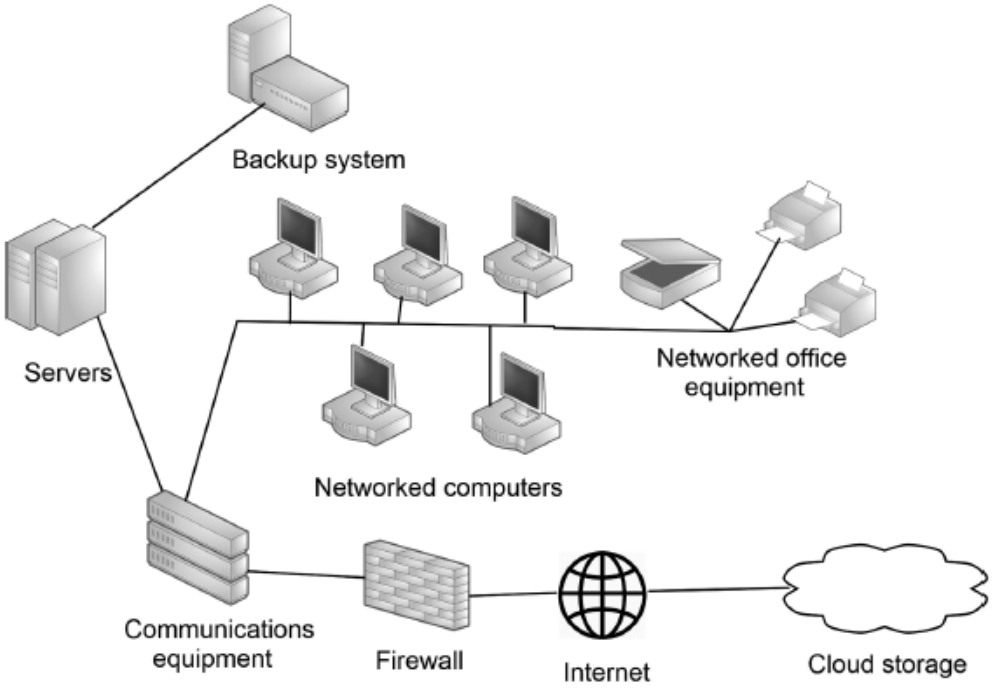

Figure 1

(i) The system designer should consult with the people who will be working with the new IT system. One of these would be the business owner.

Give **two other** people who should be consulted.

(2)

1 .....

2 .....

(ii) Explain **two** network-based security processes that should be specified and designed for the new IT system.

(4)

1 .....

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2 .....

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(Total for question = 6 marks)

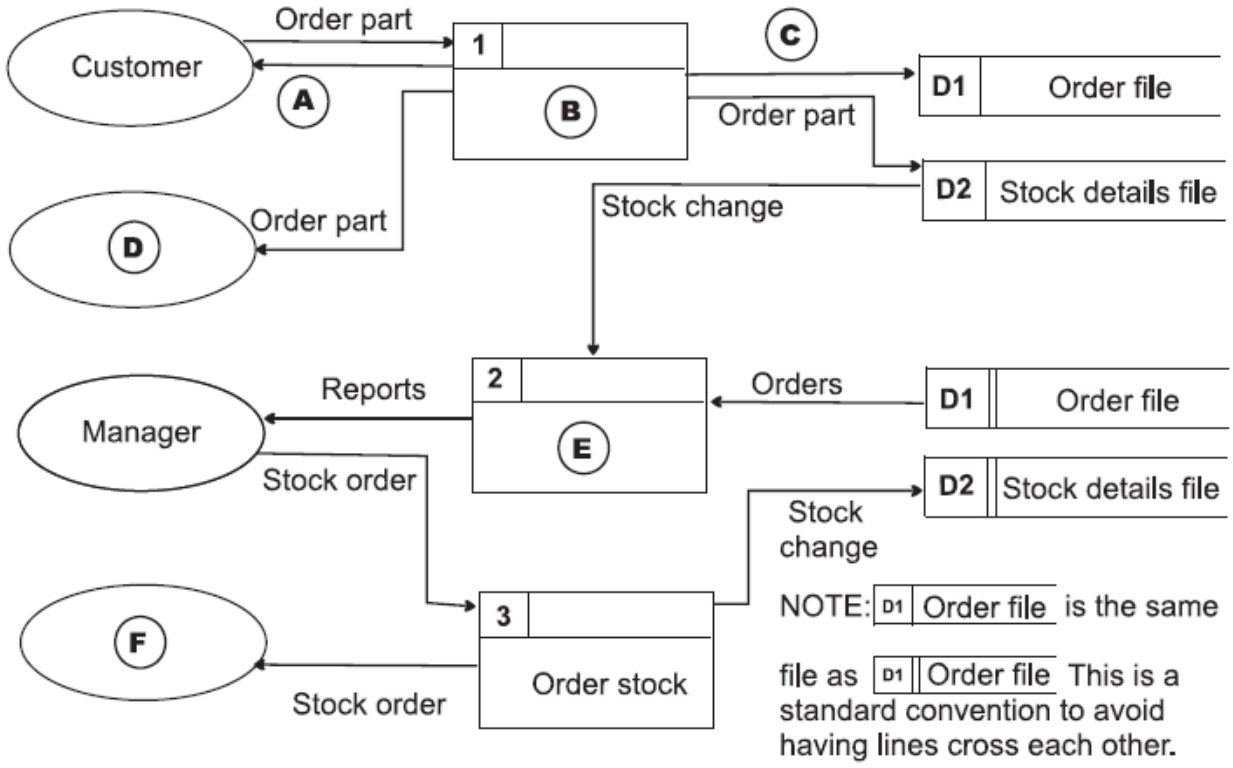
Q5.

A car dealer has a spare parts department where customers buy parts for their cars.

A customer places an order. The order is passed to a member of staff who finds the part in the stockroom. The part is then given to the customer together with an invoice.

The number in stock of that part is updated. The manager orders further stock from a supplier when needed.

Here is a partially completed data flow diagram for this process.



Complete the table to show the names for the labels A–F.

(6)

Label	Name
A	
B	
C	
D	
E	
F	

(Total for question = 6 marks)

Q6.

The country of Varma Loko has several large towns, joined by a toll road.

Every vehicle has a passive RFID tag with a unique ID, linked to the driver's account.

Each entry to the toll road has a check point. It uses a radar set to detect if a vehicle is present or not.

When a vehicle is detected at a check point its tag ID is read. The barrier is then raised to allow the vehicle to pass and dropped again afterwards.

Drivers are charged a fixed toll each time they pass through a check point.

The system updates the driver's account by adding the toll charge.

Drivers must pay into their account at a physical payment point.

Draw a dataflow diagram for the system.

(12)

(Total for question = 12 marks)

Q7.

A small business needs a new IT system.

The design of the new system needs to specify the hardware, software, and processes required.

The new IT system must be fit for purpose.

Explain how fitness for purpose of a new system is evaluated.

(3)

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(Total for question = 3 marks)

Q8.

A small online store uses a database to track its transactions.

These five entities will be used in the database:

Buyer (Buyer_ID, Username, Password, Email, Shipping_name, Shipping_address, Phone)

Product (Product_ID, Product_name, Description, Price, Stock_remaining)

Purchase (Purchase_ID, Buyer_ID, Product_ID, Quantity, Delivery_stage)

Shopcart (Shopcart_ID, Buyer_ID, Product_ID, Quantity)

Review (Review_ID, Buyer_ID, Product_ID, Comment)

A buyer can purchase only one product at a time.

The buyer puts a product into their shopcart until they are ready to pay for it.

Once paid for, a purchase record is generated for the product.

Buyers can leave product reviews.

When a buyer purchases a product, they must log on to their account. The store uses two-factor authentication.

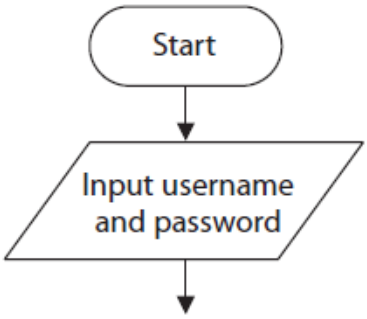
One factor is the buyer's password, stored in the database.

The second factor is a one-time code generated during the logon process and sent to the user's phone. The code is time limited to five minutes. If the user does not use the code within that time, they must restart the logon process.

There is no limit on how many times a user may enter a username, password or code.

Complete the flowchart to show how the logon process works.

(6)



(Total for question = 6 marks)

Q9.

A transport company runs bus services on several routes in a large town.

The company has an IT system that provides passenger services at bus stops including:

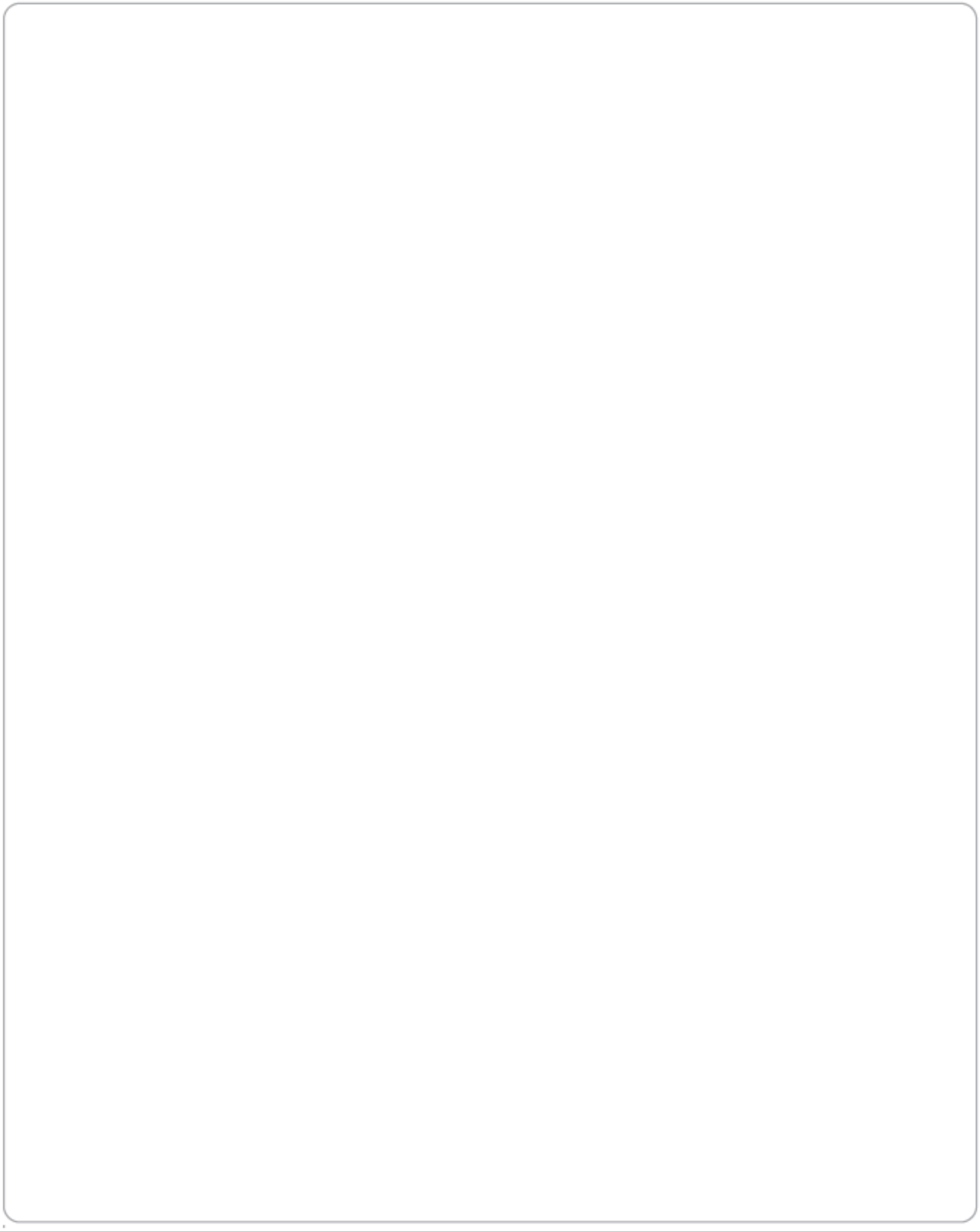
- a scrolling display that gives details of the next three buses that are due to arrive
- a contactless card terminal with a touch screen that allows a passenger to add credit to and/or check the credit remaining on a card and displays the transactions.

Displays and transactions are handled by the company's server.

Real time information for each bus's location is produced by:

- buses connecting to the company by 3G signals
- buses reporting their current location as they pass each bus stop.

Draw a dataflow diagram for the IT system.



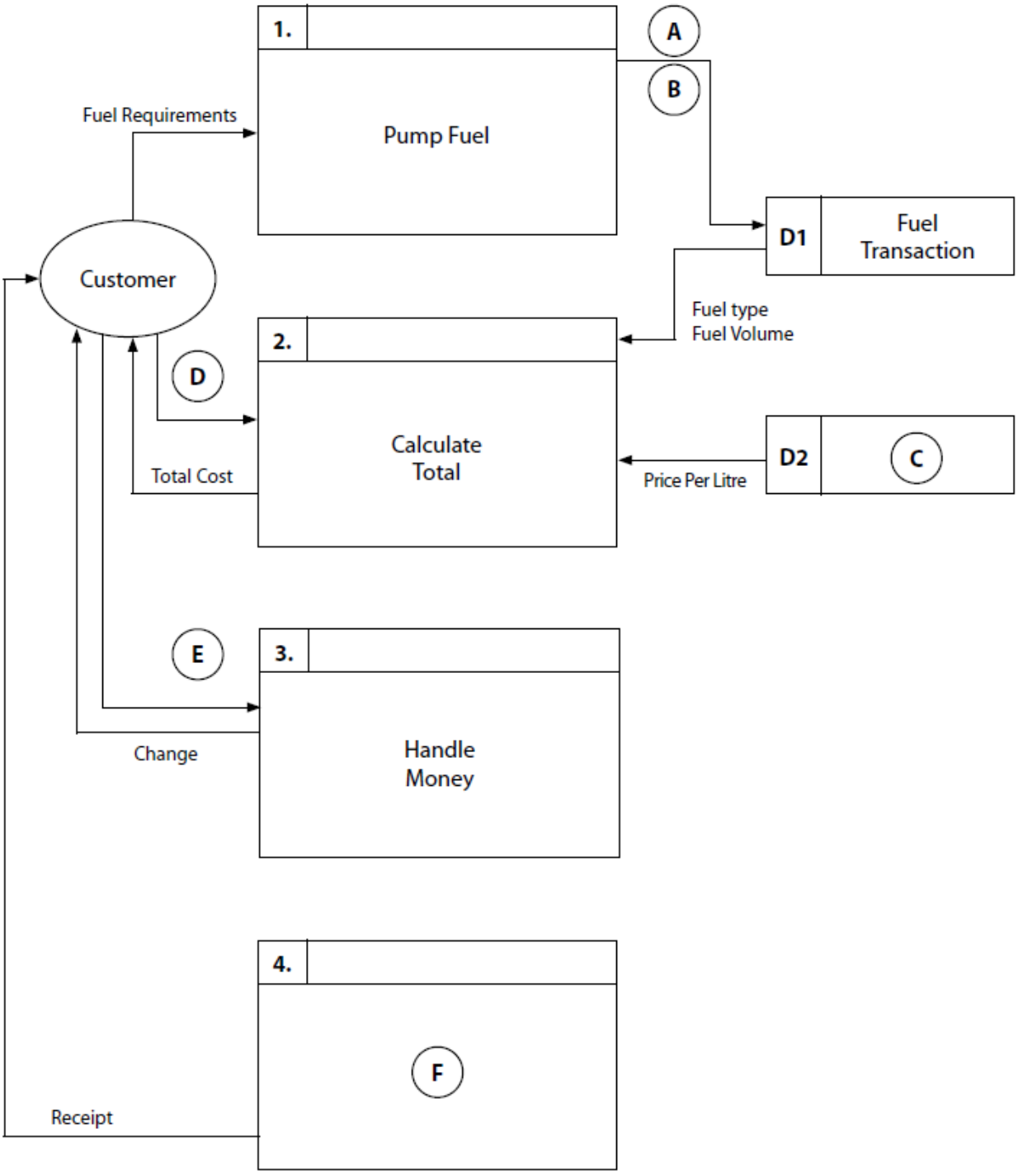
(Total for question = 12 marks)

Q10.

A service station has four self-service fuel pumps, numbered 1 to 4. Each pump can dispense

petrol and diesel fuel. The pumps measure the volume of fuel dispensed in litres. Customers pay for the number of litres shown on the pump display.

Here is a partially complete data flow diagram for purchasing fuel.



Complete the table to show names for the items labelled A–F.

(6)

Label	Name of item
A	
B	
C	
D	
E	
F	

(Total for question = 6 marks)

Q11.

Answer the questions with a cross in the boxes you think are correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Julie is a website developer. She designs and builds websites to meet the requirements of clients.

Julie uses diagrams to show a website's functionality to a client.

(i) Identify which **one** of these diagrams would be a flowchart.

(1)

☒ **A** Site map, showing the hierarchy of the pages and the links between them

☒ **B** User journey, showing the steps a user takes to perform a task on the website such as making a purchase

☒ **C** Wireframe, showing the elements that exist on a page

☒ **D** Data model, showing the data structures used for server-side processes

(ii) Using a flowchart is better than using a text description to explain a website's functionality to a client.

Identify the reason that **best** describes why it is better to use a flowchart.

(1)

☒ **A** A flowchart takes up less space than a text description

☒ **B** A flowchart is easy to email

☒ **C** A flowchart does not depend on a particular language

☒ **D** A flowchart is better for describing complex connections

(Total for question = 2 marks)

Q12.

A regional educational centre employs teachers to work with local schools.
The teachers travel between the schools. They do not have offices in either the schools or the centre. Anika is one of the teachers.

Anika is training to run a marathon. She wears a device on her wrist that helps with her training. Here is a drawing of the device.

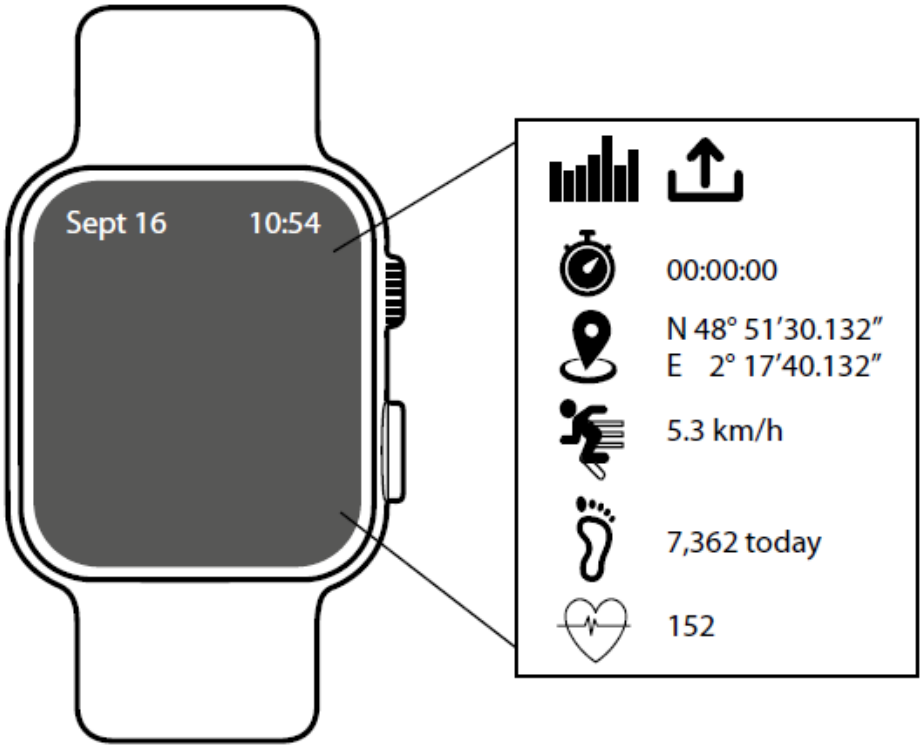


Figure 2

The device demonstrates technological convergence.

Explain **two** benefits of technological convergence in this device.

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(Total for question = 4 marks)

Q13.

A car dealer has a spare parts department where customers buy parts for their cars.

A customer places an order. The order is passed to a member of staff who finds the part in the stockroom. The part is then given to the customer together with an invoice.

The number in stock of that part is updated. The manager orders further stock from a supplier when needed.

A customer wants to buy a replacement light bulb for a car. The bulb is no longer manufactured. The car dealer can order one from a specialist supplier. A member of staff uses a specialist database to find suppliers of the bulb.

The database includes these tables. Sample data is included.

tbl_supplier		
supplierID	**name**	**telephone**
S784	Bloggs Rare Parts	01521665717
S131	Vintage Spares	01265775836
S461	Bulbs and Batteries	01831231445

tbl_bulb						
bulbID	**manufacturer**	**partnumber**	**voltage**	**supplierID**	**stocklevel**	**watts**
LA563	Lucas Electrical	LLB71Ba15d	12	2784	4	36
LA517	Lucas Electrical	LLB187APG20/4	12	1154	9	24
LA461	Osram	581 PY21W	12	1887	12	21

The manufacturer of the bulb is Lucas Electrical. The member of staff can only make out **LL~~80 1157 BAY~~D** of the part number: where the symbol ~ indicates an unreadable character.

(i) Write an SQL query that will display names and contact details of suppliers who are likely to have the bulb in stock. List the suppliers in alphabetical order.

(6)

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(ii) Explain **one** advantage for the **car dealer** of having access to the specialist database.

(3)

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(Total for question = 9 marks)

Q14.

A bus company provides hop-on hop-off buses for tourists.

The buses run on four routes, stopping at tourist attractions. Speakers by each seat give a commentary on what can be seen as a bus travels around its route.

Customers purchase tickets for one or more routes.

The bus company controls the buses and ticketing from servers at the main bus station.

There is a hot backup system at a secondary bus station. The hot backup duplicates the main system. It is updated in real time and can take over immediately if needed.

A mesh Wi-Fi network links bus stations, buses, and bus stops.

Tickets may be purchased at numerous shops around the city. A ticket is a plastic card holding details of the routes and the date for which it is valid.

Ticket outlets and buses have near field communication (NFC) devices that can read from and write to the tickets.

Each bus stop has a display screen. The screen shows the route and estimated arrival time of the next five buses.

Each bus has a GPS receiver. The buses report their position every minute and the servers update the display screens.

Complete the diagram to show a network design for the system.

Indicate:

- wired connections by solid lines
- fibre optic connections by double solid lines
- wireless connections by dashed lines
- network components by labelled symbols.

(Total for question = 12 marks)

Q15.

Paula has a network with a home office and wants to add an entertainment room.

Paula has these requirements.

- The existing home office has a PC and network-attached storage device (NAS). These are connected by Ethernet and will remain as they are.
- The internet connection comes into the house in the home office. It will be shared with the rest of the network.
- The rest of the house has a single Ethernet connection from the home office.
- Paula has a laptop that connects to the network by Wi-Fi. This must still be possible.
- The entertainment room will have a media server, a sound system, a projector and a television. These must all have Ethernet connections.
- The sound system will be controlled by the projector via Bluetooth.
- The television will be able to mirror a screen display from any mobile device that has Wi-Fi enabled.

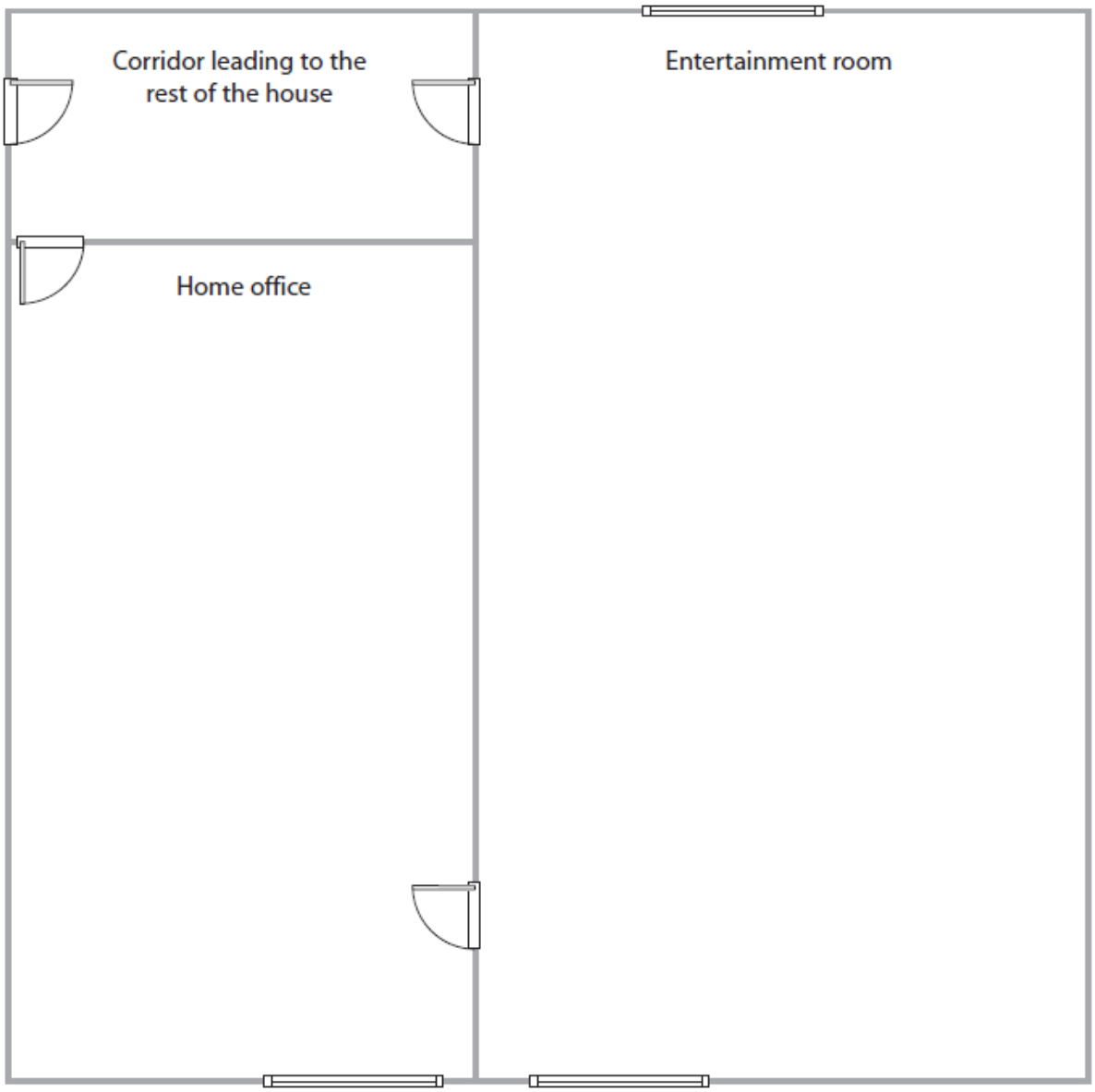
(a) Complete the diagram to show a network design that will meet Paula's requirements.

You must:

- represent an Ethernet connection by a solid line
- represent a wireless connection by a line of dashes.

You may represent network components by a labelled box or symbol.

(10)



(b) Paula's network can be improved by adding a hardware firewall.

(i) Draw an X on your network diagram to show where the hardware firewall should be located.

(1)

(ii) Explain **one** advantage of a hardware firewall over a software firewall.

(2)

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(c) When a video is sent to the projector it requires an Ethernet cable connection but the audio track for that video can be sent to the sound system via Bluetooth.

Explain why the video must be sent by Ethernet but the audio only needs Bluetooth.

(2)

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(Total for question = 13 marks)

Q16.

In the country of Varma Loko, main roads often run through small villages. The Transport Ministry has installed a traffic management system in each village.

One crossroads in each village has a set of traffic lights controlling the main road and the side roads. The system is controlled by a computer.

These are the system requirements.

- The default setting is for the lights on the main road to be green (go) and the lights on the side roads to be red (stop).

- Proximity and speed sensors are used to detect the two conditions for when the lights will change.

The conditions are:

- when a vehicle stops at a red light on the side road

- when a vehicle enters the village on a main road over the speed limit.

- An emergency vehicle can send a radio signal to change the lights.

- The lights reset to the default setting after a set time.

- If a vehicle moves past a red light on any road, a digital camera takes a photo and uploads it to the local police headquarters via the internet.

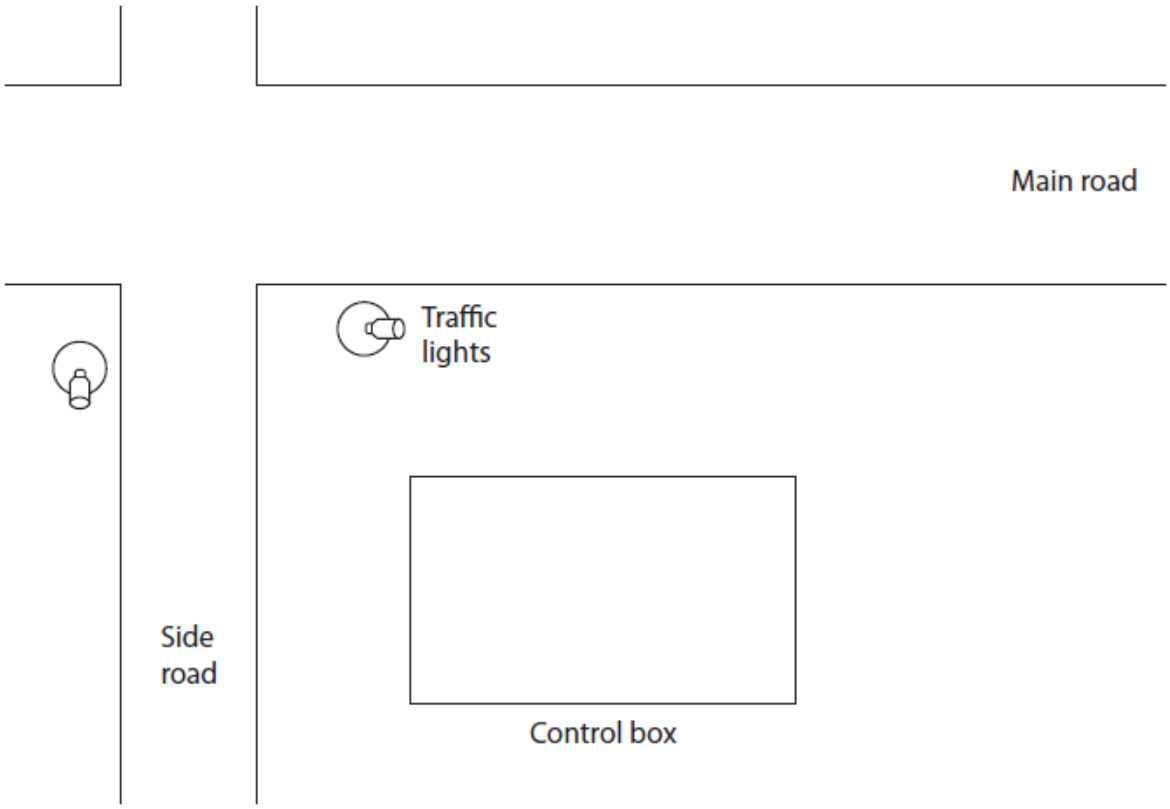
You only need to show devices and connections for the lower side road and the right-hand part of the main road.

You should:

- represent a cable connection by a solid line

- represent a wireless connection by a line of dashes
- represent network components by a labelled box or symbol
- include appropriate network components in the control box.

(10)



(Total for question = 10 marks)

Q17.

A service station has four self-service fuel pumps, numbered 1 to 4. Each pump can dispense petrol and diesel fuel. The pumps measure the volume of fuel dispensed in litres. Customers pay for the number of litres shown on the pump display.

Sometimes, customers leave without paying for the fuel. In order to stop this, the service station puts a camera and a motion sensor on each of the four pumps. The service station will have a date- and time-stamped photograph of all vehicles using the service station.

Draw a flow chart to describe this process.

(6)

(Total for question = 6 marks)

Q18.

A regional educational centre employs teachers to work with local schools.
The teachers travel between the schools. They do not have offices in either the schools or the centre. Anika is one of the teachers.

Anika has a small baby. She wants to use a new IT system to monitor the baby's health. The system uses a device inside the baby's dummy (pacifier).

(Source: ©roccomontoya/getty Images)

Figure 1

The dummy (pacifier):

- monitors the baby's temperature and sends an alert if the temperature goes too high
- can be located if lost
- works with a smartphone.

Give **four** ways in which the system could accomplish these tasks.

(4)

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(Total for question = 4 marks)

Q19.

A company that sells flowers has replaced its paper-based transaction system with an IT system.

Flowers that are available to order are displayed on the company's website.

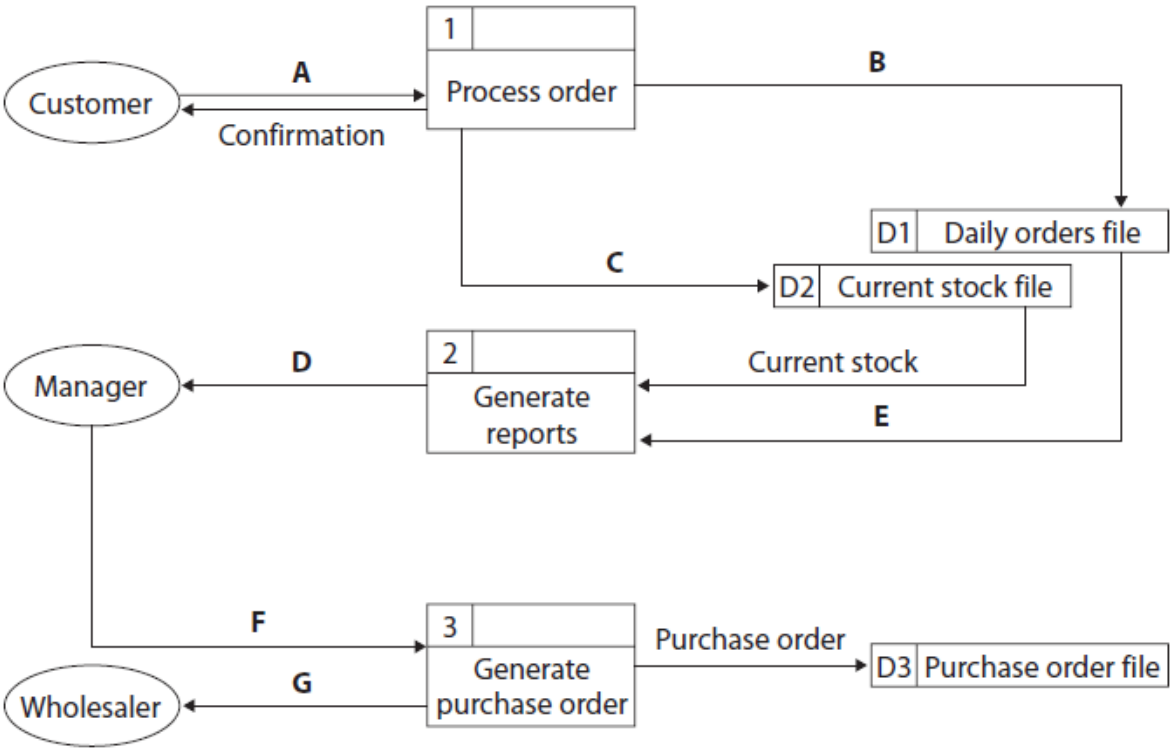
Customers order flowers online.

The company's current stock file is updated as each order is processed.

Stock and order reports are sent to the manager at the end of each day.

After reading the reports, the manager decides what new stock needs to be ordered from the wholesaler.

Here is a partially completed dataflow diagram for this process.



Dataflow is indicated by arrows.

Complete the table by stating what data is moving for the labels A to F.

The first one is done for you.

(6)

Label	Data
A	Order
B	
C	
D	
E	
F	
G	

(Total for question = 6 marks)