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Answer ALL the questions. Write your answers in the spaces provided.

1. (a) Waste minimisation in the manufacture of products leads to important cost savings.

Explain **two** ways in which manufacturers can minimise waste.

1

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2

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(4)

- (b) Economies of scale are factors that cause average costs to be lower in high-volume production than in one-off production.

Explain **three** ways in which companies can achieve economies of scale.

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3

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(6)

(Total 10 marks)

Q1

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2. (a) Marketing involves anticipating and satisfying consumer needs while ensuring profitability.

Choose **three** of the following marketing terms and explain what is meant by each.

- Brand loyalty
- Lifestyle marketing
- Target market groups
- Consumer demand

(i) Chosen marketing term 1:

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(2)

(ii) Chosen marketing term 2:

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(2)

(iii) Chosen marketing term 3:

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(2)



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(b) Electronic Point of Sale (EPOS) plays an essential role in retailing.

Explain **three** benefits, to a retail outlet, of using EPOS.

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(6)

Q2

(Total 12 marks)



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3. Figure 1 shows a stool. The three legs have been manufactured using the process of lamination.

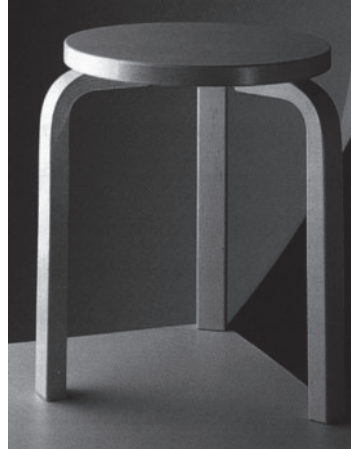


Figure 1

(a) Explain **three** advantages of laminating the legs compared with producing them from solid timber.

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3

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(6)



4. (a) Electronic Data Interchange (EDI) is widely used in manufacturing and retailing.

(i) Give **two** advantages, for the manufacturer, of using Electronic Data Interchange.

1
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2
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(2)

(ii) Give **two** advantages, for the consumer, of using Electronic Data Interchange.

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2
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(2)

(b) Complex computer control systems are constantly being developed for use in modern companies.

(i) Describe what is meant by the term 'Artificial Intelligence (AI)'.

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(2)



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(ii) Describe what is meant by **one** of the following aspects of Artificial Intelligence (AI).

- Voice recognition systems
- Natural language processing

Chosen aspect:

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(2)

Q4

(Total 8 marks)

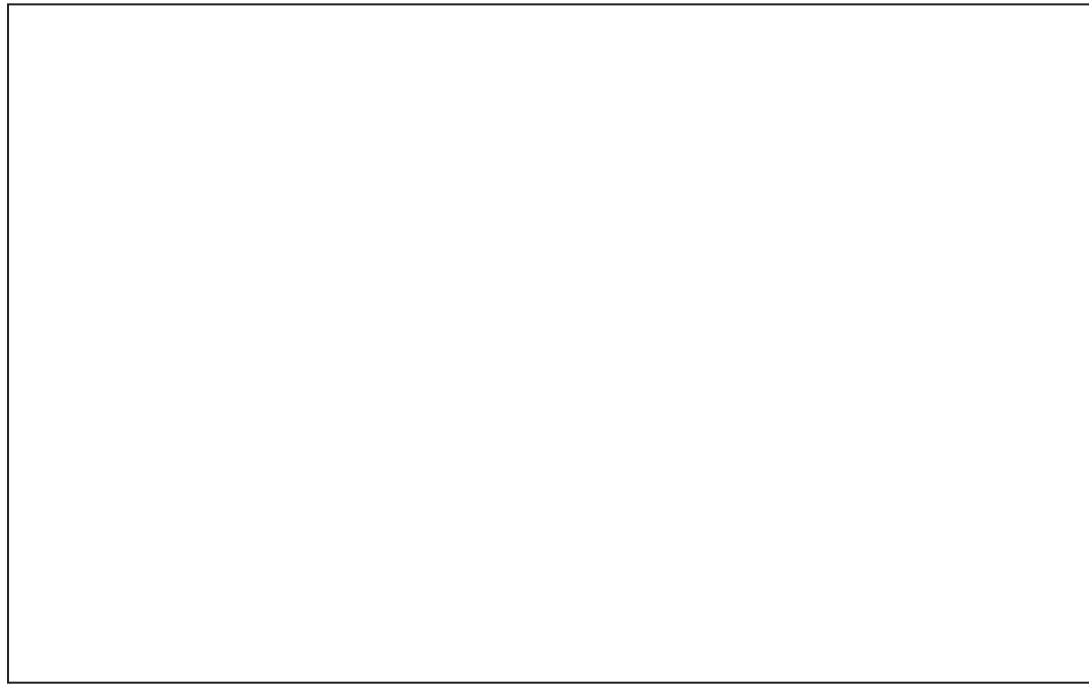


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5. The temperature in a greenhouse needs to be kept constant. The temperature is regulated by opening and closing a window as required.

(a) In the space below, design a block flow diagram to represent an automated system for opening and closing a greenhouse window to keep the temperature in the greenhouse constant.

You must clearly identify the input, process, output and where feedback occurs.



(4)

(b) Explain what is meant by the term 'Shape Memory Alloy (SMA)'.

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(2)



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(c) Figure 2 shows an illustration of a greenhouse with an opening window.

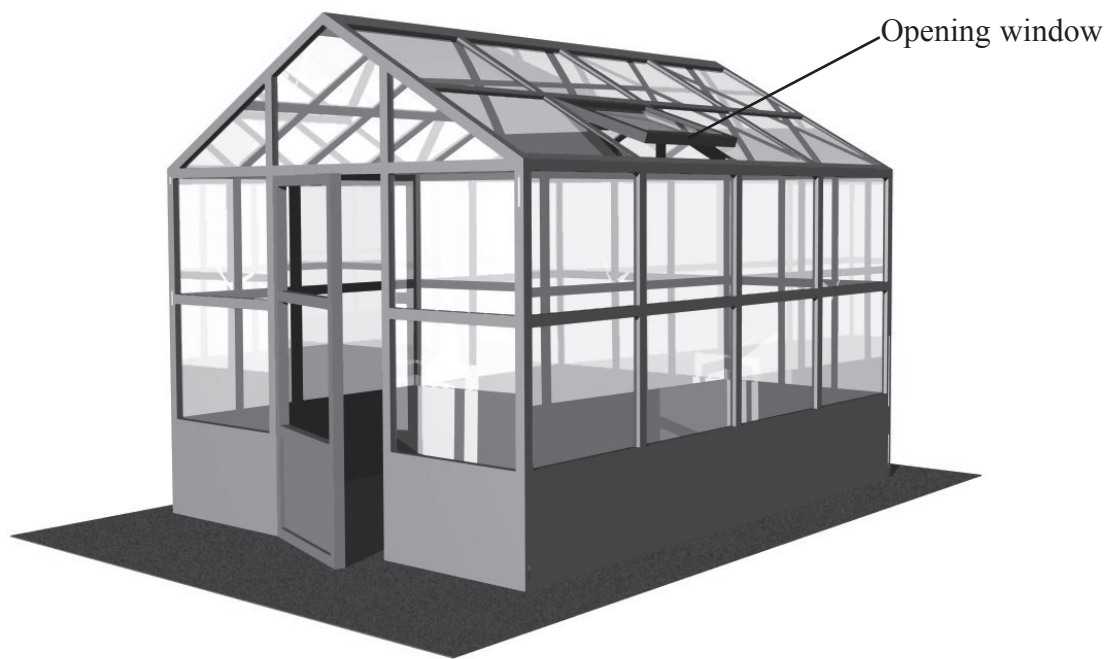
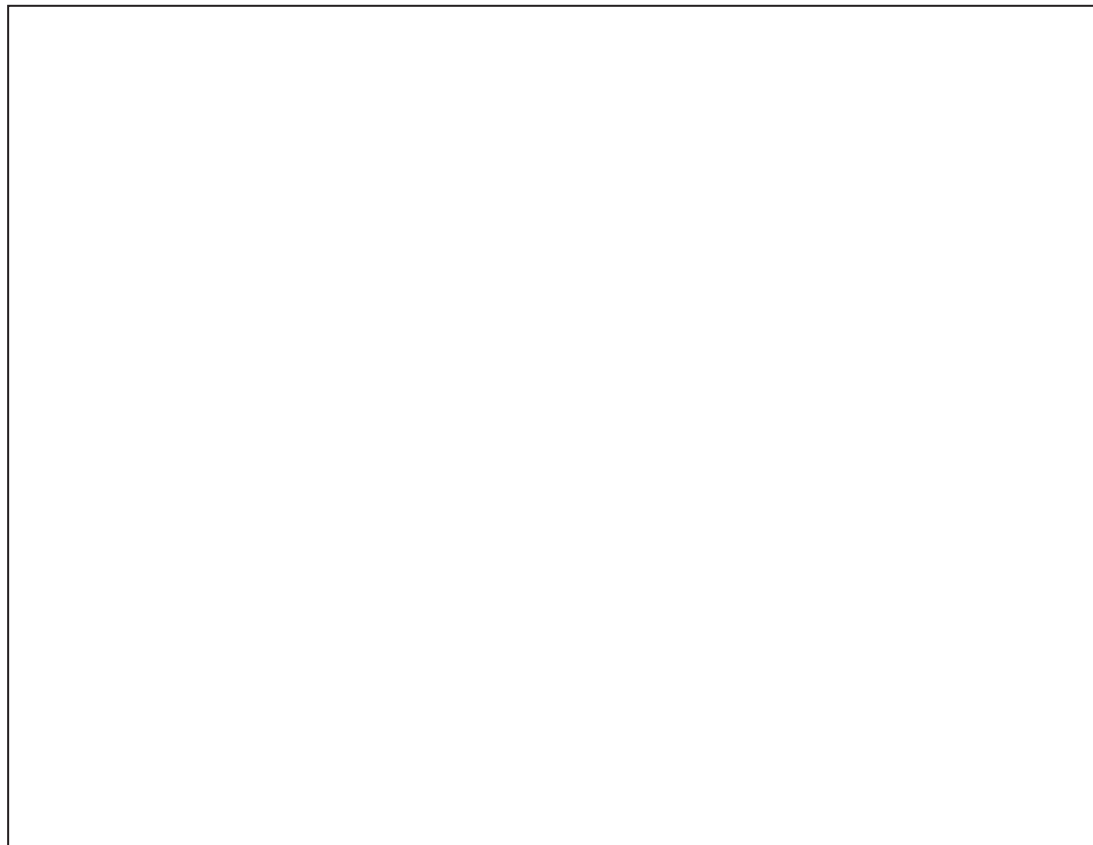


Figure 2

With reference to a **Shape Memory Alloy** produce an annotated sketch of an initial design idea of a product that would automatically open and close the greenhouse window.



(3)



(d) Before a design goes into production, the cost of materials must be taken into consideration.

Give **three** factors that determine why some materials are more expensive than others.

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(3)

(Total 12 marks)

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Q5



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6. Modern and 'smart' materials are being developed to replace existing materials, due to their improved properties.

(a) Explain **two** reasons why carbon fibre is used in the production of body armour.

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2

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(4)

(b) (i) Explain **two** advantages of using solar panels to generate electricity for domestic use.

1

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(4)

(ii) Explain **one** disadvantage of using solar panels to generate electricity for domestic use.

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(2)

(Total 10 marks)

Q6

13

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7. Life Cycle Assessments (LCA) are used by manufacturers to assess products at various stages from conception through to disposal in order to reduce the negative environmental impact.

Explain, under the following headings, how companies can reduce the negative environmental impact when manufacturing products.

(a) Use of the product

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(4)

(b) Recycle/disposal of the product

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(4)

(Total 8 marks)

Q7



