

**Friday 18 January 2013 – Morning**

**A2 GCE DESIGN AND TECHNOLOGY**

**F524/01** Product Design: Component 1

Candidates answer on the Question Paper.

**OCR supplied materials:**

None

**Other materials required:**

- A calculator may be used

**Duration: 1 hour**



Candidate forename		Candidate surname	
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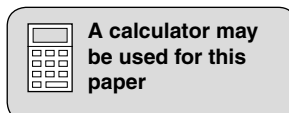
Centre number						Candidate number				
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**INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- This paper is to be taken with F524/02 in the same examination session of **2 hours 30 minutes**. The times given on the front of each paper are advisory.
- Components 1 and 2 should be available to candidates for the full session.
- Answer **ONE** question only from component 1 and **ONE** question only from component 2.
- Component 1 and Component 2 choices can be from different material areas although it is envisaged that most candidates will select the same material area.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Do **not** write in the bar codes.
- The discuss question will be used to assess your Quality of Written Communication.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **36**.
- All dimensions are in mm.
- Where appropriate calculations should be shown.
- This document consists of **44** pages. Any blank pages are indicated.



1 Built Environment and Construction

Fig. 1 shows an internal wall constructed from dense concrete blocks.

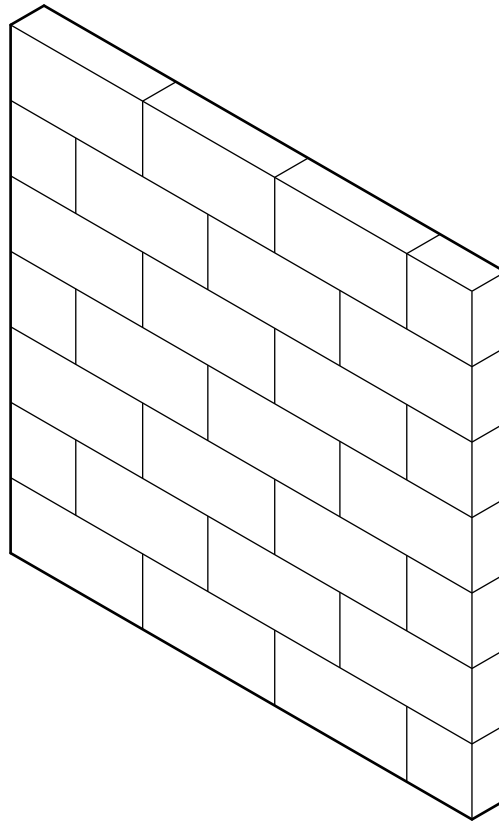


Fig. 1

(a) Give **four** justified design requirements for an internal wall of the type shown in Fig. 1.

- 1 .....
- 2 .....
- 3 .....
- 4 .....

[4]

(b) Give **two** benefits of using an automated system to manufacture products.

1 .....

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2 .....

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[4]

(c) Describe **two** key features of the Health and Safety at Work Act 1974.

1 .....

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2 .....

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[4]

(d) Explain, using examples, the importance of aesthetics in product design.

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[4]

- (e) (i) State a **suitable specific surface finish** that could be fixed to the internal wall shown in Fig. 1.

Give **two** properties or characteristics that make the fixed surface finish suitable for this use.

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..... [3]

**Question 1(e)(ii) begins on page 5**

- (ii) Describe, in detail, one method of fixing the surface finish to the internal wall. Give details of tools, materials and/or specialist equipment used. Use a flow chart and/or annotated diagrams to support your answer.

[9]

**Question 1(f) begins on page 6**



2 Engineering

Fig. 2 shows an underground storage tank for waste water.

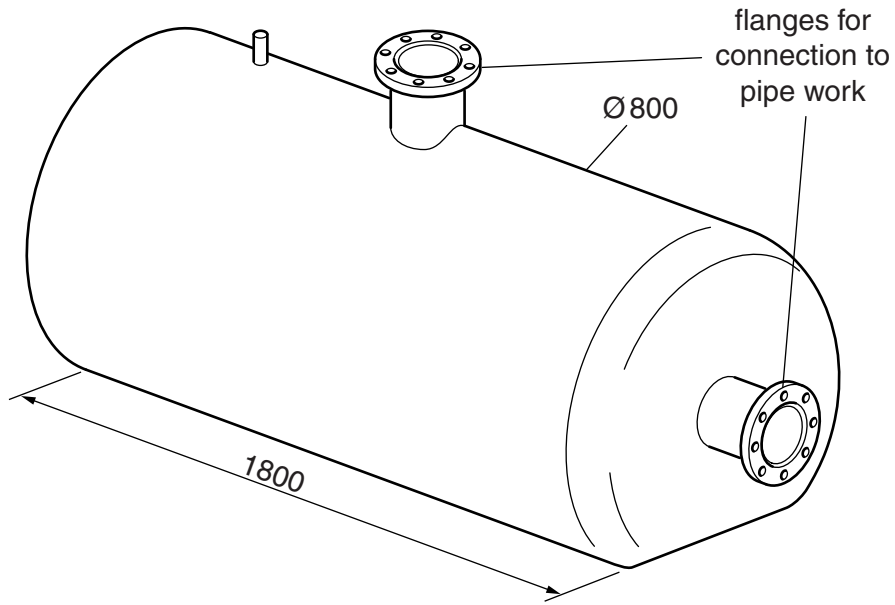


Fig. 2

(a) Give **four** justified design requirements for a storage tank of the type shown in Fig. 2.

- 1 .....
- 2 .....
- 3 .....
- 4 .....

[4]

(b) Give **two** benefits of using an automated system to manufacture products.

1 .....

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[4]

(c) Describe **two** key features of the Health and Safety at Work Act 1974.

1 .....

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(d) Explain, using examples, the importance of aesthetics in product design.

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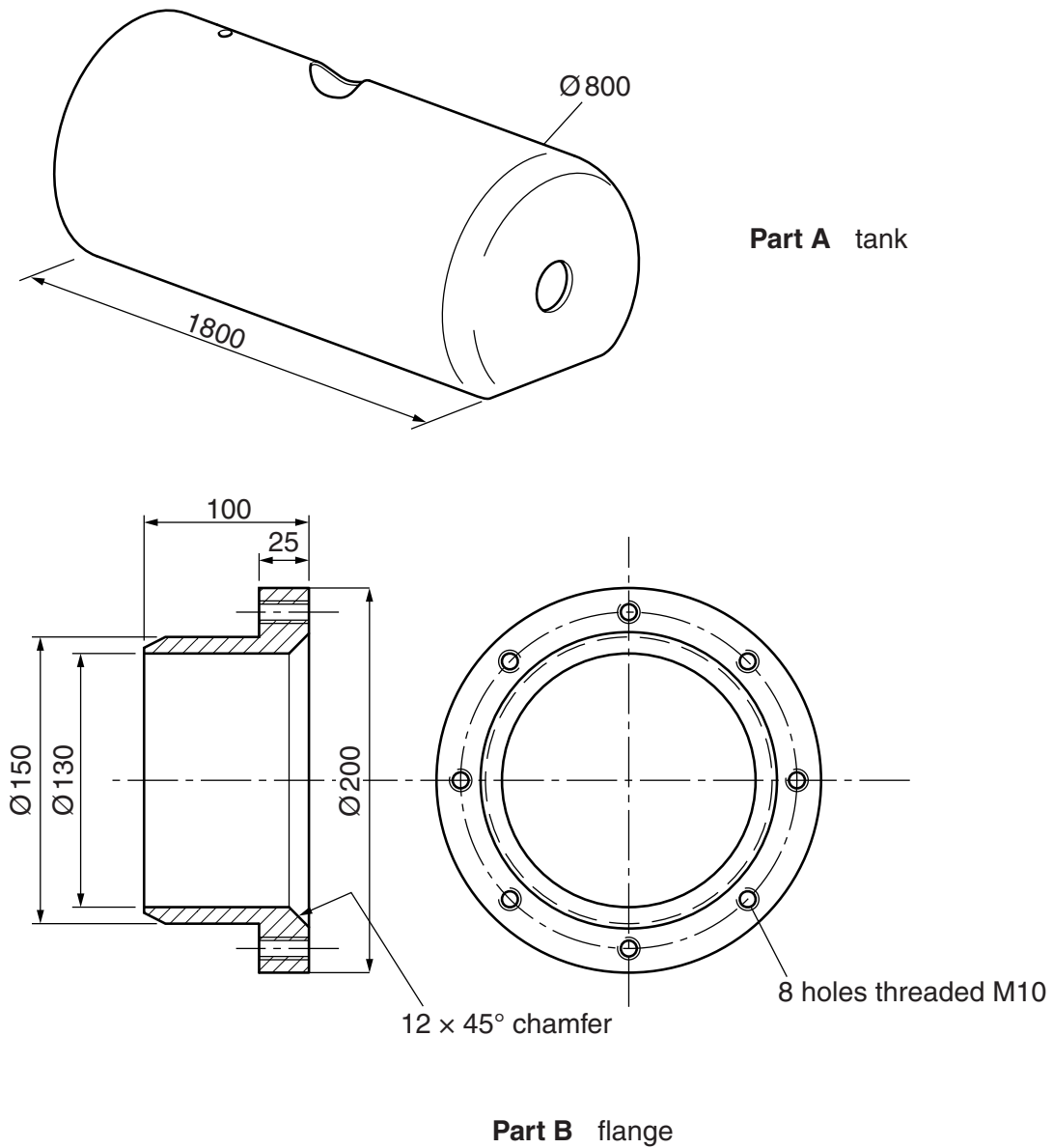
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[4]



(e) Fig. 3 shows two parts of the storage tank shown in Fig. 2.



**Fig. 3**

Choose **one** of the parts shown in Fig. 3

Chosen part .....

- (i) State a **suitable specific material** for the part that you have chosen.  
Give **two** properties or characteristics that make the material suitable for this use.

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[3]

Turn over

**10**

- (ii)** Describe, in detail, how the part you have chosen would be manufactured as a batch of 50.  
Include details of any jigs, moulds and/or formers used.  
Use a flow chart and/or annotated diagrams to support your answer. **[9]**

**Question 2(f) begins on page 11**



3 Food

Fig. 4 shows a pre-packed sandwich.



Fig. 4

(a) Give **four** justified design requirements for a pre-packed sandwich of the type shown in Fig. 4.

- 1 .....
- 2 .....
- 3 .....
- 4 .....

[4]

(b) Give **two** benefits of using an automated system to manufacture products.

- 1 .....
- 2 .....

[4]



- (ii) Describe, in detail, how the pre-packed sandwiches would be manufactured as a batch of 500.  
Include details of the quality control measures used during production.  
Details of the manufacture of the packaging and the printing are not required.  
Use a flow chart and/or annotated diagrams to support your answer. **[9]**

**Question 3(f) begins on page 15**



4 Graphic Products

Fig. 5 shows a pop-up greetings card.



Fig. 5

(a) Give **four** justified design requirements for a pop-up card of the type shown in Fig. 5.

- 1 .....
- 2 .....
- 3 .....
- 4 .....

[4]



(b) Give **two** benefits of using an automated system to manufacture products.

1 .....

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2 .....

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[4]

(c) Describe **two** key features of the Health and Safety at Work Act 1974.

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[4]

(d) Explain, using examples, the importance of aesthetics in product design.

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[4]

(e) Fig. 6 shows a part of the pop up card.

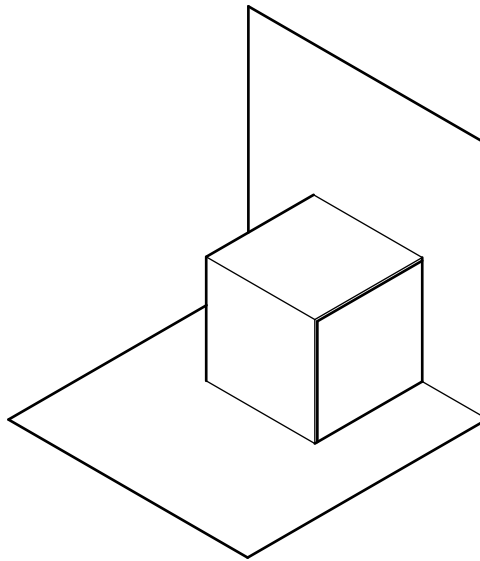


Fig. 6

(i) State a **suitable specific material** for the pop-up card.  
Give **two** properties or characteristics that make the material suitable for this use.

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- (ii) Describe, in detail, how the pop up card would be manufactured as a batch of 10 000. Include details of specialist equipment used. Use a flow chart and/or annotated diagrams to support your answer. [9]

Question 4(f) begins on page 20



5 Manufacturing

Fig. 7 shows a wooden table for outdoor use.

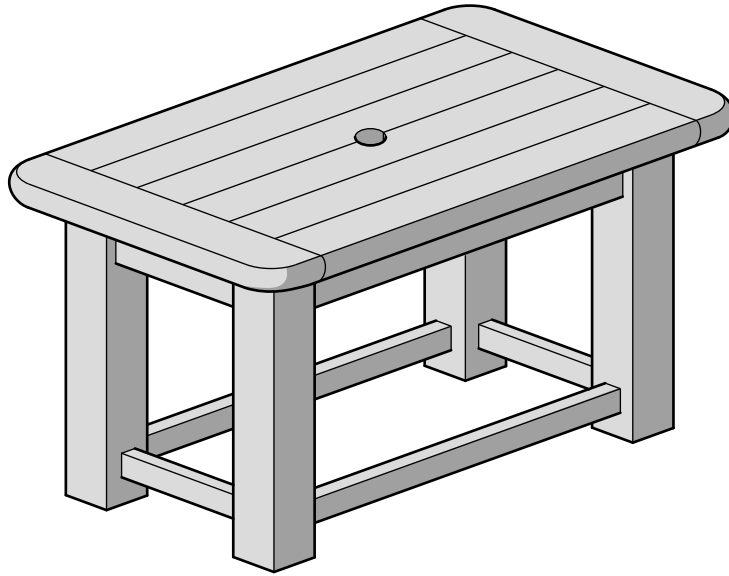


Fig. 7

(a) Give **four** justified design requirements for a wooden table of the type shown in Fig. 7.

- 1 .....
- 2 .....
- 3 .....
- 4 .....

[4]

(b) Give **two** benefits of using an automated system to manufacture products.

1 .....

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2 .....

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[4]

(c) Describe **two** key features of the Health and Safety at Work Act 1974.

1 .....

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[4]

(d) Explain, using examples, the importance of aesthetics in product design.

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[4]

(e) Fig. 8 shows the top of the wooden table shown in Fig. 7.

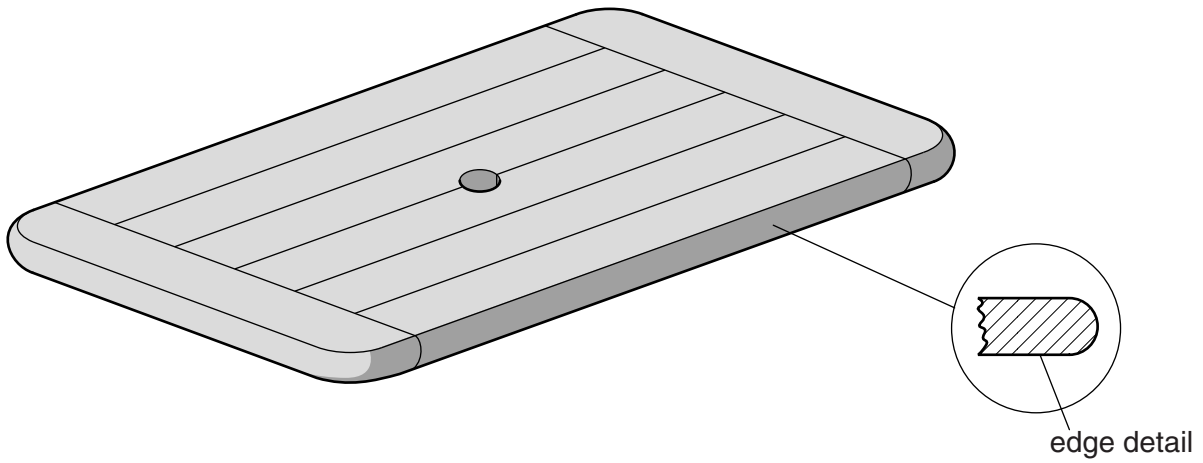


Fig. 8

- (i) State a **suitable specific material** for the table top.  
Give **two** properties or characteristics that make the material suitable for this use.

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- (ii) Describe, in detail, how the table top would be manufactured as a batch of 500. Include details of any jigs or specialist equipment used. Use a flow chart and/or annotated diagrams to support your answer.

[9]

**Question 5(f) begins on page 25**





6 Resistant materials

Fig. 9 shows a music stand.

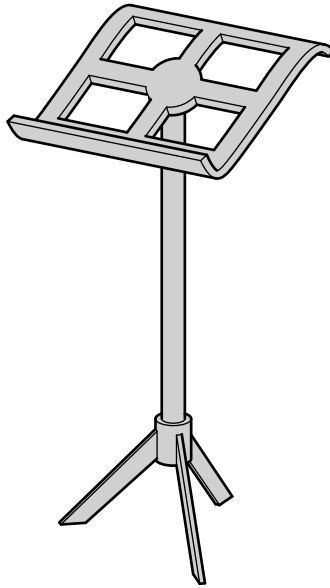


Fig. 9

(a) Give **four** justified design requirements for a music stand of the type shown in Fig. 9.

- 1 .....
- 2 .....
- 3 .....
- 4 .....

[4]

(b) Give **two** benefits of using an automated system to manufacture products.

1 .....

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2 .....

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[4]

(c) Describe **two** key features of the Health and Safety at Work Act 1974.

1 .....

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[4]

(d) Explain, using examples, the importance of aesthetics in product design.

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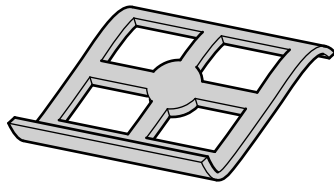
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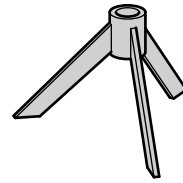
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[4]

(e) Fig. 10 shows parts of the music stand.



A



B

Fig. 10

Choose **one** of the parts shown in Fig. 10

Chosen part .....

(i) State a **suitable specific material** for the part that you have chosen.  
Give **two** properties or characteristics that make the material suitable for this use.

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[3]

- (ii) Describe, in detail, how the part you have chosen would be manufactured as a batch of 50.  
Include details of any jigs and/or formers used.  
Use a flow chart and/or annotated diagrams to support your answer. **[9]**

**Question 6(f) begins on page 30**



7 Systems and Control

Fig. 11 shows an electric toothbrush.

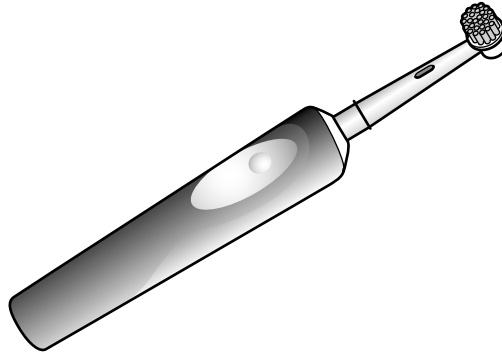


Fig. 11

(a) Give **four** justified design requirements for an electric toothbrush of the type shown in Fig. 11.

- 1 .....
- 2 .....
- 3 .....
- 4 .....

[4]

(b) Give **two** benefits of using an automated system to manufacture products.

- 1 .....
- 2 .....

[4]

(c) Describe **two** key features of the Health and Safety at Work Act 1974.

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[4]

(d) Explain, using examples, the importance of aesthetics in product design.

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[4]



- (e) (i) Draw a labelled diagram of a mechanism that could be used in an electric toothbrush to convert the rotary motion of the motor into the reciprocating or oscillating motion of the brush head. [3]

Question 7(e)(ii) begins on page 34

- (ii) To remind the user to clean a different section of the teeth, during use, the electric toothbrush beeps every 30 seconds.  
Draw a labelled circuit diagram of a timer that could achieve this.  
You should show relevant calculations to determine component values. **[9]**

**Question 7(f) begins on page 35**



8 Textiles

Fig. 12 shows a work apron.

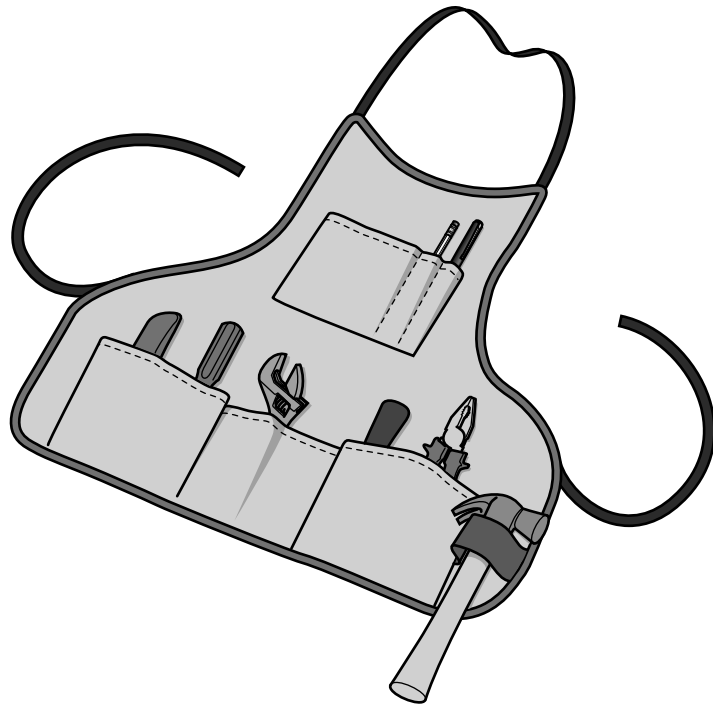


Fig. 12

(a) Give **four** justified design requirements for a work apron of the type shown in Fig. 12.

- 1 .....
- 2 .....
- 3 .....
- 4 .....

[4]

(b) Give **two** benefits of using an automated system to manufacture products.

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[4]

(c) Describe **two** key features of the Health and Safety at Work Act 1974.

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[4]

(d) Explain, using examples, the importance of aesthetics in product design.

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[4]

(e) The work apron shown in Fig. 12 is made from closely woven polyamide fabric.

(i) Give **three** properties or characteristics that make the material suitable for this use.

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**Question 8(e)(ii) begins on page 39**

- (ii) Describe, in detail, how the work apron shown in Fig. 12 would be manufactured as a batch of 1000.  
Give details of all pattern pieces and markings.  
Use a flow chart and/or annotated diagrams to support your answer. [9]

Question 8(f) begins on page 40





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