

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

A-level

DESIGN AND TECHNOLOGY:

PRODUCT DESIGN

Paper 2 Designing and Making Principles

Wednesday 12 June 2024

Morning

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- normal writing and drawing instruments
- a scientific calculator.

Instructions

- Use black ink or black ball-point pen. Use pencil only for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- There are 30 marks for **Section A** and 50 marks for **Section B**.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8–9	
10	
11	
12–13	
14	
15	
TOTAL	



J U N 2 4 7 5 5 2 2 0 1

Section A – Product AnalysisAnswer **all** questions in this section.

0 1

Figures 1 and 2 show two chairs.**Figure 1****Figure 2**

	Figure 1	Figure 2
Materials	Polypropylene, powder-coated low carbon steel, beech	Beech
Joining methods	Allen key bolts and locking nuts	Traditional wood joints
Applied finish	Self-finishing thermoplastics, powder-coated steel and clear varnished timber	Acrylic paint

Analyse **and** evaluate the suitability of each of the two chairs shown for large-scale production.

[12 marks]



This image shows a single page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, leaving small margins at the top and bottom. There are no vertical margin lines, and the page is completely blank except for the lines themselves.

12

Turn over ►



[illegible]

6



[6 marks]

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

6

Turn over for the next question

Turn over ►



0	4
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A shipping container measures $12\text{ m} \times 2.5\text{ m} \times 2.5\text{ m}$ and costs £3000 to transport from manufacturer to retail store.

A flat-packed chair is packaged in a single box measuring $600\text{ mm} \times 600\text{ mm} \times 600\text{ mm}$

A full container of flat-packed chairs is shipped.

Calculate in pounds and pence the shipping cost of a single, flat-packed chair.

Show your working.

[3 marks]

Answer £ _____

3



0	5
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State **three** ways manufacturers can reduce the environmental impact of the packaging they use.

[3 marks]

1 _____

2 _____

3 _____

3

Turn over for Section B

Turn over ►



Section B – Commercial Manufacture

Answer **all** questions in this section.

0	6
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Figure 3 shows an initial Styrofoam prototype model of a hairdryer.

Figure 3



Analyse and evaluate the suitability of **different** prototyping methods for further development of the hairdryer prototype model shown in **Figure 3** for production.

In your answer you should refer to:

- modelling materials
- virtual prototyping
- physical prototyping.

[12 marks]



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12

Turn over for the next question

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0 8

Describe the term 'acceptable tolerance'.

[3 marks]

0 9

Describe a quality control check that may be performed on a production line to ensure all products conform to acceptable tolerances.

[2 marks]

5

Turn over for the next question**Turn over ►**

[6 marks]

6

[6 marks]

[illegible]

6

Turn over ►



1 2

State **two** methods used when evaluating a prototype product.**[2 marks]**

1 _____

2 _____

1 3

Screws are supplied in bags of 200 g ($\pm 2\%$)

Each screw has a mass of exactly 3 g

Calculate the maximum and minimum number of whole screws in a bag.

Show your working.

[3 marks]

Maximum number of screws = _____

Minimum number of screws = _____

5



1	4
---	---

Name **two** specific eco labels relating to energy use **and** describe their use.

[2 × 3 marks]

Eco label 1 _____

Description of use _____

Eco label 2 _____

Description of use _____

6

Turn over for the next question

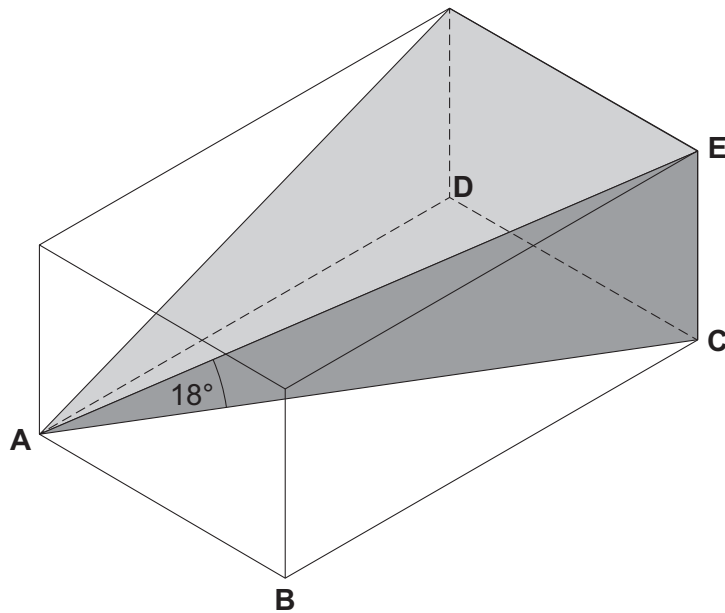
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1 5

Figure 5 shows a Styrofoam block.

Figure 5



The Styrofoam block is cut from a cuboid.

The length (**AE**) is 25 cm

(**AE**) makes an angle of 18 degrees with the base of the cuboid (**ABCD**)

The area of the base of the cuboid is 215 cm^2

The volume of the Styrofoam block model is $\frac{1}{3}$ of the cuboid volume.

Calculate the volume of the Styrofoam block model.

Show your working.

[4 marks]

Answer = _____ cm^3

4

END OF QUESTIONS



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outside the
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ANSWER IN THE SPACES PROVIDED**



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