



Surname _____

Other Names _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

I declare this is my own work.

A-level

**DESIGN AND TECHNOLOGY:
PRODUCT DESIGN**

7552/2

Paper 2 Designing and Making Principles

Time allowed: 1 hour 30 minutes

For this paper you must have:

- normal writing and drawing instruments
- a scientific calculator.

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]



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

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INSTRUCTIONS

- Use black ink or black ball-point pen. Use pencil only for drawing.
- Answer ALL questions.
- You must answer the questions in the spaces provided.
- Do not write 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.

DO NOT TURN OVER UNTIL TOLD TO DO SO



SECTION A – Product Analysis

Answer ALL questions in this section.

0	1
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FIGURES 1 and 2 show two step ladders.

FIGURE 1

Wooden step ladder



FIGURE 2

Aluminium step ladder



	FIGURE 1	FIGURE 2
Main manufacture process	Wood wastage techniques	Aluminium extrusion
Joining methods	Adhesive and screws	Nuts and bolts
Applied finish	Clear varnish	Self-finishing

Compare and evaluate the two step ladders shown.

In your answer you should refer to:

- **design safety**
- **ergonomic factors.**

[12 marks]

[Turn over]



[illegible]

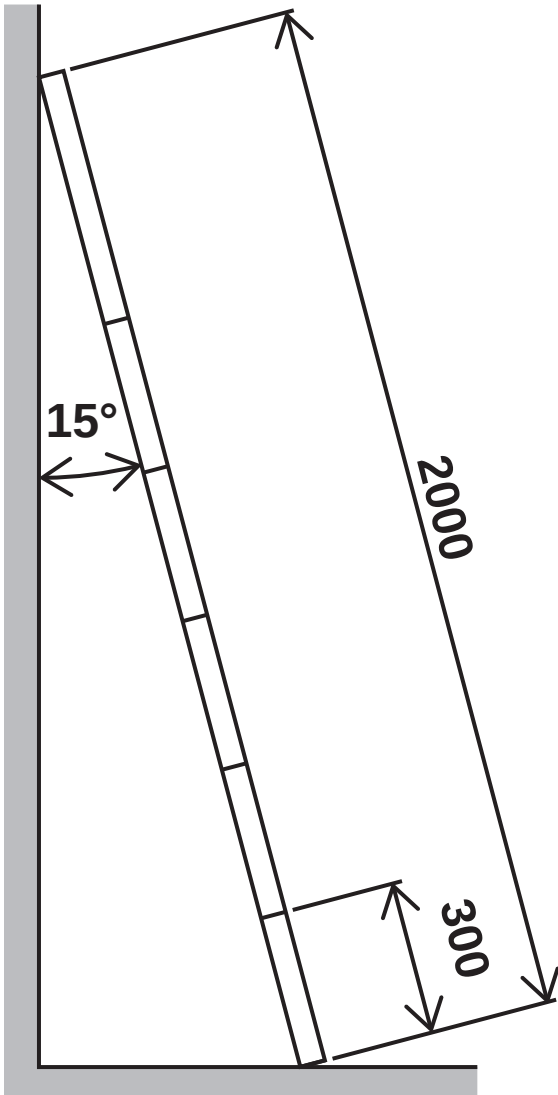


0	2
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FIGURE 3 shows a 2D view of a 2 metre step ladder.

FIGURE 3

Not drawn to scale



The step ladder is angled at 15 degrees from the vertical wall and stands on a horizontal floor.

The ladder has 5 steps with even spacing of 300 mm between each step.



The first step is 300 mm from the bottom of the ladder.

Calculate the vertical height of the 5th step from the floor to the nearest mm. [4 marks]

[illegible]

[Turn over]



4



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[Turn over]



0	3
---	---

Describe the testing procedures required during product development to ensure a step ladder is safe for sale.

[6 marks]

[illegible]

6

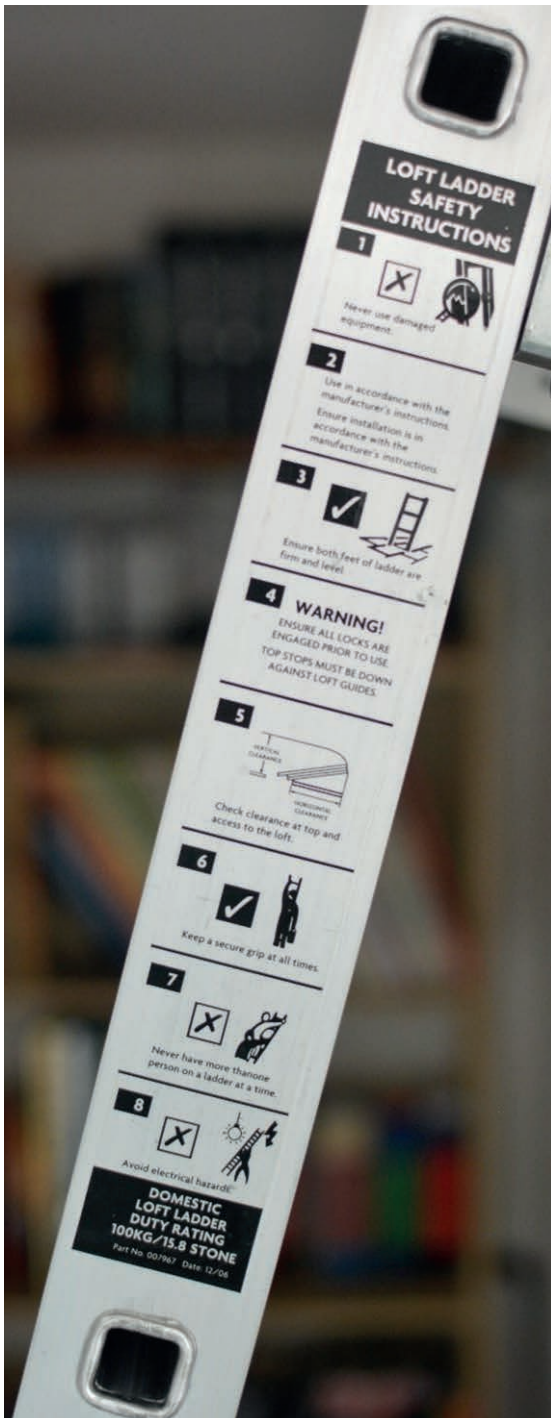
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0 4

FIGURE 4, on pages 14 and 15, shows a range of safety instructions used on a loft ladder.

FIGURE 4



1

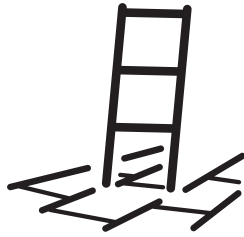


Never use damaged equipment.

2

Use in accordance with the manufacturer's instructions.
Ensure installation is in accordance with the manufacturer's instructions.

3



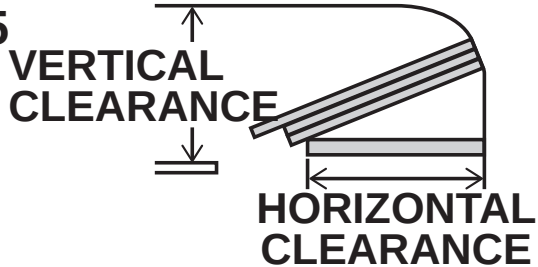
Ensure both feet of ladder are firm and level.

4

WARNING!

ENSURE ALL LOCKS ARE ENGAGED PRIOR TO USE.
TOP STOPS MUST BE DOWN AGAINST LOFT GUIDES.

5



Check clearance at top and access to the loft.

6



Keep a secure grip at all times.

7



Never have more than one person on a ladder at a time.

8



Avoid electrical hazards.

[Turn over]



Analyse and evaluate how the images shown in FIGURE 4 effectively communicate the safety instructions to the user. [6 marks]

[illegible]



0	5
---	---

State TWO specific forms of anthropometric data used in the development of a step ladder. [2 marks]

1 _____

2 _____

2



SECTION B – Commercial Manufacture

Answer ALL questions in this section.

0	6
---	---

State the TWO types of nutrient associated with the circular economy. [2 marks]

1 _____

2 _____

2

[Turn over]



0	7
---	---

Outline how a manufacturer could personalise a mass-produced product to an individual customer's requirements. [6 marks]

[illegible]

6

[Turn over]



0	8
---	---

Explain the benefits of using laser scanning for quality control in mass production. [6 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, providing a guide for handwriting practice. There are no margins, text, or other markings present.

[Turn over]



09

FIGURE 5 shows some packaging for biscuits.

FIGURE 5



Component	Material
Box	Carton board
Polymer wrapper	Low density polyethylene (LDPE) film
Biscuit tray	Polyethylene terephthalate (PET)



Analyse and evaluate the environmental impact of the three packaging components shown.

In your answer you should refer to:

- **raw materials**
- **product manufacture**
- **disposal/end of life.**

[12 marks]

[illegible]

[Turn over]





12

[Turn over]



1	0
---	---

State TWO reasons why a barcode is used on packaging.
[2 marks]

1 _____

2 _____

2



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1	1
---	---

FIGURE 6 represents the coverage of different printing ink colours on some packaging.

FIGURE 6

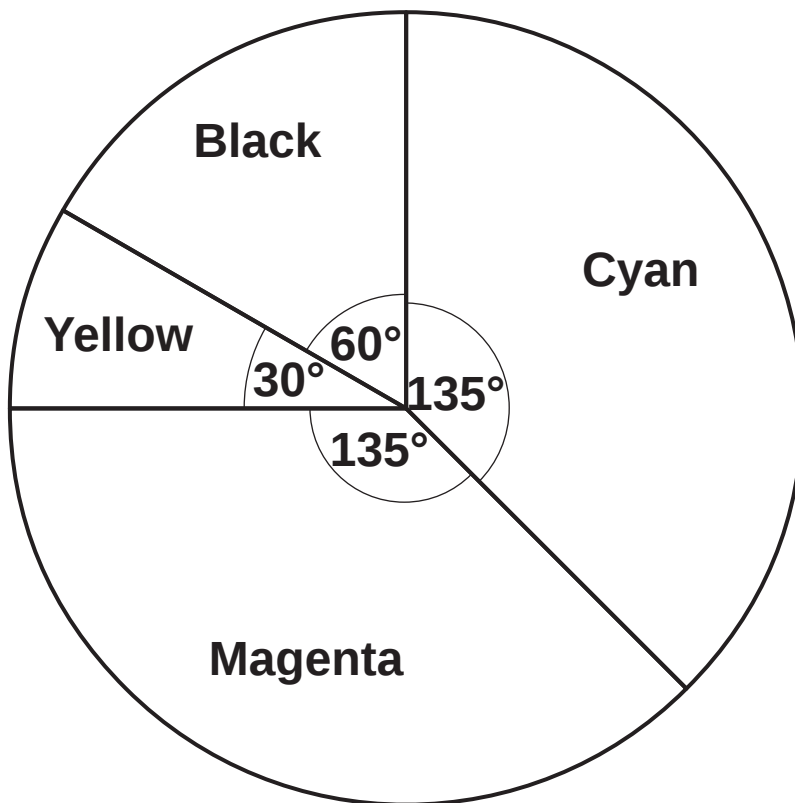


TABLE 1 shows the cost of different cartridges and the ink areas each cartridge can cover.

TABLE 1

Colour	Cartridge cost (£)	Surface coverage per cartridge (m ²)
Black	10.50	8 m ²
Cyan	16.00	12 m ²
Magenta	16.00	12 m ²
Yellow	16.00	12 m ²



The packaging has a surface area of 0.6 m²

11.1

Show that FIVE yellow cartridges will be needed for 1000 packages. [3 marks]

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[Turn over]



$$\boxed{1} \boxed{1} . \boxed{2}$$

Calculate the total cost of full cartridges needed for 1000 packages. [3 marks]

[illegible]

Answer £

6

[Turn over]



1	2	.	1
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Define the purpose of the RoHS directive. [2 marks]

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

State TWO specific materials that are restricted under the RoHS directive. [2 marks]

1 _____

2 _____

4



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[Turn over]



1	3
---	---

Identify the following labels and state what they mean.
[4 marks]

FIGURE 7



FIGURE 8



FIGURE 7

FIGURE 8

4

[Turn over]

1	4
---	---

Outline the impact of the work of Charles and Ray Eames on furniture design.

**You should refer to specific examples in your answer.
[6 marks]**

[illegible]

1	5
---	---

FIGURE 9 shows steel beam supports for a wooden floor.

Give TWO reasons why an I-beam cross-section is ideal for the main support. [2 marks]

FIGURE 9



Steel I-beam
cross-section

1 _____

2 _____

2

END OF QUESTIONS



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Additional page, if required.

Write the question numbers in the left-hand margin.

[illegible]

Additional page, if required.

Write the question numbers in the left-hand margin.

[illegible]

Additional page, if required.

Write the question numbers in the left-hand margin.

[illegible]

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For Examiner's Use	
Question	Mark
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TOTAL	

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