



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

Tuesday 10 June 2025

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	
9–11	
12	
13	
14	
15	
TOTAL	



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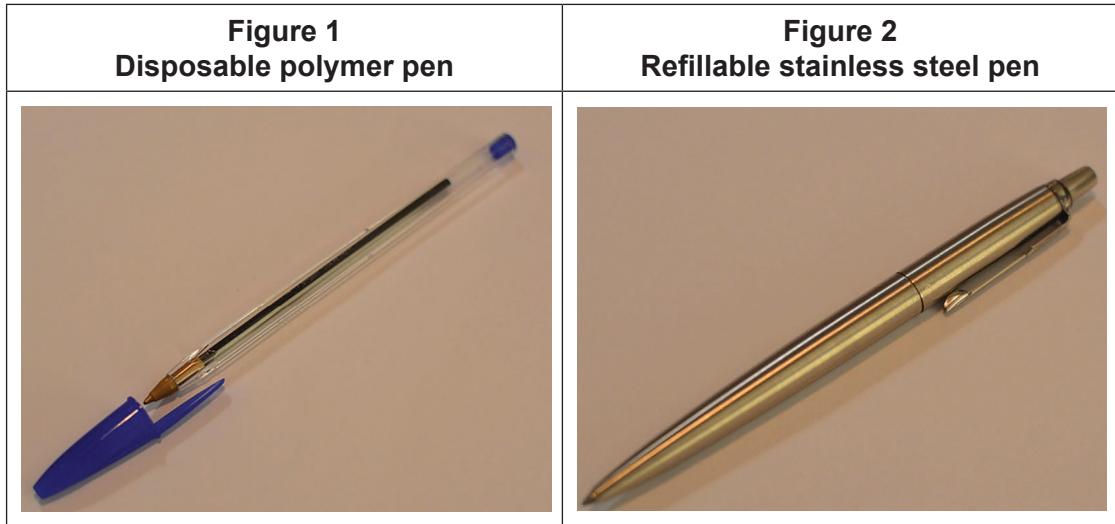
Section A – Product AnalysisAnswer **all** questions in this section.**0****1****Figures 1 and 2** show two pens.

	Figure 1	Figure 2
Material(s) used	Thermoplastics	Stainless Steel
Manufacturing processes used	Polymer deformation	Metal deformation

Compare **and** evaluate the two pens shown.In your answer you should refer to material **and** design suitability for large-scale production.**[12 marks]**



This image shows a single 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.

Turn over for the next question

[6 marks]

[illegible]

[2 marks]



0	4
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The spherical ball in a ball point pen has a volume of 7.24 mm^3

The ball is held in a circular hole with a radius 0.1 mm smaller than that of the ball.

Calculate the diameter of the hole.

Give your answer to the nearest 0.1 mm

Show your working out.

$$\text{Volume of a sphere} = \frac{4}{3} \pi r^3$$

[4 marks]

Answer: _____ mm

4

Turn over for the next question

Turn over ►



[6 marks]

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

6



Section B – Commercial ManufactureAnswer **all** questions in this section.**0 6**Identify **two** health and safety hazards **and** appropriate control measures when using machinery within a school workshop.**[4 marks]**

Hazard 1 _____

Control measure 1 _____

Hazard 2 _____

Control measure 2 _____

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

Figures 3 and 4 show lights designed by Marianne Brandt.

Figure 4



[6 marks]

[illegible]

0	8
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Explain how designers use specific types of labelling to encourage effective recycling of products.

[3 marks]

9

Turn over for the next question

Turn over ►



Figure 5 shows a car dashboard display.

[6 marks]

[illegible]

1	0
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Define the purpose of 'Six Sigma'.

[2 marks]

1	1
---	---

An injection moulding cavity has a volume of 36 mm^3

The cavity is filled using an injector with a circular cross section.

The diameter of the circular cross section is 0.5 mm and the injector has a feed rate of 250 mm per second.

Calculate the time taken to fill the cavity.

Give your answer to two decimal places.

Show your working out.

[4 marks]

Answer _____ seconds

12

Turn over for the next question

Turn over ►



Outline how designers may refine or redevelop electronic products to reduce a decline in sales and encourage consumers to upgrade.

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on the right side, suggesting it's resting on a surface.

6



Turn over for the next question

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outside the
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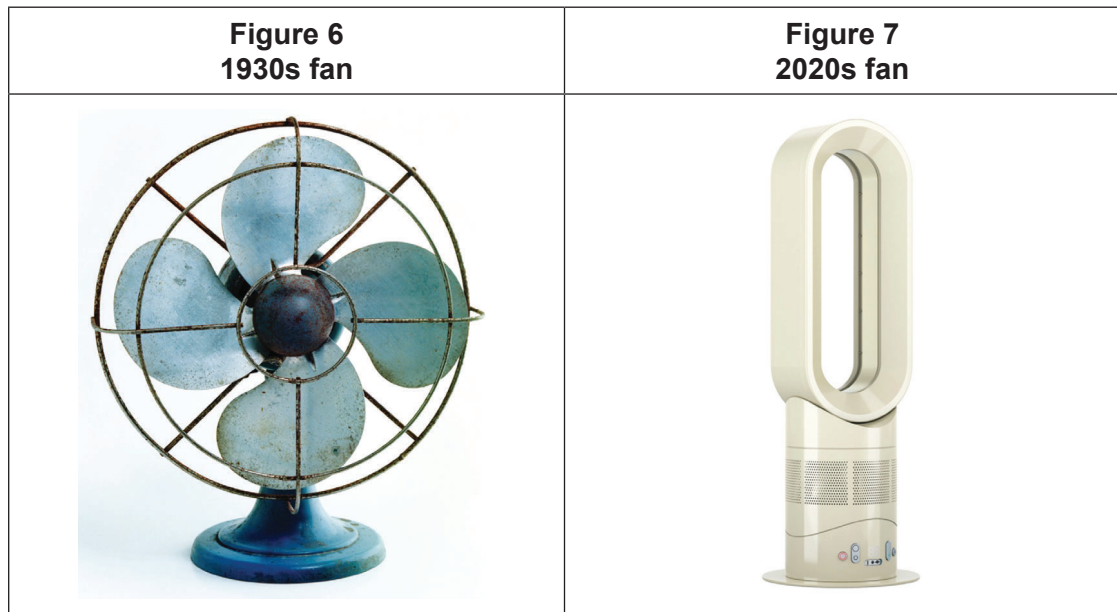
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ANSWER IN THE SPACES PROVIDED**

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1 3

Figures 6 and 7 show two room fans.



	1930s fan (Figure 6)	2020s fan (Figure 7)
Air movement	Bladed	Bladeless
Main material	Aluminium	ABS
Main manufacturing process	Die casting	Injection moulding
Speed	One speed	Multiple speed
Operation	Manual on/off	Manual or Auto mode based on air quality and temperature

Discuss the developments that have enabled the **product evolution** from the 1930s fan to the 2020s fan.

In your answer you should refer to:

- technological developments
- improvements in product development techniques
- developments in materials and manufacturing processes.

[12 marks]



[illegible]

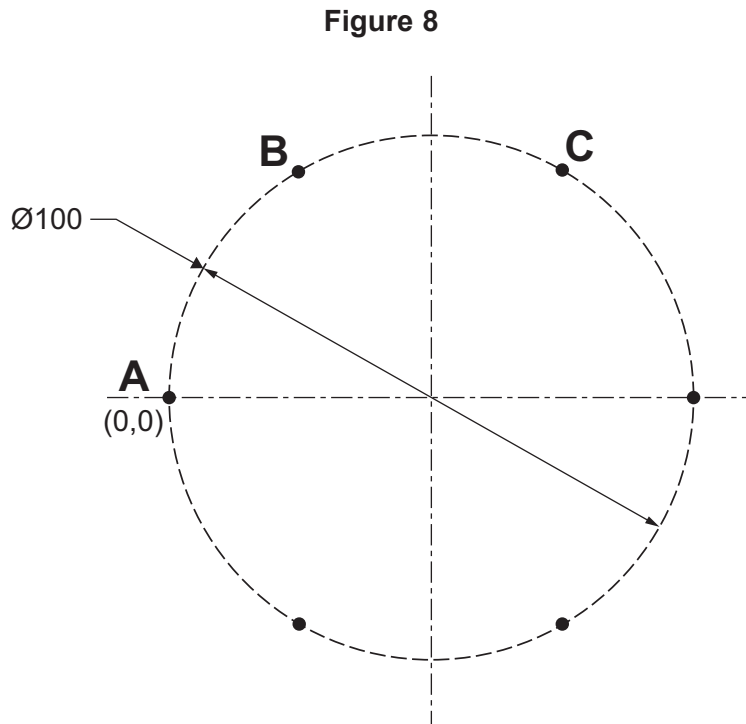
12

Turn over ►



1	4
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Figure 8 shows six identical holes, with centre points **evenly spaced** around a large circle.



The centre of hole **A** is (0,0)

Calculate the co-ordinates of the centre of hole **C**

Show your working out.

[4 marks]

Answer _____

4



1	5
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Outline how Fairtrade is improving the ethical extraction of gold.

[3 marks]

3

END OF QUESTIONS



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ANSWER IN THE SPACES PROVIDED**



[illegible]

