Surname _____

Forename(s) _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

I declare this is my own work.

A-level

DESIGN AND TECHNOLOGY: PRODUCT DESIGN

Paper 2 Designing and Making Principles

7552/2

Wednesday 12 June 2024 Morning

Time allowed: 1 hour 30 minutes

At the top of the page, write your surname and forename(s), your centre number, your candidate number and add your signature.

[Turn over]

JUN247552201

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.**
- **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

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]

[Turn over]

8

12

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[Turn over]

0 2

Explain how reliance on global supply chains can affect the development of a product.

In your answer you should refer to:

- **materials**
- **energy**
- **product cost.**

[6 marks]

11

6

[Turn over]

0 3

Outline the key features required in an instruction booklet for self-assembly furniture. [6 marks]

13

6

[Turn over]

0 4

A shipping container measures 12 m × 2.5 m × 2.5 m and costs £3000 to transport from manufacturer to retail store.

A flat-packed chair is packaged in a single box measuring 600 mm × 600 mm × 600 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

[Turn over]

0 5

State THREE ways manufacturers can reduce the environmental impact of the packaging they use. [3 marks]

1 _____

2 _____

3 _____

_____

_____

3

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[Turn over]

SECTION B – COMMERCIAL MANUFACTURE

Answer ALL questions in this section.

0 6

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]

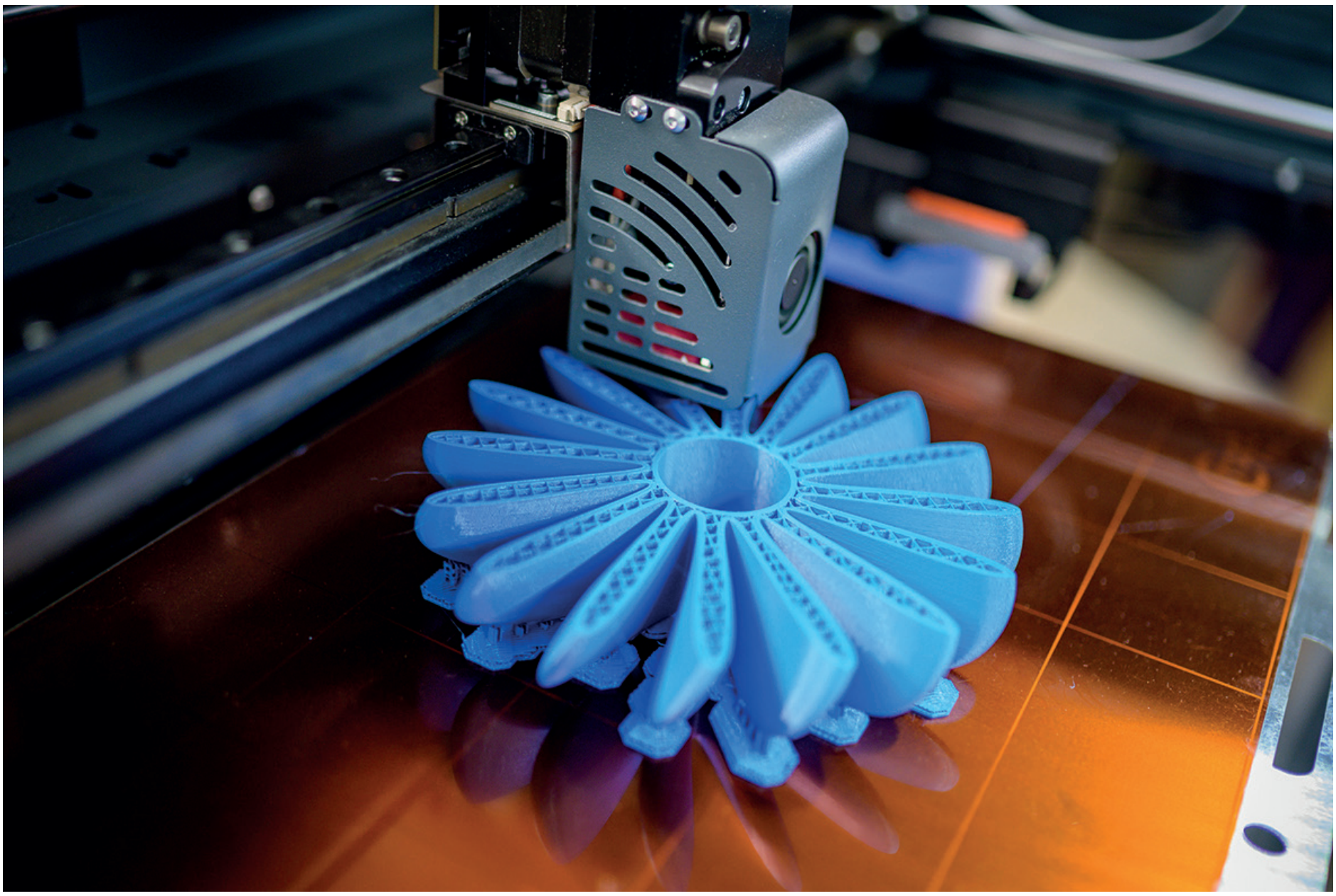
20

[Turn over]

0 7

Describe how a 3D component would be designed and produced using the 3D printing process shown in FIGURE 4. [6 marks]

FIGURE 4



[Turn over]

24

6

2 4

0 8

Describe the term ‘acceptable tolerance’. [3 marks]

3

[Turn over]

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]

2

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[Turn over]

1 0

Describe how a designer could apply a user-centred design approach when developing a toaster for a family home. [6 marks]

6

1	1

Consumers increasingly want to repair electronic products rather than replace them.

Discuss what designers and manufacturers are doing to enable consumers to repair their electronic products. [6 marks]

6

[Turn over]

1	2

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

1 _____

_____

2 _____

_____ 2

BLANK PAGE

[Turn over]

1	3

Screws are supplied in bags of 200 g (+/−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]

35

Maximum number of screws =

Minimum number of screws =

3

[Turn over]

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 _____

_____

_____

_____

_____

_____

_____

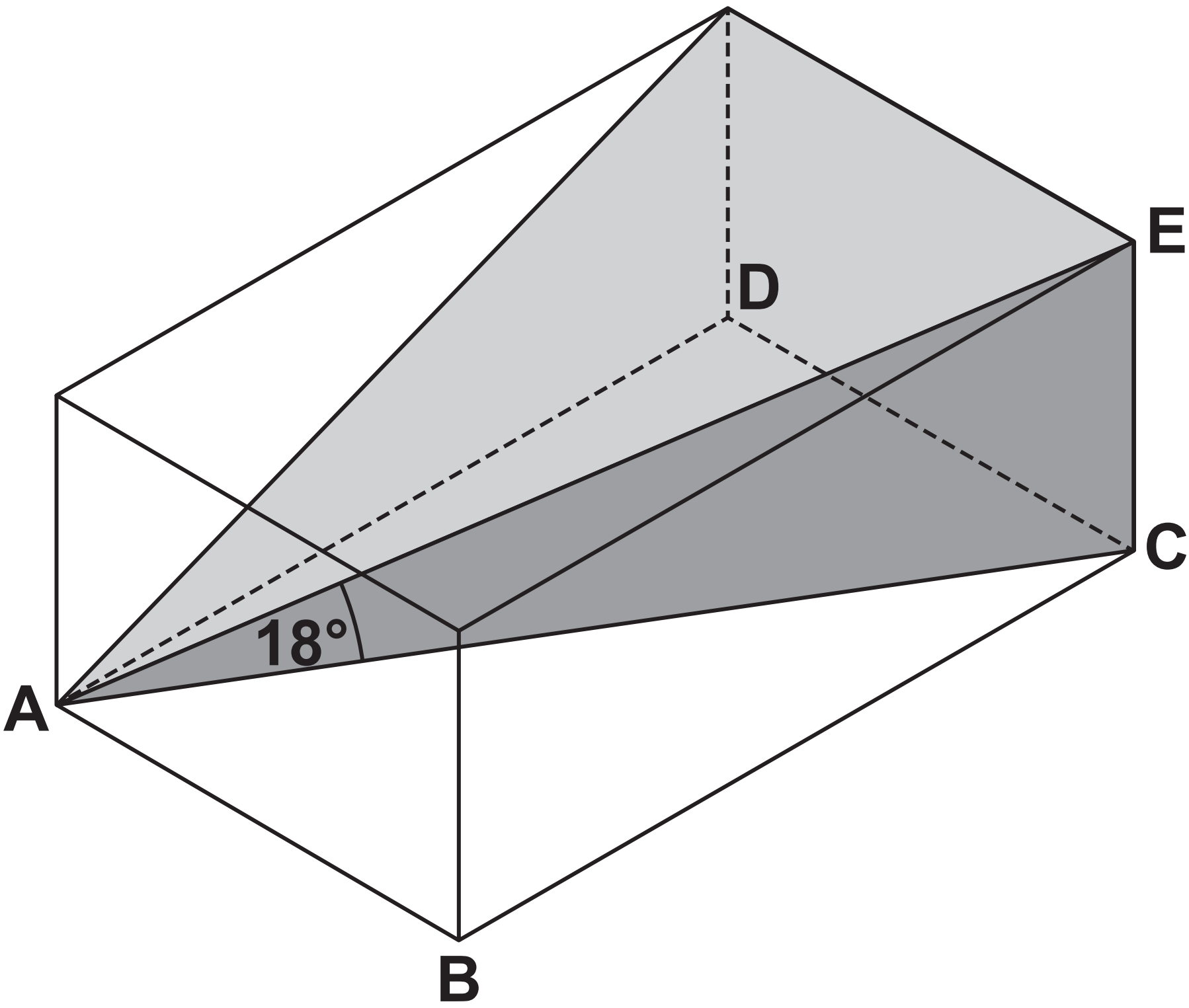
6

[Turn over]

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

Additional page, if required. Write the question numbers in the left-hand margin.

Additional page, if required. Write the question numbers in the left-hand margin.

Additional page, if required. Write the question numbers in the left-hand margin.

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For Examiner's Use	
Question	Mark
1	
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15	
TOTAL	