CAMBRIDGE
International Education

Cambridge O Level

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

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DESIGN & TECHNOLOGY **6043/03**

Paper 3 Materials **For examination from 2028**

SPECIMEN PAPER **1 hour**

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen. Do **not** use correction fluid or tape.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [ ].
- All dimensions are in millimetres unless otherwise stated.

This document has **10** pages.

Section A

1 Figure 1.1 shows a 'single use' polystyrene spoon that is thrown away after one use.

Figure 1.1

(a) Name **one** suitable alternative material for the spoon shown in Figure 1.1 that would reduce the environmental impact of this product.

..... [1]

(b) Give **one** reason why your answer in **1(a)** is a suitable alternative material.

.....

..... [1]

2 Figure 2.1 shows a stock form of metal.

Figure 2.1

(a) Name the stock form of metal shown in Figure 2.1.

..... [1]

(b) Give **two** reasons why designers select materials that are available in stock forms.

1 .....

.....

2 .....

.....
[2]

3 Explain what is meant by the term composite material.

.....

.....

..... [2]

4 Figure 4.1 shows a drawing of a cabinet.

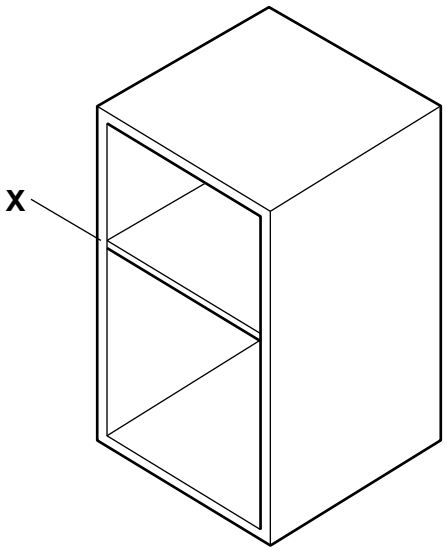


Figure 4.1

(a) Name a suitable manufactured board that could be used to produce the cabinet shown in Figure 4.1.

..... [1]

(b) Use sketches and notes to show **two** different methods that could be used to **temporarily** join the parts labelled at **X** in Figure 4.1.

method 1 method 2

[4]

5 State **two** ways designers could collaborate when working remotely to develop new products.

1 .....

.....

2 .....

.....

[2]

6 **(a)** Explain what is meant by the term ‘smart material’.

.....

.....

..... [2]

(b) Circle the smart material from the list.

duralumin **PVC** **copper** **SMA** **MDF** [1]

7 Surface finishes are often applied to products to improve the aesthetics.

Give **two** other reasons why surface finishes are applied to products.

1 .....

.....

2 .....

.....

[2]

8 Give **two** alternatives to throwing products away at the end of their useful life.

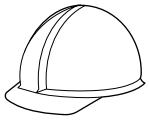
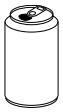
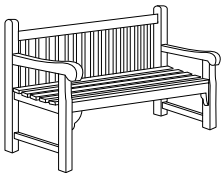
1 .....

2 .....

[2]

9 Complete Table 9.1 by naming a suitable material for each product.

Table 9.1

product	suitable material
 polymer hard hat	.....
 metal drinks can	.....
 hardwood bench	.....

[3]

10 Circle the correct property from the list to complete the sentence.

Tempering ferrous alloys, such as steel or cast iron, increases the ..... of the metal.

hardness **toughness** **softness** **brittleness** [1]

Section B

11 Figure 11.1 show details of a child's stool. The stool is manufactured in two parts from sheet material.

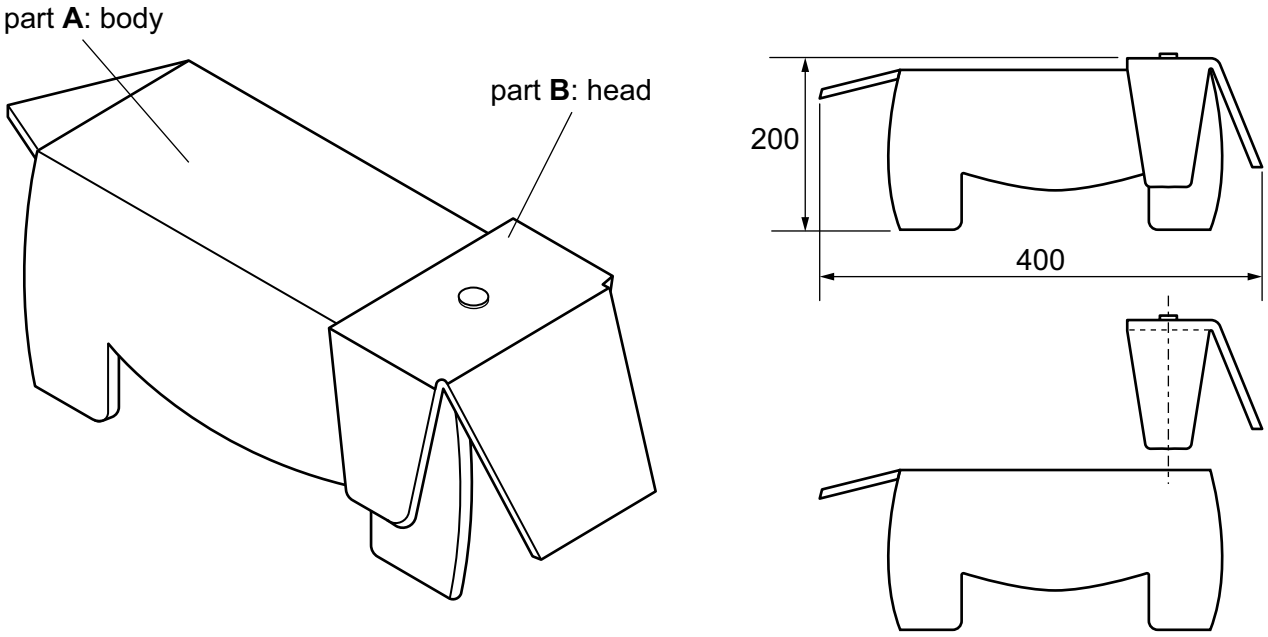


Figure 11.1

(a) (i) Give **one** way in which artificial intelligence (AI) could be used to help with designing the child's stool.

.....

..... [1]

(ii) Hand tools are used to make a model of the child's stool shown in Figure 11.1.

Explain why using computer-aided design and computer-aided manufacture (CAD/CAM) to make the model for this design would be better than using hand tools.

.....

.....

..... [2]

(b) (i) Name a suitable sheet material for the manufacture of part **A** and part **B** of the child's stool shown in Figure 11.1.

..... [1]

(ii) Explain **two** reasons why the material named in **11(b)(i)** would be suitable for part **A** of the child's stool in Figure 11.1.

reason 1 .....

.....

reason 2 .....

.....

[4]

(c) Use sketches and notes to show how workshop tools and equipment could be used to produce a prototype of part **B** in Figure 11.1 from the material stated in your answer to **11(b)(i)**.

Include the following details:

- measuring and marking out
- cutting and finishing
- forming or joining.

[8]

(d) Use sketches and notes to show how the process in **11(c)** could be modified to commercially produce part **B** in Figure 11.1 in a batch of 100.

Include the following details:

- method of manufacture
- details of quality assurance
- reduction of waste.

[6]

(e) Use sketches and notes to show **one** method that could be used to permanently join part **A** and part **B** in Figure 11.1.

[3]