



Cambridge International AS & A Level

DESIGN & TECHNOLOGY

9705/12

Paper 1

May/June 2023

3 hours



You must answer on the answer booklet/paper.

You will need: Answer booklet/A4 paper Coloured pencils
A3 drawing paper (2 sheets) Extra sheets of A3 drawing paper if needed
A range of design drawing equipment

INSTRUCTIONS

- Answer **three** questions in total:
 - Section A: answer **one** question on the answer booklet/A4 paper provided.
 - Section B: answer **one** question on the answer booklet/A4 paper provided.
 - Section C: answer **one** question on A3 drawing paper. Use both sides of the paper.
- You may request additional sheets of A3 drawing paper, but only if you have used up both sides of each of the 2 sheets provided.
- If you have been given an answer booklet, follow the instructions on the front cover of the answer booklet.
- Use a black or dark blue pen.
- Write your name, centre number and candidate number on all the work you hand in.
- Do **not** use an erasable pen or correction fluid.
- You may use an HB pencil, or coloured pencils as appropriate, for any diagrams, graphs or rough working.
- At the end of the examination, fasten all your work together. Do **not** use staples, paper clips or glue.

INFORMATION

- The total mark for this paper is 120.
- The number of marks for each question or part question is shown in brackets [].
- All dimensions are in millimetres.

This document has **12** pages. Any blank pages are indicated.

Section A

Answer **one** question from this section on the Answer Booklet/A4 paper provided.

- 1 Fig. 1.1 gives details of a set of weighing scales to be made in a school workshop.

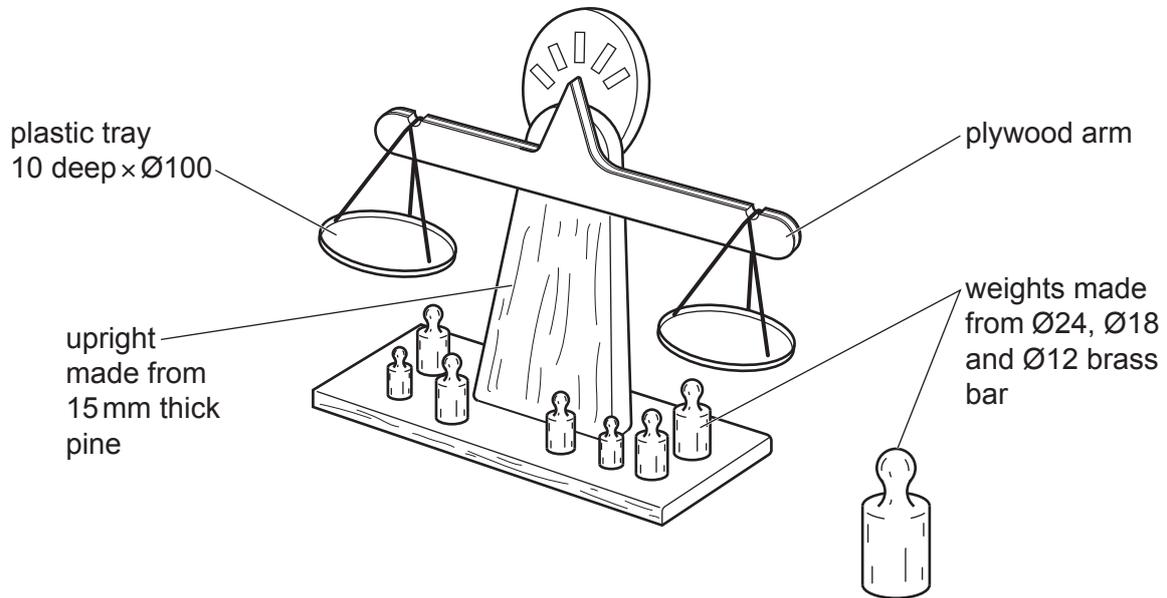


Fig. 1.1

- (a) Give **two** reasons why plywood has been chosen for the arm. [2]
- (b) Use notes and sketches to describe:
- (i) how the arm could be made to pivot on the upright [6]
 - (ii) how the brass weights could be made. [6]

You must give details about the tools, equipment and processes involved and the safety precautions that have to be undertaken at each stage.

- (c) Use notes and sketches to describe a method of making 12 plastic trays. [6]

2 Fig. 2.1 gives details of packaging for a drinking glass, to be made in a school workshop.

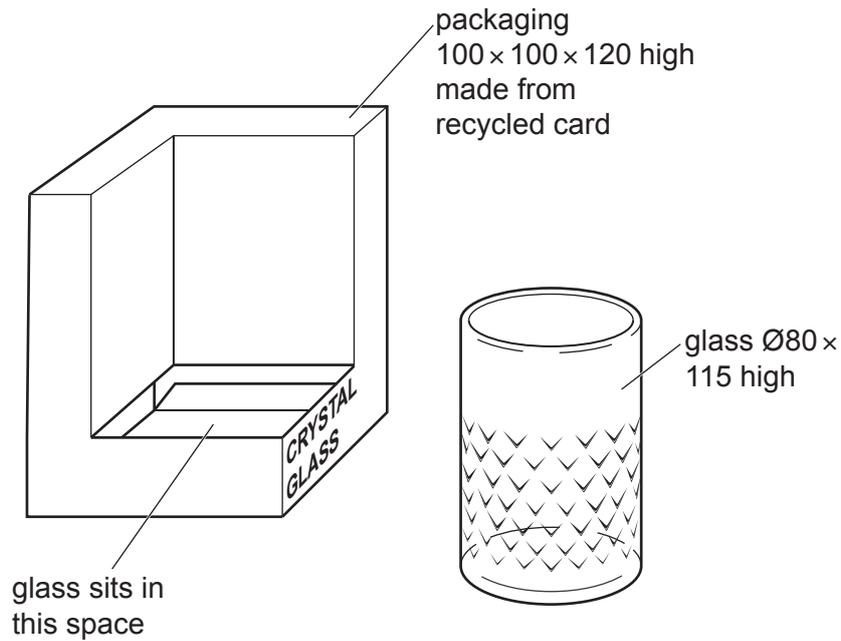


Fig. 2.1

- (a) Give **two** reasons why recycled card has been chosen for the packaging. [2]
- (b) Use notes and sketches to show the shape of the one-piece development (net) required to make the packaging. [6]
- (c) Use notes and sketches to describe:
- (i) how the development (net) could be marked out and cut out from a sheet of recycled card [6]
 - (ii) a method of adding a clear plastic cover to the packaging to protect and display the drinking glass. [6]

You must give details about the tools, equipment and processes involved and the safety precautions that have to be undertaken at each stage.

- 3 Fig. 3.1 gives details of a model of a height adjustable table which is to be made in a school workshop.

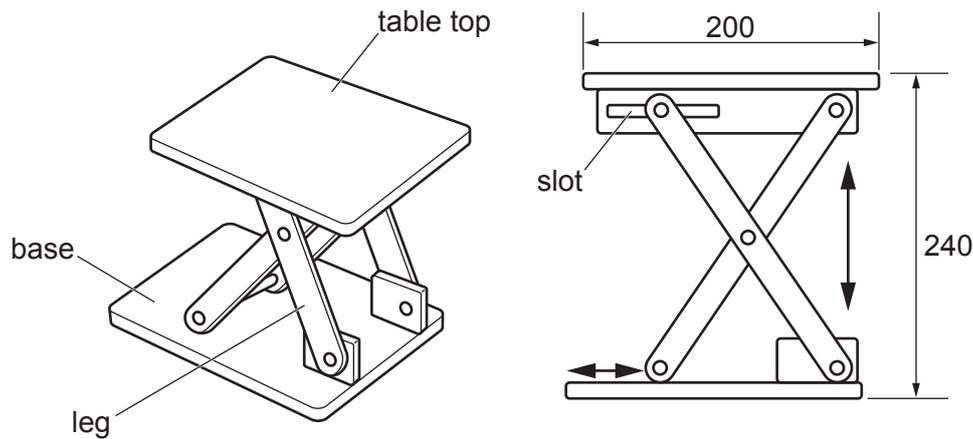


Fig. 3.1

- (a) Give **two** reasons why 6mm thick MDF has been chosen for the model of the height adjustable table. [2]
- (b) Use notes and sketches to describe:
- (i) how four identical legs could be made [6]
 - (ii) how to accurately cut the slot. [6]

You must give details about the tools, equipment and processes involved and the safety precautions that have to be undertaken at each stage.

- (c) Use notes and sketches to describe a method of locking the table at different heights. [6]

Section B

Answer **one** question from this section on the Answer Booklet/A4 paper provided.

- 4 Fig. 4.1 shows an incomplete design for a plant stand that is to be used outdoors at a garden centre.

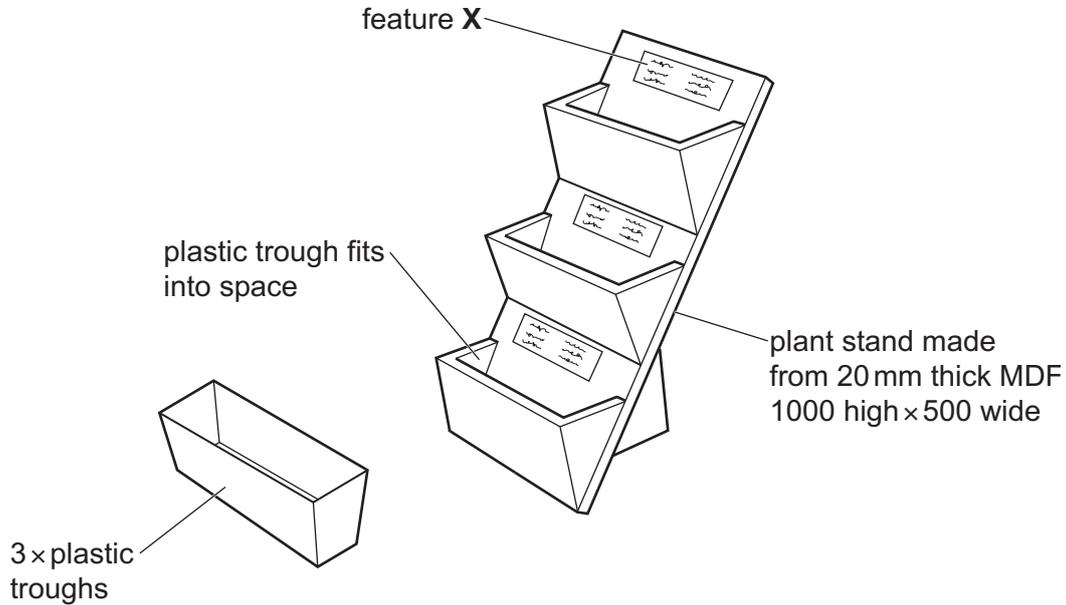


Fig. 4.1

- (a) Explain the function of the design feature shown at X. [2]
- (b) Identify and describe **two** problems with the plant stand. [4]
- (c) Use notes and sketches to explain how the design of the plant stand would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss why manufacturers of batch produced products, such as the plant stand, purchase all the resources they need before production begins.
Your answer should:
- (i) analyse the given situation and identify **three** relevant issues raised by the question [3]
- (ii) explain why you consider these issues to be relevant [3]
- (iii) contain specific examples/evidence to support your conclusions. [2]

5 Fig. 5.1 shows an incomplete design for a shape sorter that is to be used by pre-school children.

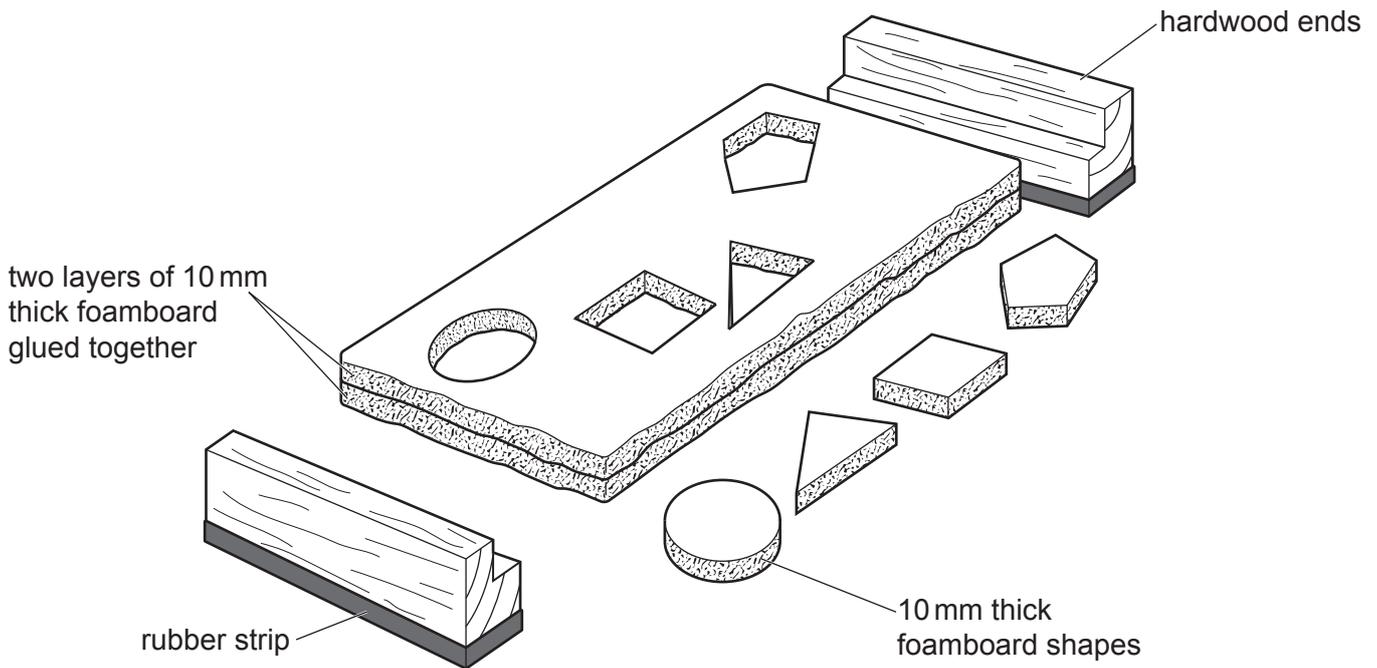


Fig. 5.1

- (a) Explain the function of the rubber strip. [2]
- (b) Identify and describe **two** problems with the shape sorter. [4]
- (c) Use notes and sketches to explain how the design of the shape sorter would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss why manufacturers who mass produce products, such as the shape sorter, make a prototype model before production begins. Your answer should:
- (i) analyse the given situation and identify **three** relevant issues raised by the question [3]
 - (ii) explain why you consider these issues to be relevant [3]
 - (iii) contain specific examples/evidence to support your conclusions. [2]

6 Fig. 6.1 shows an incomplete design for an electric toothbrush.

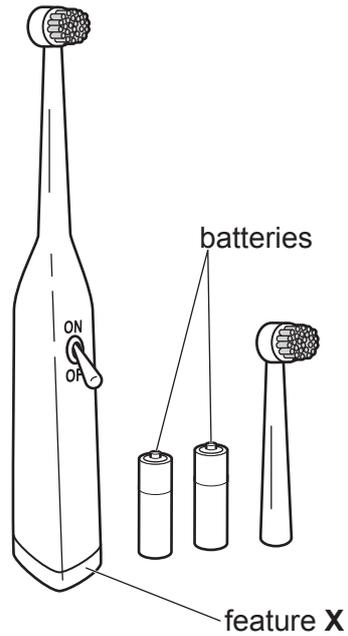


Fig. 6.1

- (a) Explain the function of the design feature shown at **X**. [2]
- (b) Identify and describe **two** problems with the electric toothbrush. [4]
- (c) Use notes and sketches to explain how the design of the electric toothbrush would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss why designers of products, such as the electric toothbrush, seek to make them energy efficient. Your answer should:
- (i) analyse the given situation and identify **three** relevant issues raised by the question [3]
 - (ii) explain why you consider these issues to be relevant [3]
 - (iii) contain specific examples/evidence to support your conclusions. [2]

Section C

Answer **one** question from this section on the plain A3 paper provided.

You are provided with two sheets of plain A3 paper. You should use **both** sides of the paper. **Each** of the four parts (a)–(d) of the question you choose to answer should take up one side of paper.

When you are asked to **develop** a design you must show, using notes and sketches, the development and evaluation of a **range** of ideas into a single design solution. The design proposal should be annotated to give details about materials, joining methods and important sizes.

7 Fig. 7.1 shows an incomplete design for a device for hanging clothes.

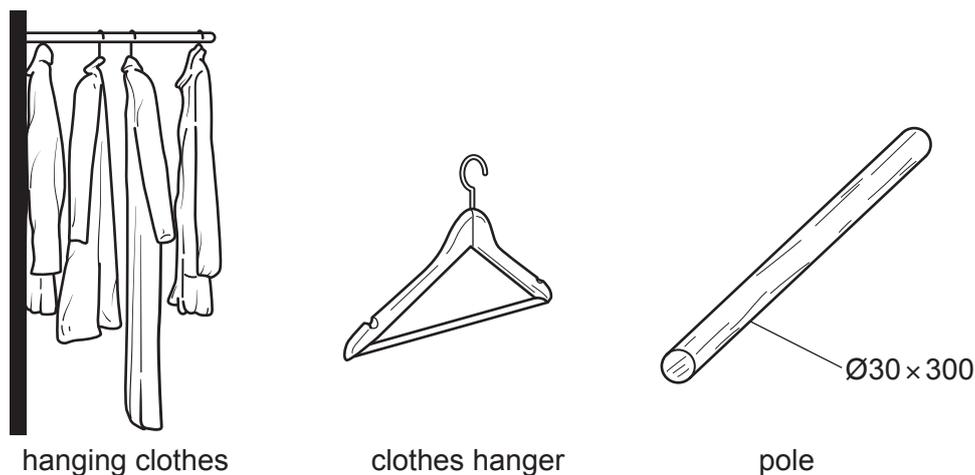


Fig. 7.1

- (a) Use notes and sketches to **develop** a design for attaching the pole to a vertical surface. The design must have a vertical adjustment of 300 mm to prevent longer clothes touching the floor. [20]
- (b) Use notes and sketches to **develop** a design for a means of extending the pole from 300 mm to 600 mm. The pole must lock at different lengths. [20]
- (c) Use notes and sketches to **develop** a design for an adjustable system to attach to the pole to space out the hangers and prevent them from falling off the end. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete device for hanging clothes which shows all of the features that you have designed in **parts (a)–(c)**. [20]

8 Fig. 8.1 shows an incomplete design for a gift set that is to be sent through the post.

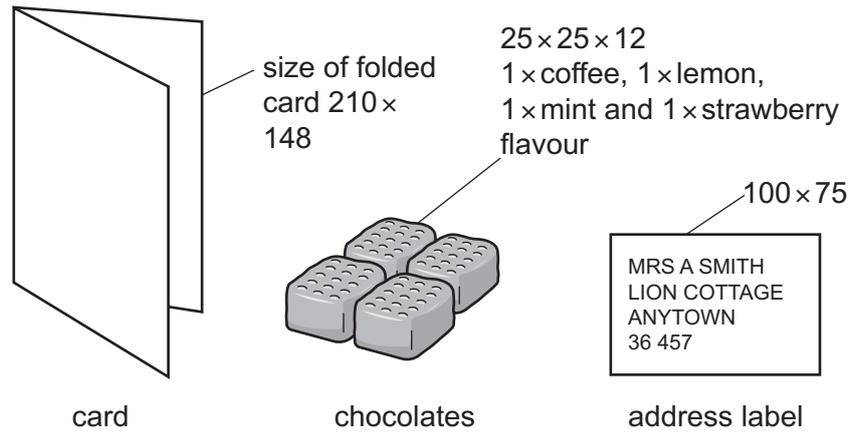


Fig. 8.1

- (a) Use notes and sketches to **develop** a design for a pop-up mechanism for the card. The pop-up card must be based on the theme of congratulations. [20]
- (b) Use notes and sketches to **develop** a design for a tray for the four chocolates. The tray must include a method of identifying the four different flavours. [20]
- (c) Use notes and sketches to **develop** a design for packaging for the pop-up card designed in **part (a)** and the tray designed in **part (b)**. Only the address label must be used to seal the packaging. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete gift set which shows all of the features that you have designed in **parts (a)–(c)**. [20]

- 9 Fig. 9.1 shows an incomplete design for a barrier to be used in a corridor when maintenance is taking place.

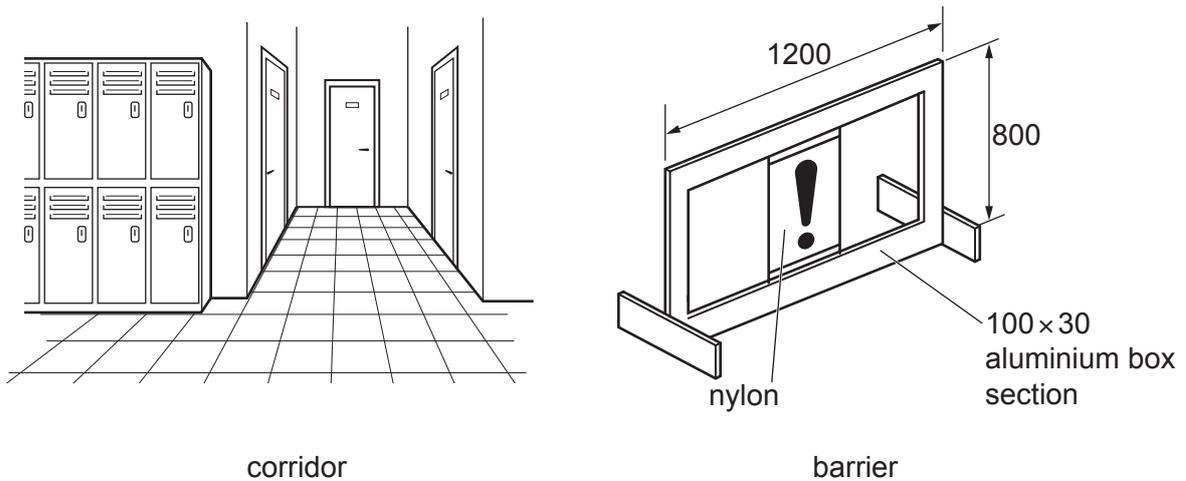


Fig. 9.1

- (a) Use notes and sketches to **develop** a design for making the barrier width adjustable. The barrier must be able to be set at any width between 1200 mm and 2000 mm. [20]
- (b) Use notes and sketches to **develop** a design for a method of easily moving the barrier and then temporarily securing it in a new position in the corridor. [20]
- (c) Use notes and sketches to **develop** a design for a device that will attach to the barrier and provide a visual and audible alarm when someone approaches. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete barrier which shows all of the features that you have designed in **parts (a)–(c)**. [20]

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