

## Cambridge International AS & A Level

## DESIGN & TECHNOLOGY

9705/13

Paper 1

October/November 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.

## Section A

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

1 Fig. 1.1 gives details of a teaching aid which is to be made in a school workshop.

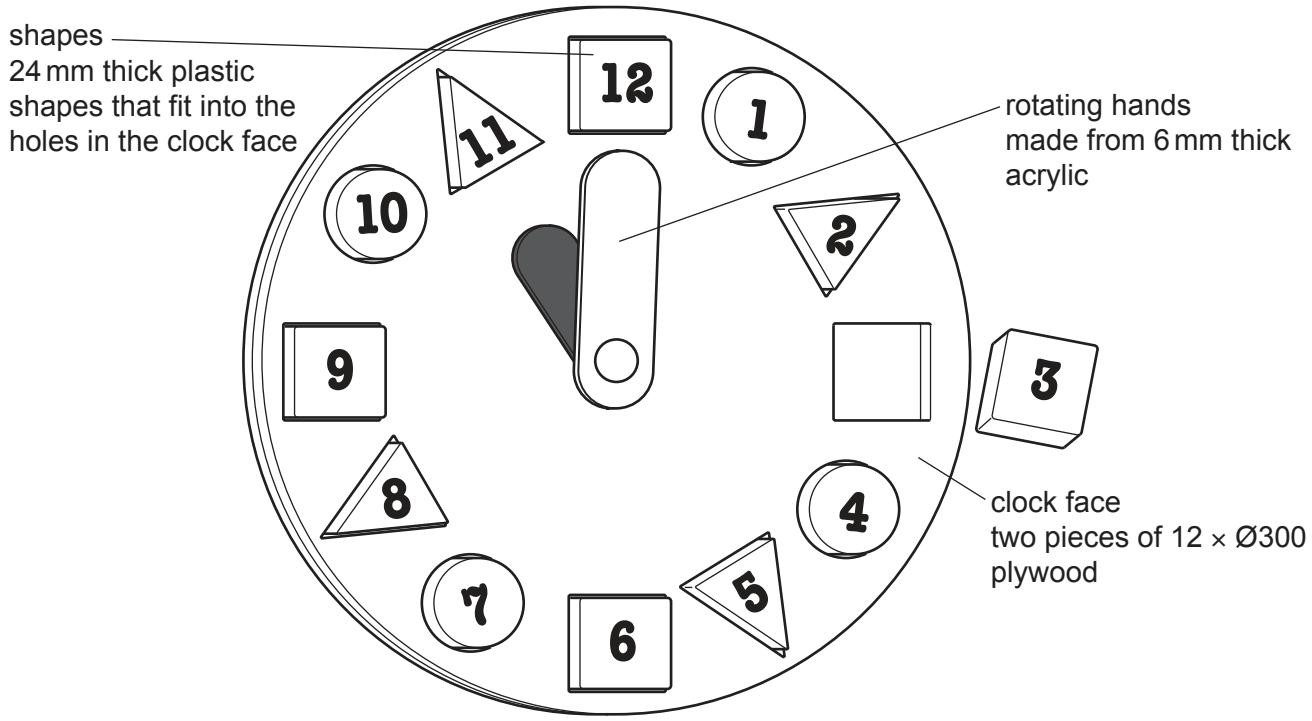


Fig. 1.1

(a) Use a sketch and notes to show how the rotating hands could be attached to the clock face. [2]

(b) Use notes and sketches to describe:

- (i) a method of making the clock face [6]
- (ii) a method of making and applying the numbers to the plastic shapes. [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 show a method of making a batch of 2000 of **one** of the plastic shapes. [6]

2 Fig. 2.1 gives details of a coffee table which is to be made in a school workshop.

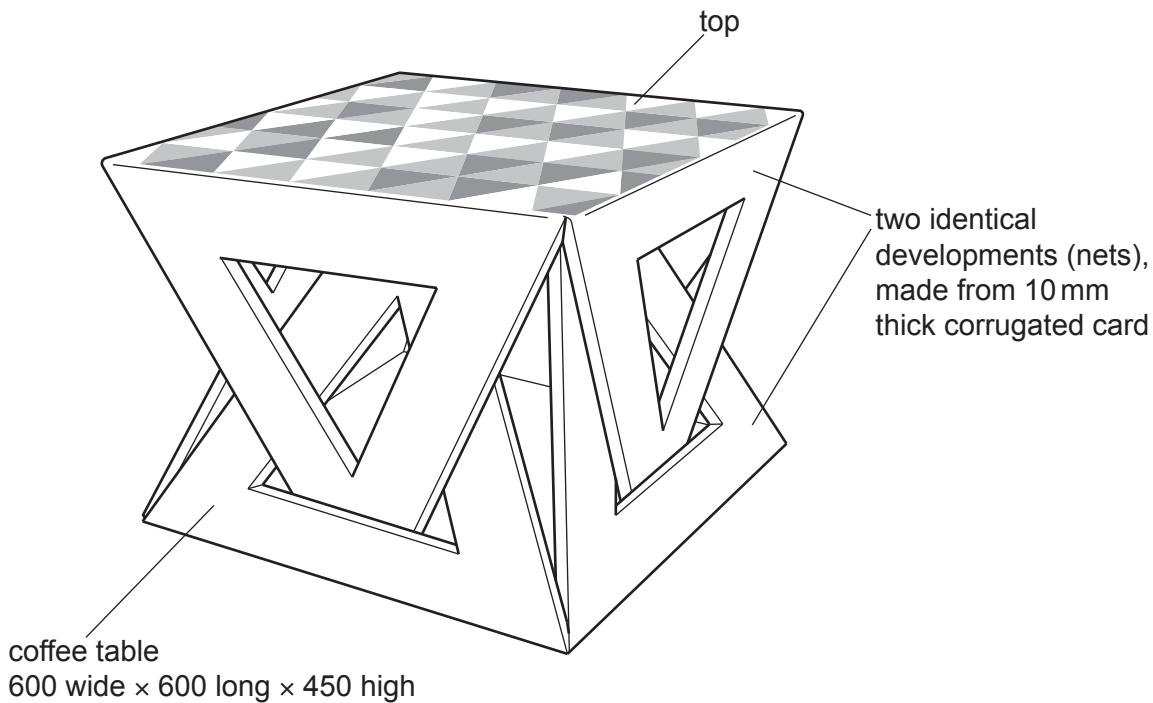


Fig. 2.1

(a) Give **two** reasons why corrugated card is a suitable material for the coffee table. [2]

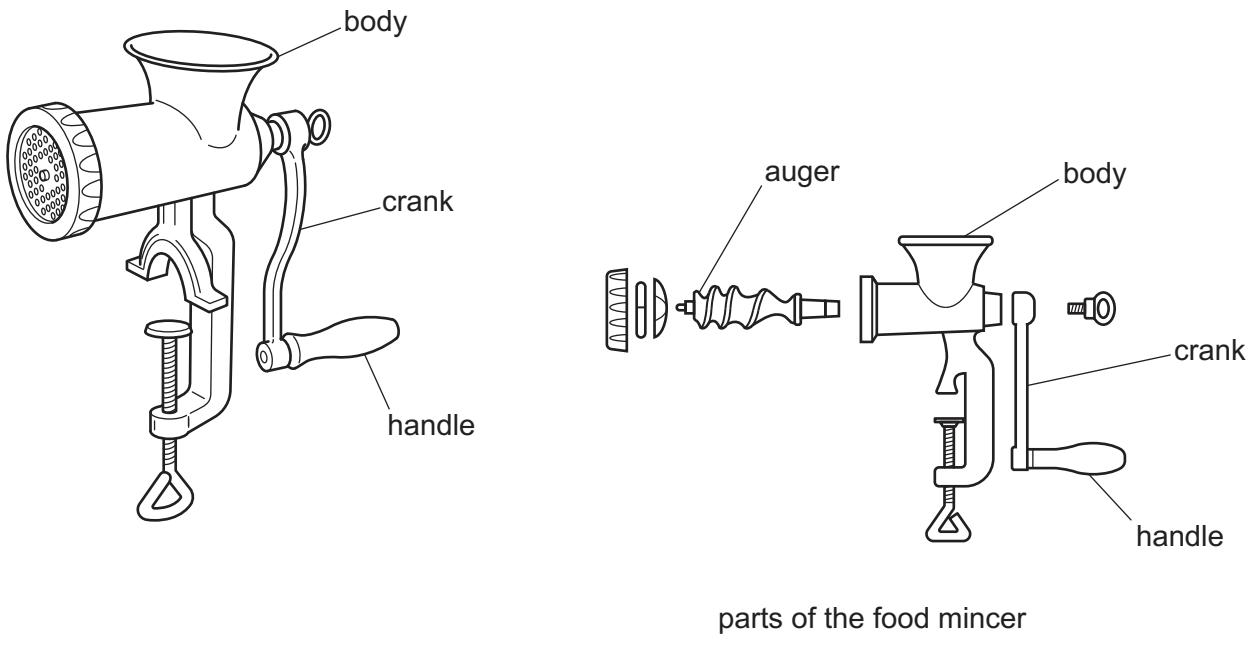
(b) Use notes and sketches to show the shape of **one** of the developments (nets) required to make the coffee table. [6]

(c) Use notes and sketches to describe:

- (i) how to make the **two** identical shaped developments (nets) that are required to form the coffee table [6]
- (ii) a method of creating and waterproofing the design on the top of the coffee table. [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 food mincer which is used in a school kitchen.



**Fig. 3.1**

(a) Give **two** reasons why the food mincer is designed to be taken apart. [2]

(b) Use notes and sketches to describe a method of making the handle. [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 sketches and notes to describe:

- (i) the action of the auger in the food mincer [6]
- (ii) how the length of the crank impacts upon the user. [6]

## Section B

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

4 Fig. 4.1 gives details of an incomplete design for a sunshade. The canopy hangs from the mild steel frame.

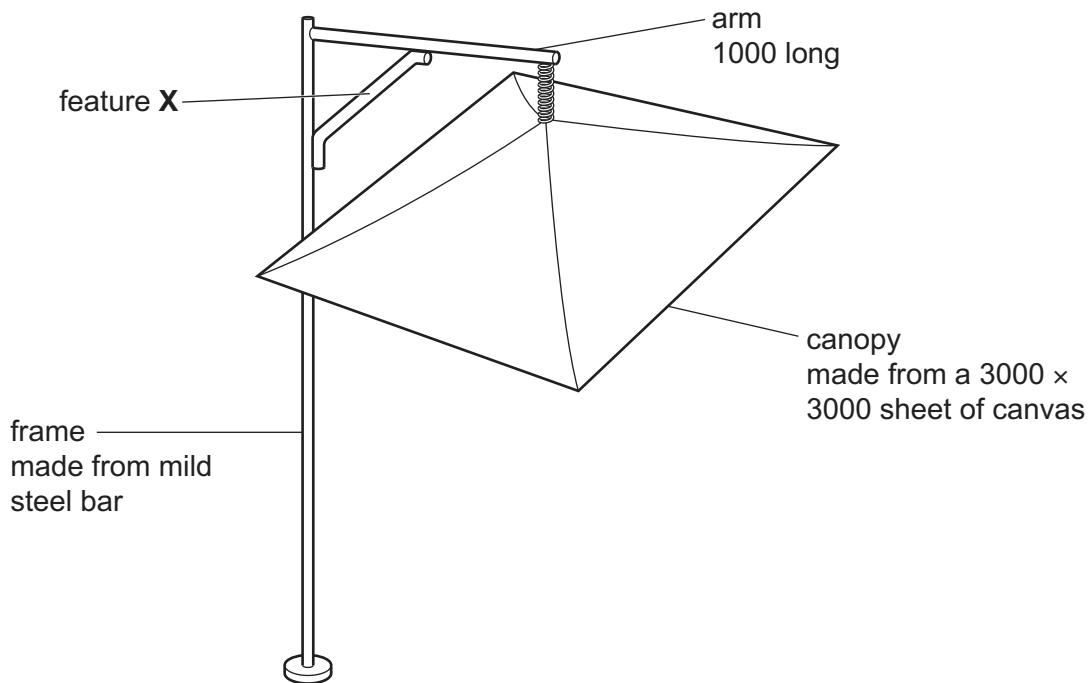


Fig. 4.1

- (a) Explain the function of the design feature shown at X. [2]
- (b) Identify and describe **two** problems with the sunshade. [4]
- (c) Use notes and sketches to explain how the design of the sunshade would need to be changed to overcome the **two** problems you have identified in part (b). [6]
- (d) Discuss why manufacturers of products, such as the sunshade, must undertake risk assessments on all manufacturing processes. 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 gives details of incomplete packaging for a birthday cake. The packaging consists of a box that slides into an outer sleeve.

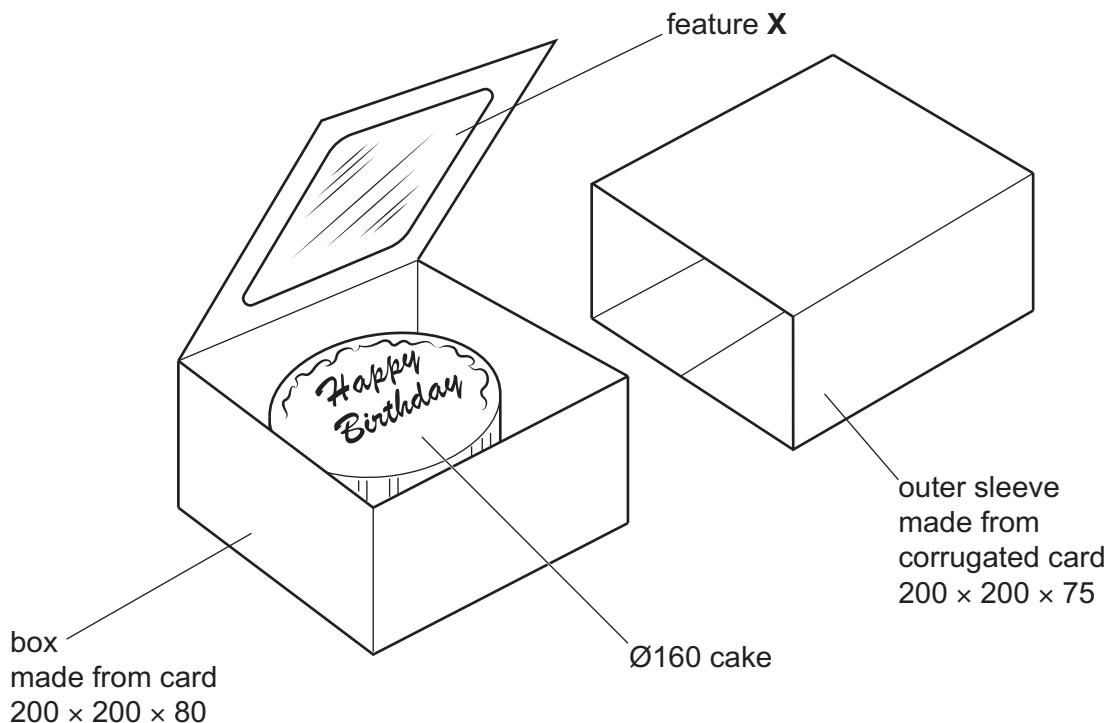


Fig. 5.1

- (a) Explain the function of the design feature shown at **X**. [2]
- (b) Identify and describe **two** problems that make the packaging for the birthday cake unsuitable for use. [4]
- (c) Use notes and sketches to explain modifications to the packaging to overcome the **two** problems you have identified in part (b). [6]
- (d) Discuss why designers of packaging, such as used for the birthday cake, consider the protection of products important. 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 gives details of an incomplete design for a lamp that is fastened to a house wall. The lamp is powered by mains electricity and detects movement.

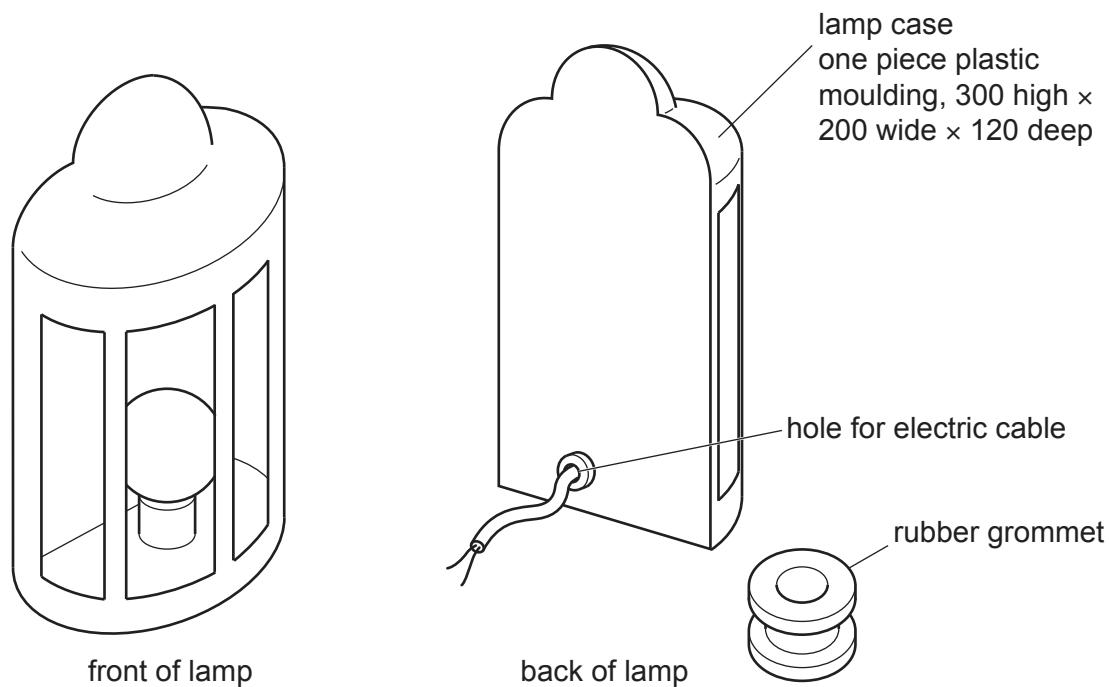


Fig. 6.1

- (a) Explain why a rubber grommet is used in the hole for the electric cable. [2]
- (b) Identify and describe **two** problems with the lamp. [4]
- (c) Use notes and sketches to explain how the lamp would need to be changed to overcome the **two** problems you have identified in part (b). [6]
- (d) Discuss how mass-production methods impact on the people involved. 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 mirror stand.

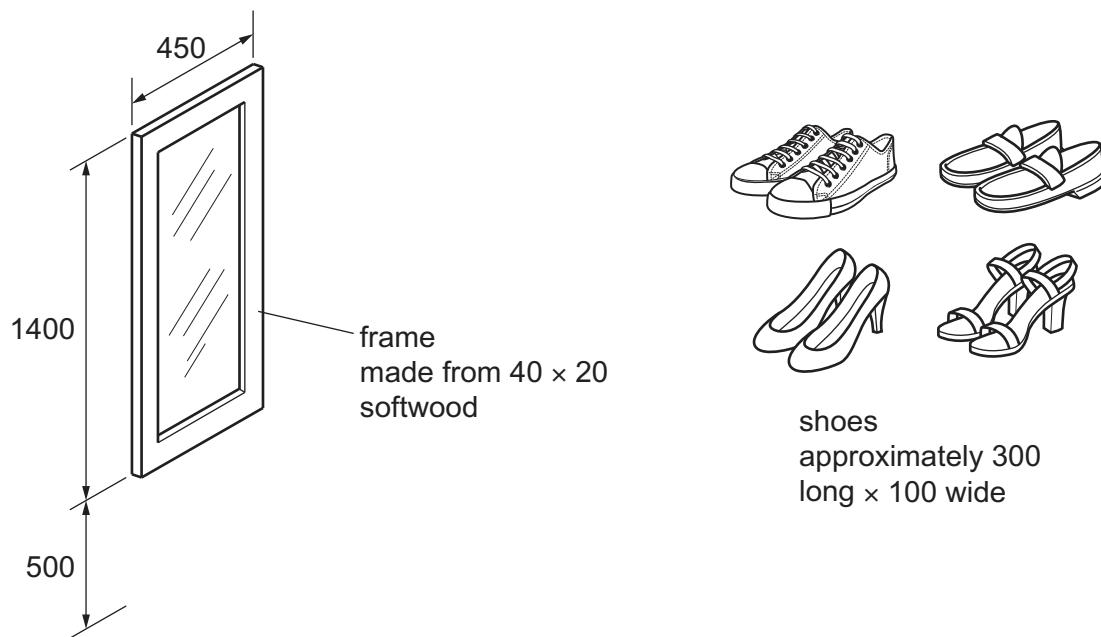


Fig. 7.1

- (a) Use notes and sketches to **develop** a design for a stand for the mirror. The stand must hold the bottom of the mirror 500 mm above the floor. [20]
- (b) Use notes and sketches to **develop** a design for a method that allows the angle of the mirror to be adjusted and attaches to the stand designed in **part (a)**. [20]
- (c) Use notes and sketches to **develop** a design for a shoe rack that attaches to the stand designed in **part (a)**. The rack must hold four pairs of shoes. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete mirror stand which shows all of the features that you have designed in **parts (a) – (c)**. [20]

8 Fig. 8.1 shows four shapes that could form the basis of a design for a freestanding slot-together robot to be used to promote a film called 'Robot Heroes'.

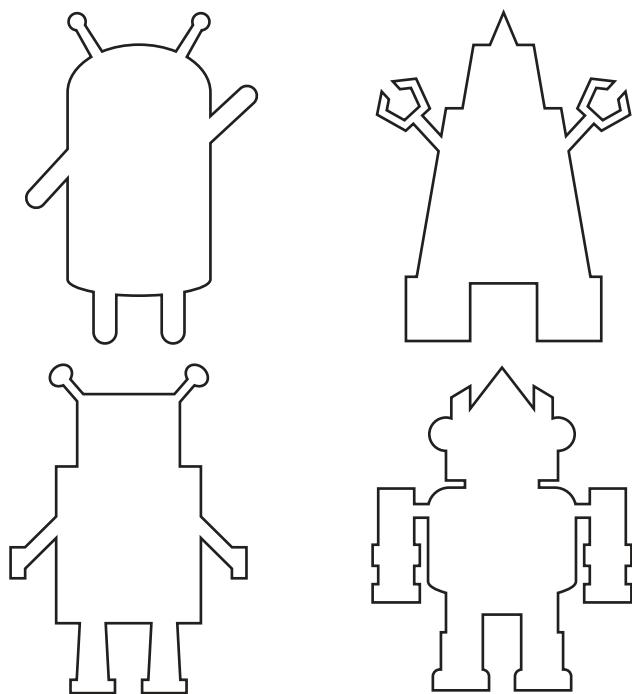


Fig. 8.1

- (a) Use notes and sketches to **develop** a design for a freestanding slot-together robot. The robot should be 1000mm high and have a minimum of four parts made from 10mm foamboard. [20]
- (b) Use notes and sketches to **develop** a design for a set of stickers to be applied to the robot you designed in **part (a)**. The stickers must show the key facial features of the 'Robot Heroes'. [20]
- (c) Use notes and sketches to **develop** a design for an A5 leaflet holder for promotional materials that will be attached to the robot you designed in **part (a)**. [20]
- (d) Produce a pictorial (3D) rendered drawing of the fully assembled robot 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 model of a stage set made from 15 mm thick plywood.

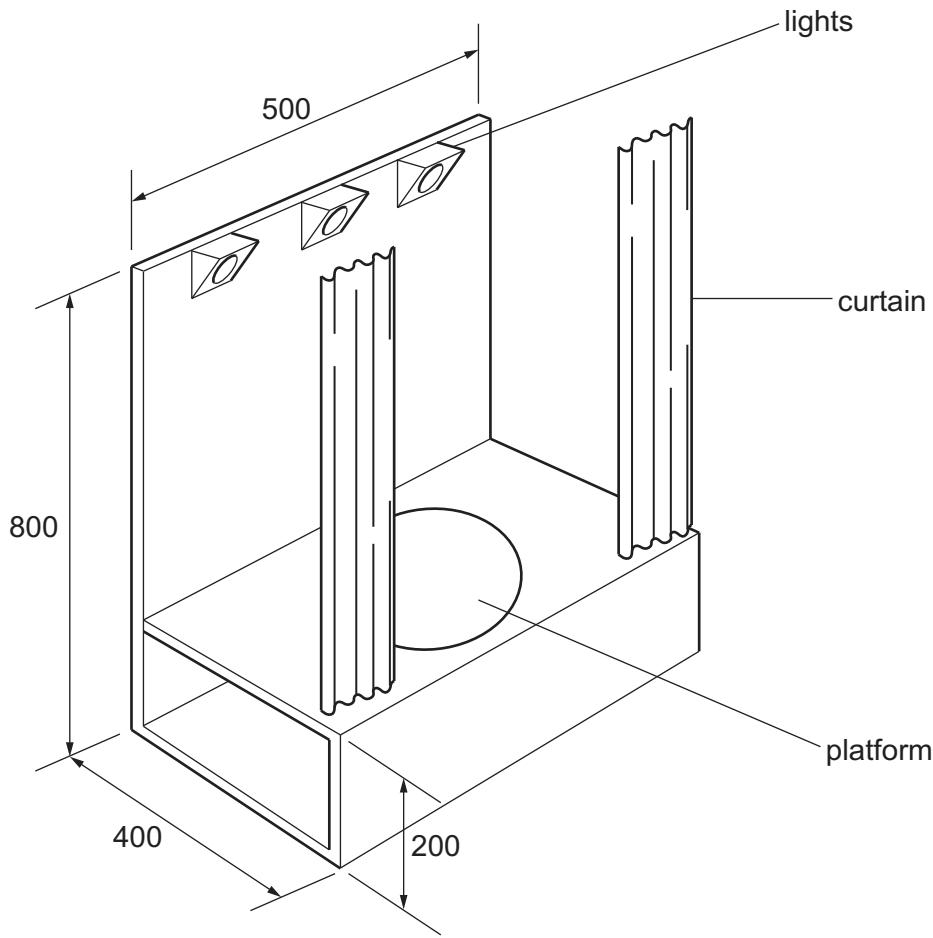


Fig. 9.1

- (a) Use notes and sketches to **develop** a design for a device that will open and close the curtains. The curtains must be able to be stopped at any position. [20]
- (b) Use notes and sketches to **develop** a design for a device that will raise and lower the platform to a height of 50 mm. [20]
- (c) Use notes and sketches to **develop** a design for a lighting control system. The three lights must be different colours, controlled independently and capable of being dimmed. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete stage set which shows all of the features that you have designed in **parts (a) – (b)**. [20]



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