



Cambridge International AS & A Level

DESIGN & TECHNOLOGY

9705/13

Paper 1

October/November 2024

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 an outdoor picnic bench which is to be made in a school workshop.

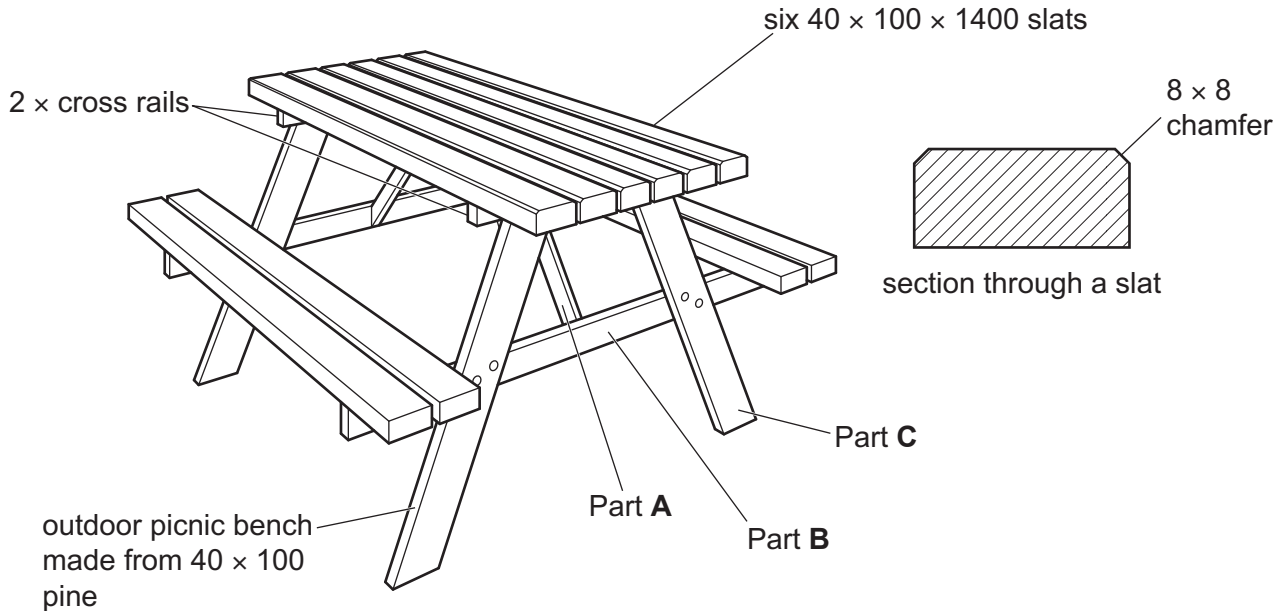


Fig. 1.1

- (a) Use notes and sketches to explain the function of Part A. [2]

- (b) Use notes and sketches to describe:

- (i) how to cut and make two slats from a $40 \times 100 \times 3000$ plank of pine [6]

- (ii) how to fasten the six slats to the two cross rails, with a 6 mm gap between each slat. [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 how to join Part B to Part C with nuts and bolts. [6]

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

2 Fig. 2.1 gives details of a package for a coffee cup and saucer.

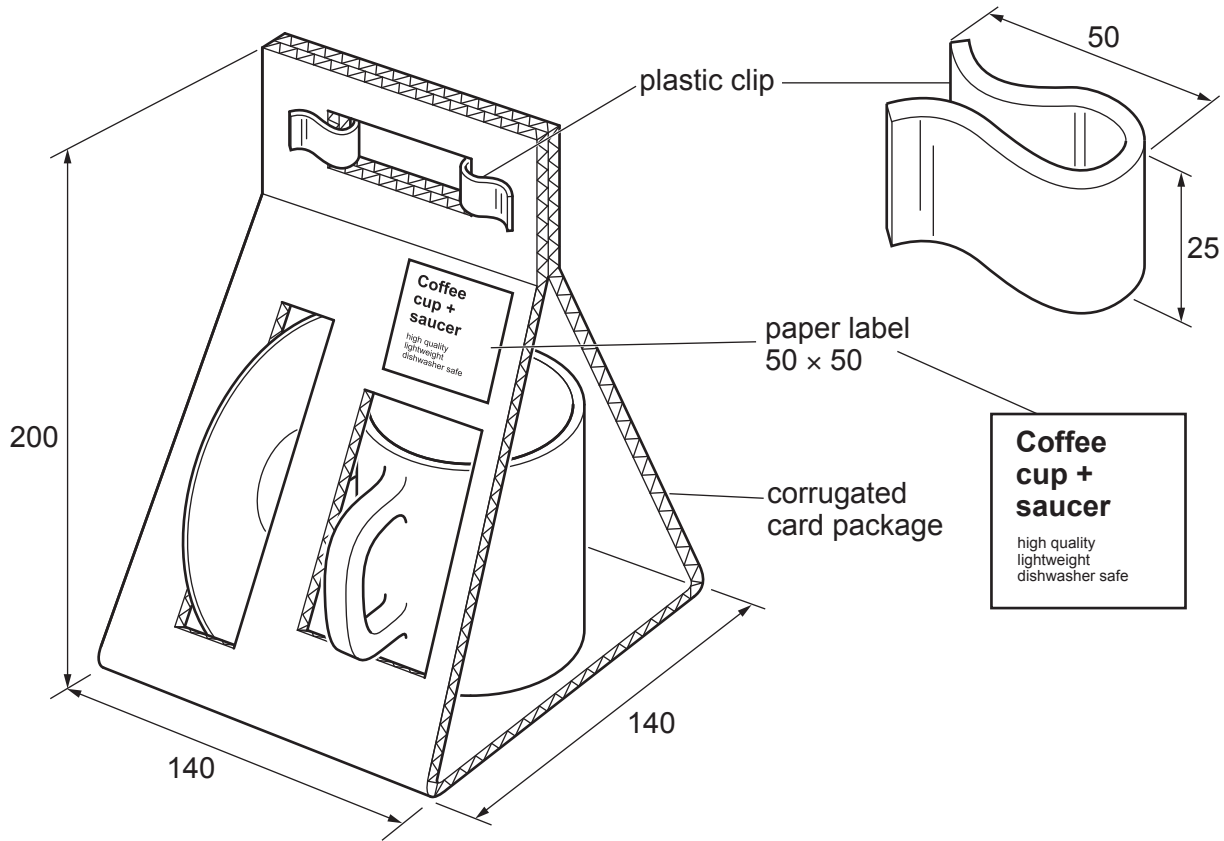


Fig. 2.1

- (a) Give **two** reasons why corrugated card has been used for the package. [2]
- (b) Use notes and sketches to show the shape, including fold lines and cut lines, of the one-piece development (net) required to make the package. [6]
- (c) Use notes and sketches to show how to make and attach the paper label to the package. [6]
- You must give details about the tools, equipment and processes involved and the safety precautions that have to be undertaken at each stage.
- (d) Name a specific plastic for the clip and use notes and sketches to describe the process used to make a batch of 5000 clips. [6]

- 3 Fig. 3.1 gives details of a model of a pulley system which is to be made in a school workshop.

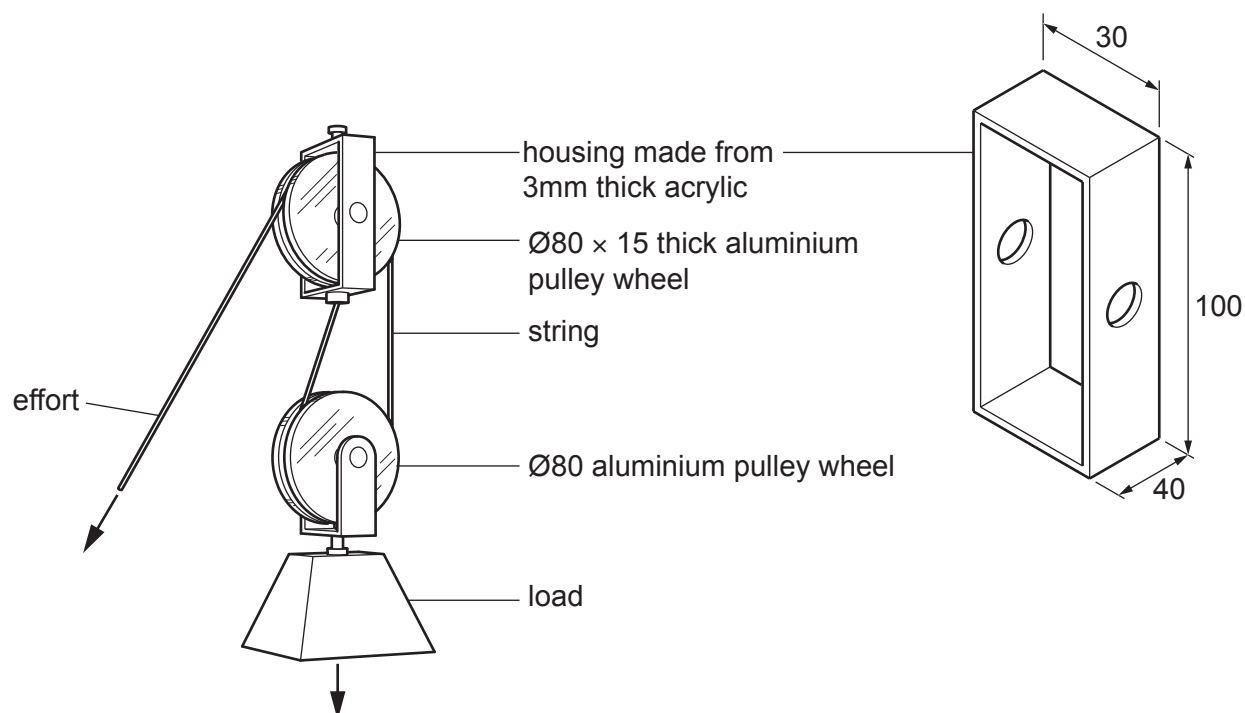


Fig. 3.1

- (a) Give **two** reasons why string has been used in the model of the pulley system. [2]
- (b) Use notes and sketches to describe:
- (i) a method of making the acrylic housing [6]
 - (ii) a method of making **one** aluminium pulley wheel. [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:
- (i) rotary, linear and reciprocating motion in the pulley system [3]
 - (ii) mechanical advantage in the pulley system. [3]

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 chair.

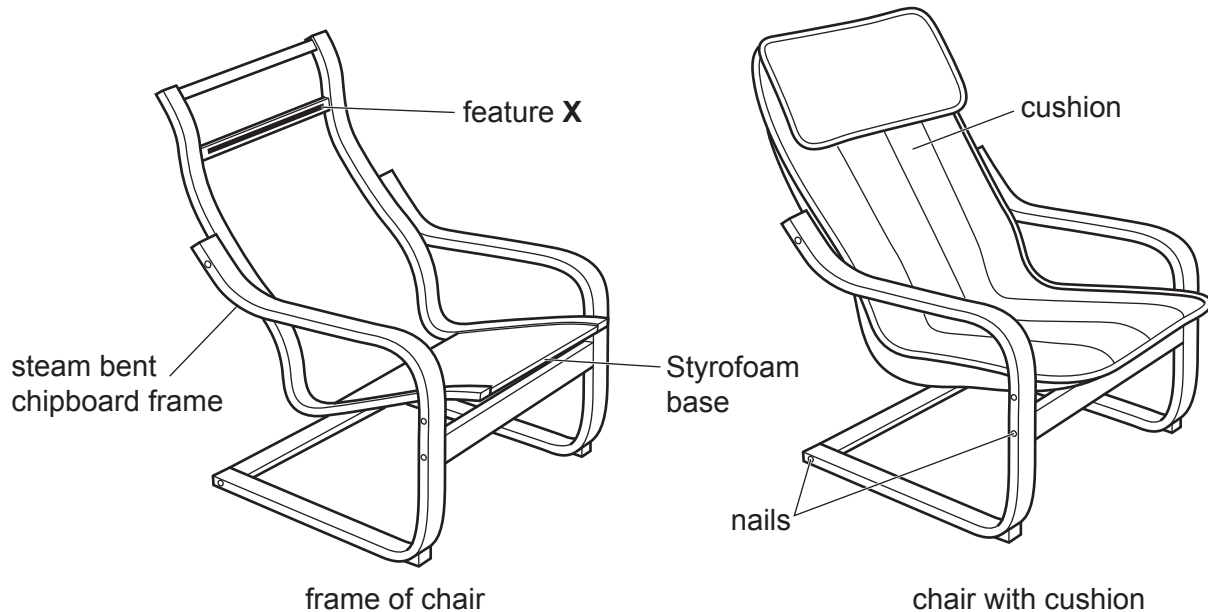


Fig. 4.1

- (a) Explain the function of the design feature shown at X. [2]
- (b) Identify and describe **two** problems with the design of the chair. [4]
- (c) Use notes and sketches to explain how the design of the chair would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss how manufacturers of mass-produced products are able to reduce unit production costs. 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 an incomplete design for a storage rack. Two or more racks slot together to produce a larger rack.

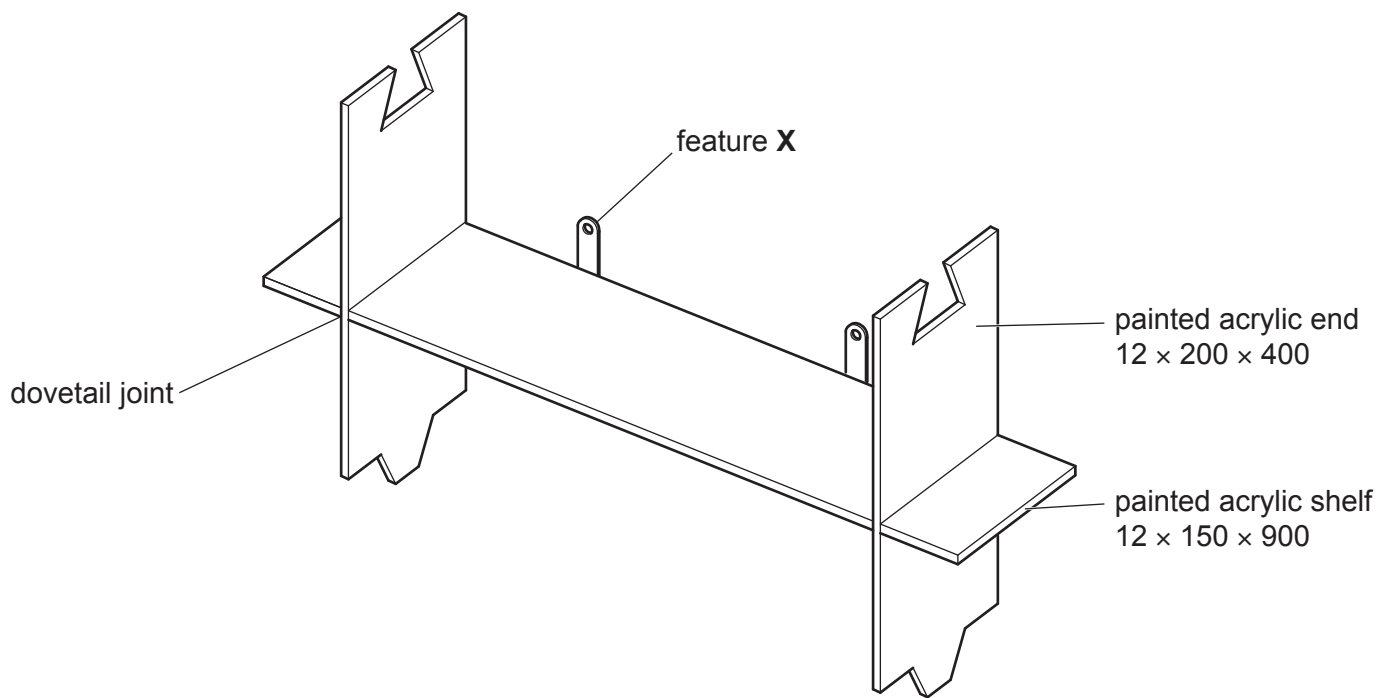


Fig. 5.1

- (a) Explain the function of the design feature shown at X. [2]
- (b) Identify and describe **two** problems with the design of the storage rack. [4]
- (c) Use notes and sketches to explain how the design of the storage rack would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss why designers of some products consider the functionality of the product more important than the aesthetics. 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 an electric food mixer.

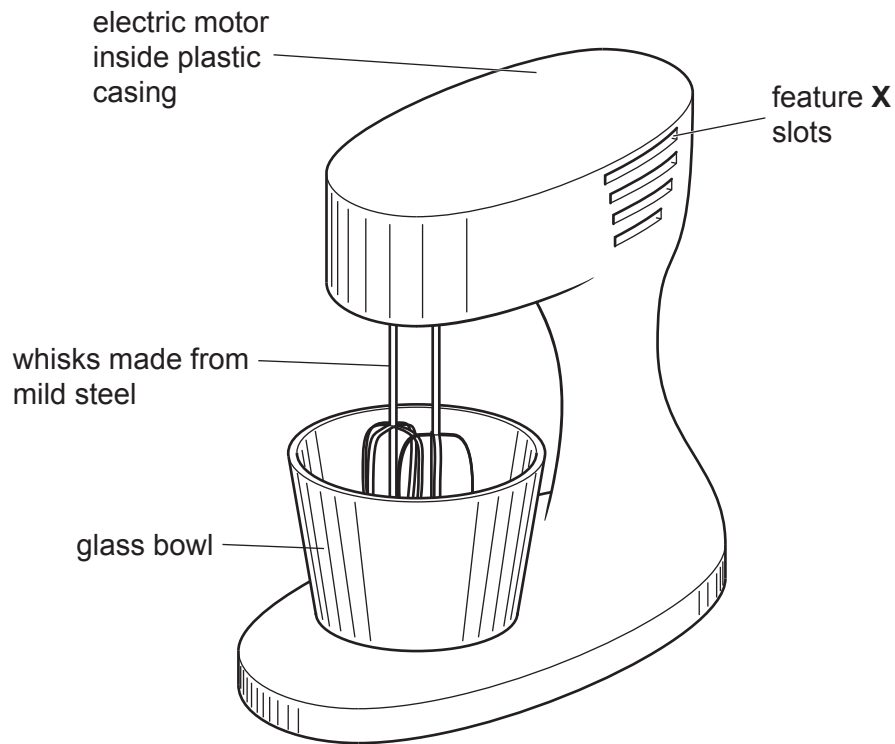


Fig. 6.1

- (a) Explain the function of the design feature shown at X. [2]
- (b) Identify and describe **two** problems with the design of the electric food mixer. [4]
- (c) Use notes and sketches to explain how the design of the electric food mixer would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss why manufacturers of electrical products design them to be 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 components for a bathroom storage unit.

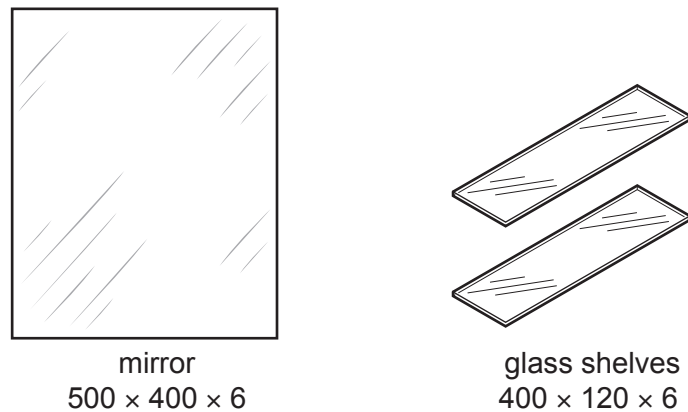


Fig. 7.1

- (a) Use notes and sketches to **develop** a design for a bathroom storage unit that incorporates the mirror. The bathroom storage unit must fasten to a wall. [20]
- (b) Use notes and sketches to **develop** a design that incorporates the two glass shelves in the bathroom storage unit designed in **part (a)**. The position of the shelves must be adjustable. [20]
- (c) Use notes and sketches to **develop** a design for a method of holding a towel on the bathroom storage unit designed in **part (a)**. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete bathroom storage unit which shows all of the features that you have designed in **parts (a) – (c)**. [20]

8 Fig. 8.1 shows details of the design requirements for a package for six cartons of fruit drink.

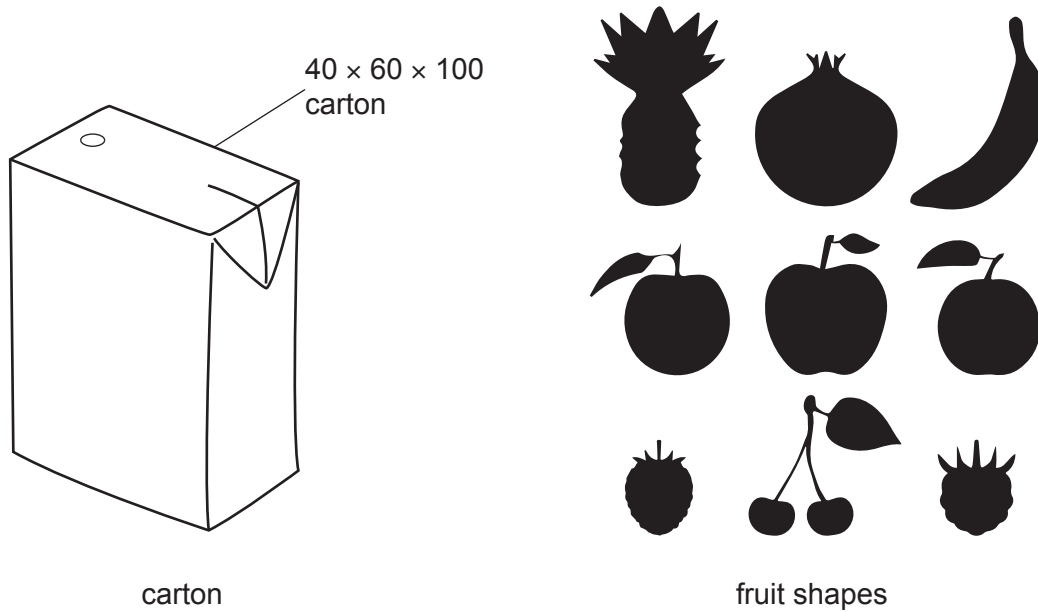


Fig. 8.1

- (a) Use notes and sketches to **develop** a design for a development (net) for a package to hold six cartons of fruit drink of the size shown in Fig. 8.1. The package must be based on the shape of a fruit. [20]
- (b) Use notes and sketches to **develop** a design for graphics for the front of the package designed in **part (a)**. The graphics must be based upon the name 'Fruitee'. [20]
- (c) Use notes and sketches to **develop** a design for a game to go on the back of the package designed in **part (a)**. The game must be suitable for children aged 4 – 5 years. [20]
- (d) Produce pictorial (3D) rendered drawings of the package which show all of the features that you have designed in **parts (a) – (c)**. [20]

9 Fig. 9.1 shows an incomplete design for a garden shade.

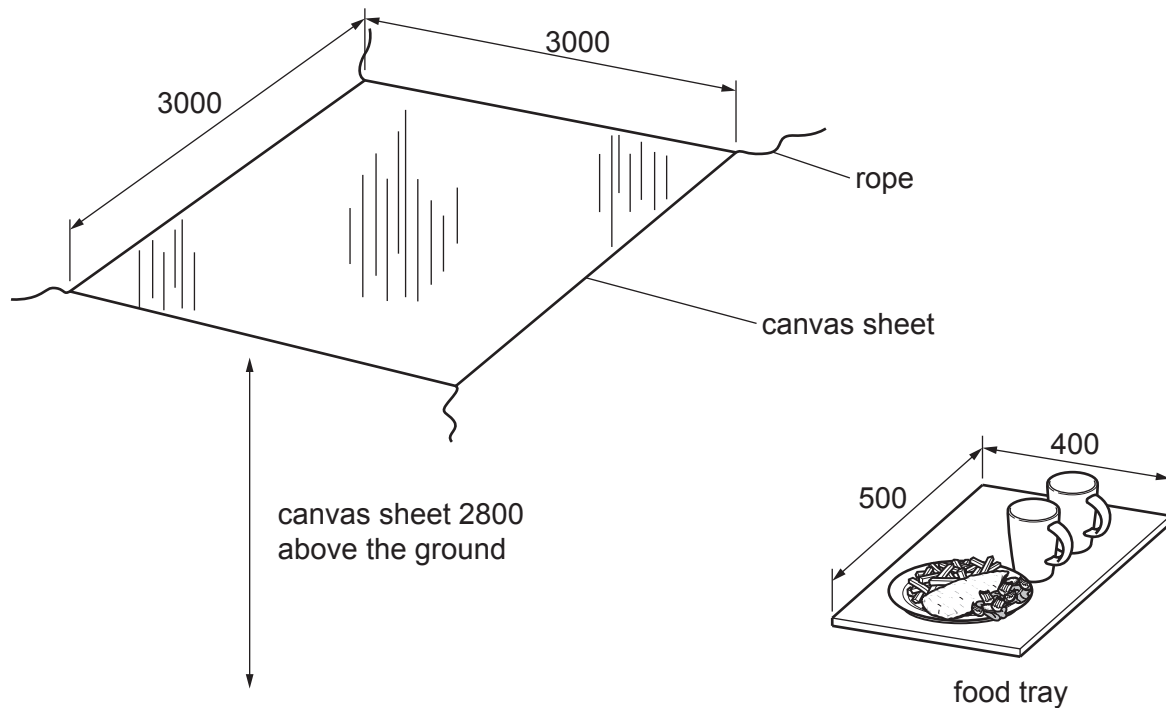


Fig. 9.1

- (a) Use notes and sketches to **develop** a design for a lightweight structure that will support the canvas sheet at the height shown in Fig. 9.1. The structure should be assembled without the use of tools. [20]
- (b) Use notes and sketches to **develop** a design for a device to attach the food tray to the structure designed in **part (a)**. The food tray must be adjustable to any height between 800 mm and 1200 mm from the ground. [20]
- (c) Use notes and sketches to **develop** a design for a lighting system for the garden shade designed in **part (a)**. The lighting system should **not** be powered by mains electricity. [20]
- (d) Produce a pictorial (3D) rendered drawing which shows all of the features that you have designed in **parts (a) – (c)**. [20]

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