

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.

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.

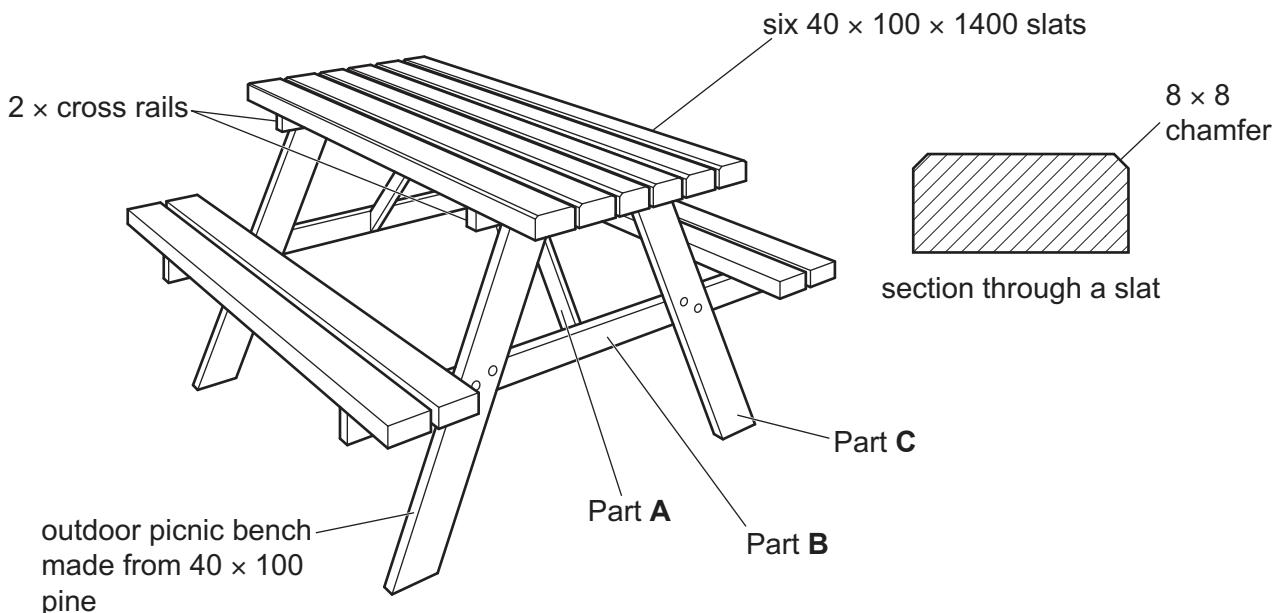


Fig. 1.1

(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 x 100 x 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.

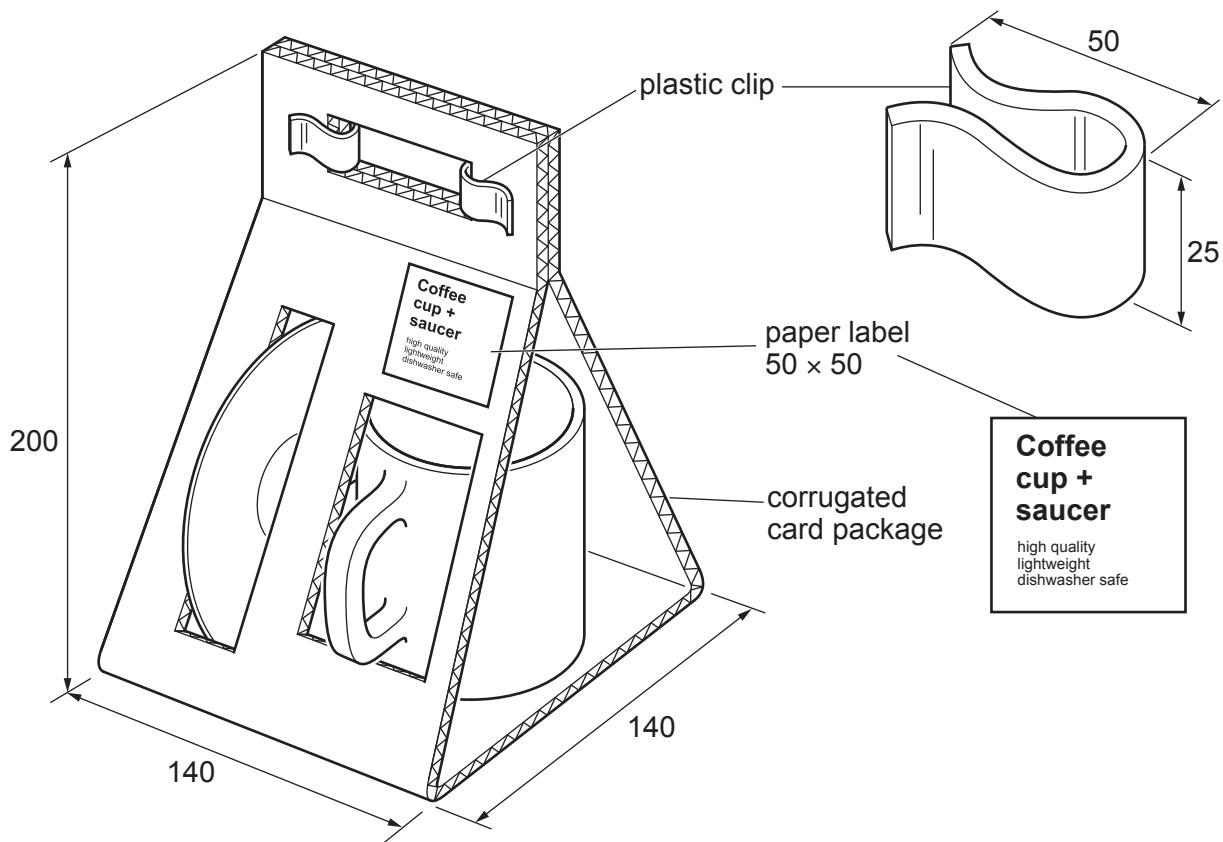


Fig. 2.1

(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.

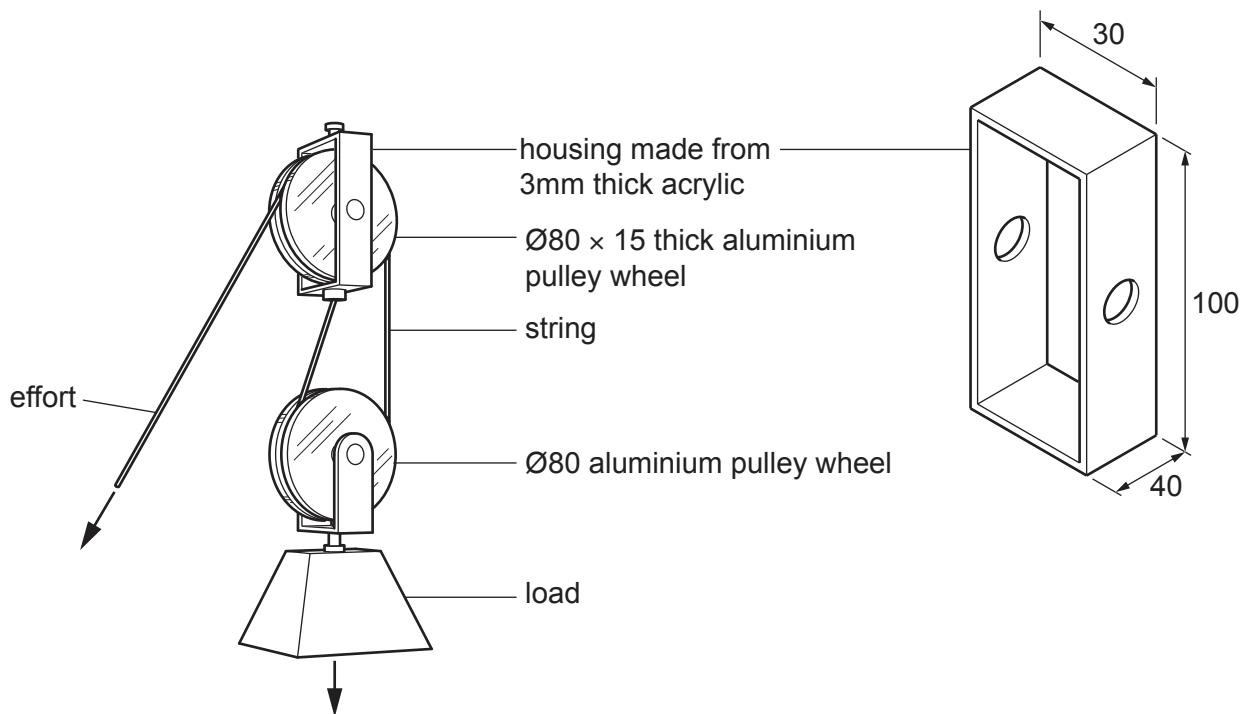


Fig. 3.1

(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.

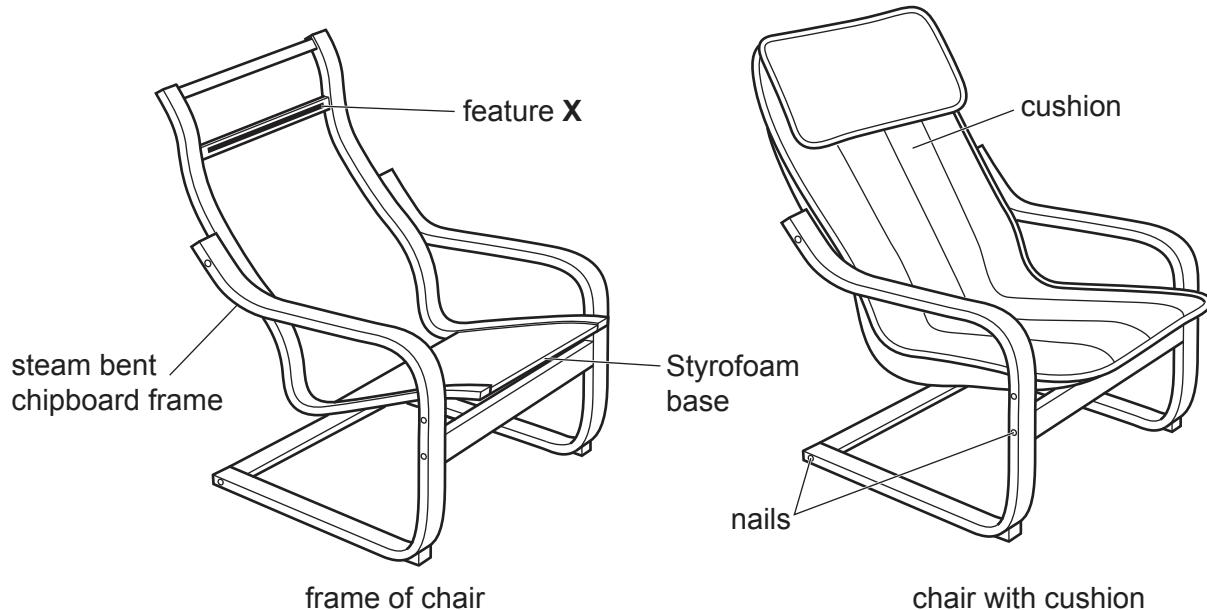


Fig. 4.1

- (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.

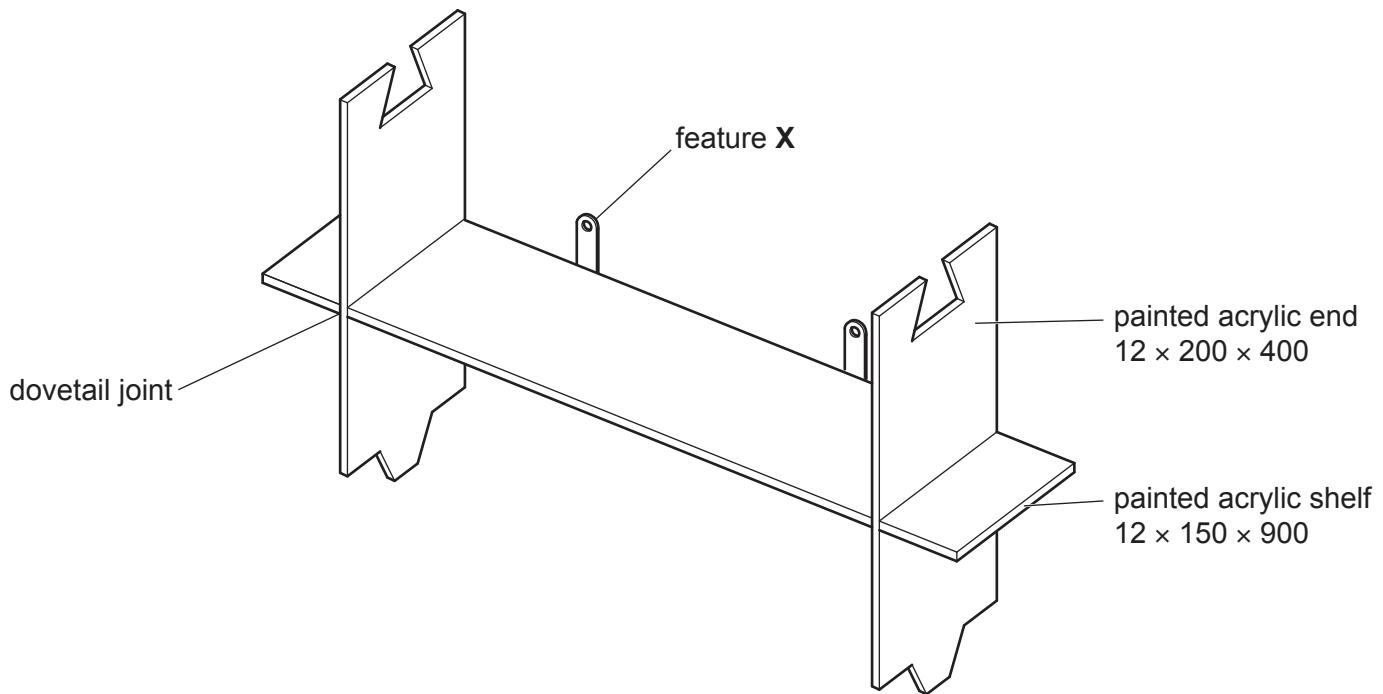


Fig. 5.1

- (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.

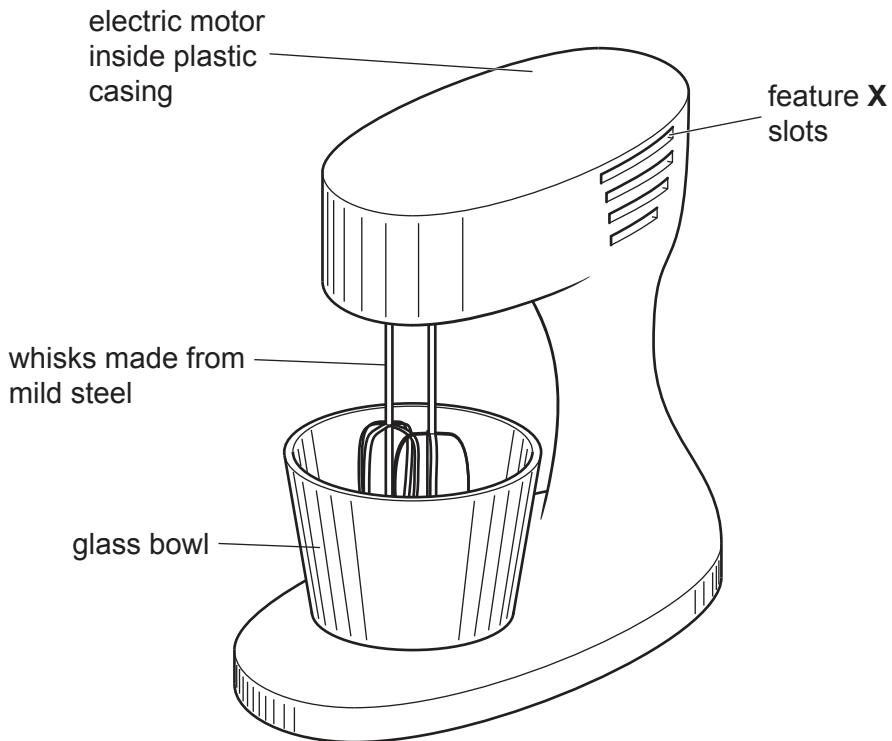


Fig. 6.1

(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:

- analyse the given situation and identify **three** relevant issues raised by the question [3]
- explain why you consider these issues to be relevant [3]
- 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.

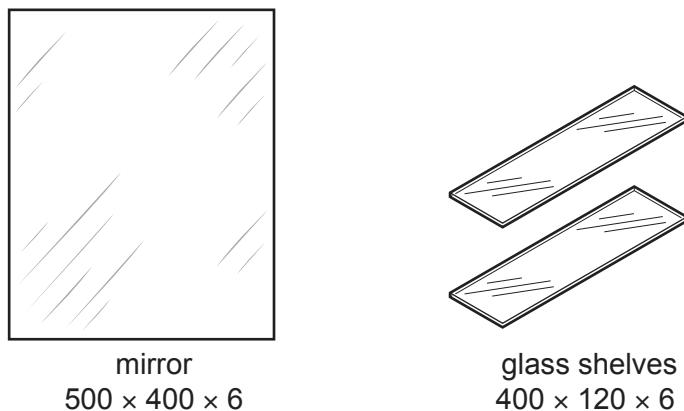


Fig. 7.1

- (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.

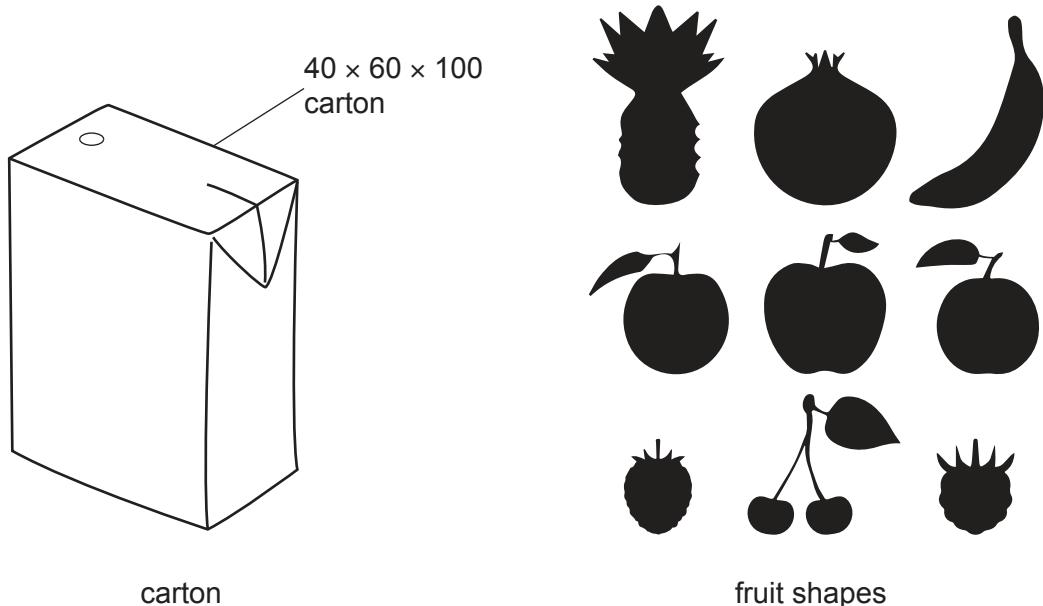


Fig. 8.1

- (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.

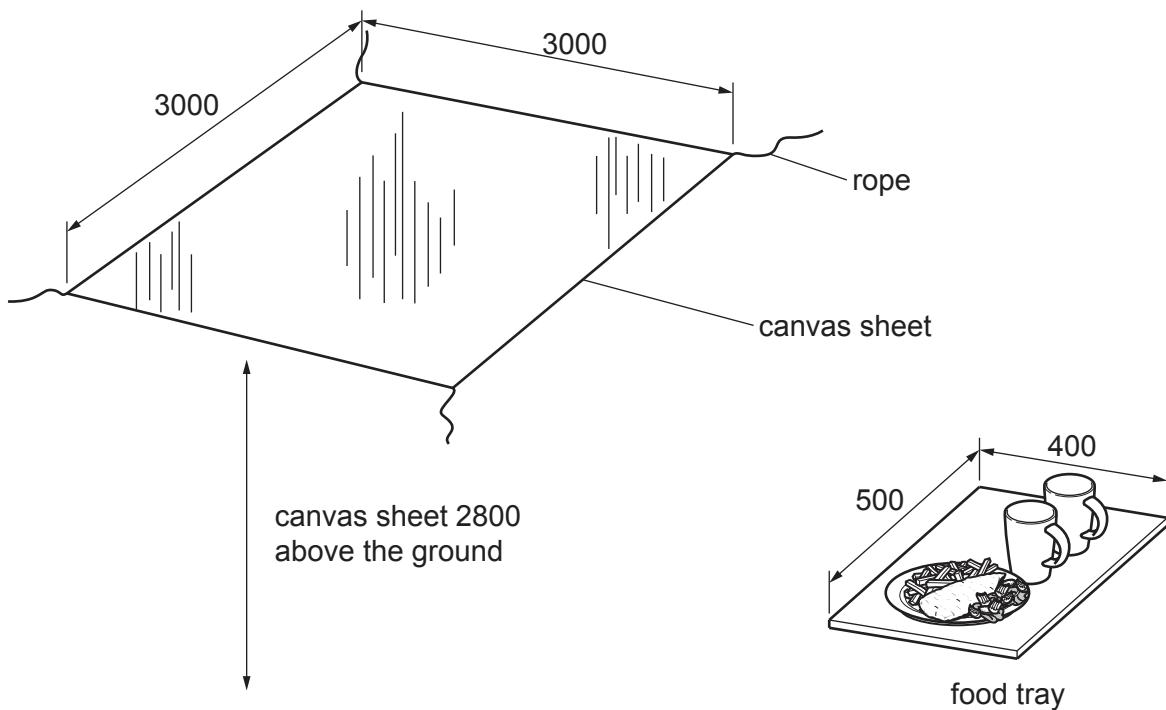


Fig. 9.1

- (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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