



Cambridge International AS & A Level

DESIGN & TECHNOLOGY

9705/13

Paper 1

October/November 2021

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 shows details of the cardboard lid, box and insert used to package fragile ceramic balls. The packaging will be made in a school workshop.

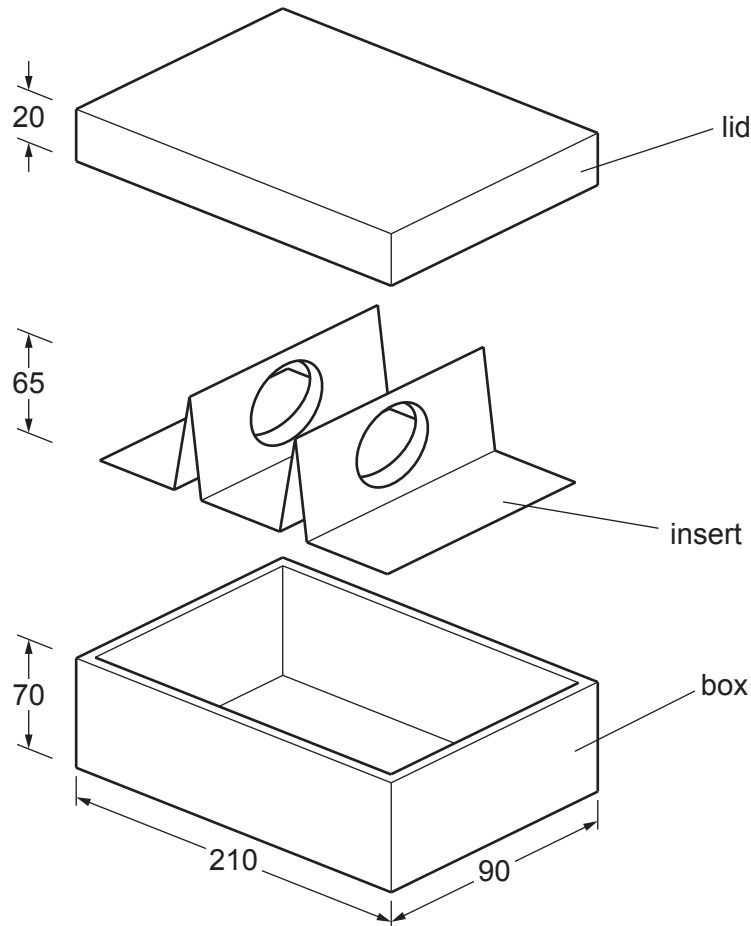


Fig. 1.1

- (a) State a suitable sheet material (other than cardboard) that could be used to make the lid and give **one** reason for your choice. [2]
- (b) Use notes and sketches to describe:
- (i) how the cardboard lid would be marked out, cut out and assembled [6]
 - (ii) how a thin plastic template could be made and used to mark out the development (net) for the insert. [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) Draw the development (net), including the fold lines, required to make the box. The walls of the box are double thickness for added strength. [6]

- 2 Fig. 2.1 gives details of a wooden desk tidy that is commonly used in an office or school. The desk tidy is to be made in a school workshop.

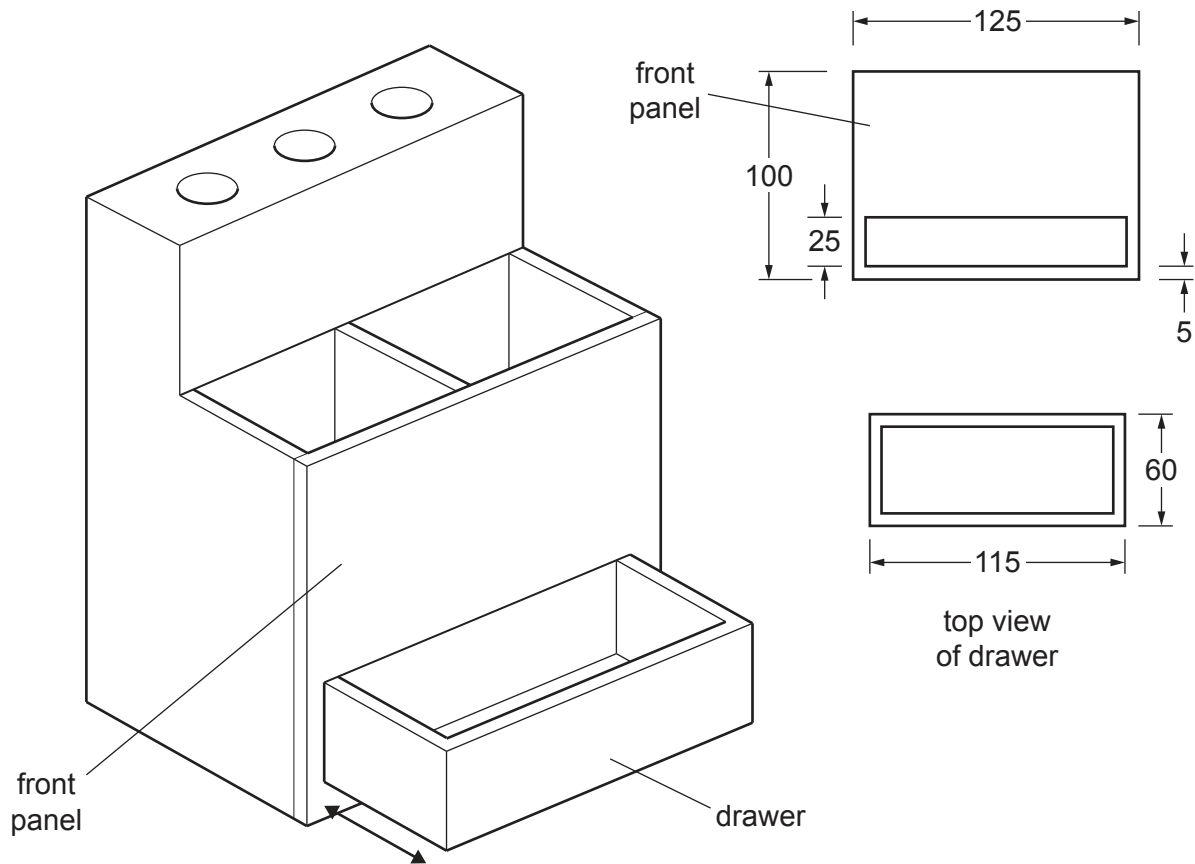


Fig. 2.1

- (a) State **two** types of wood suitable for the desk tidy. The thickness of the wood is 5 mm. [2]
- (b) Use notes and sketches to describe:
- (i) how the front panel could be made [6]
 - (ii) how the drawer 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) Explain why products such as the drawer are made from flat sheet materials. [6]

- 3 Fig. 3.1 shows the blade of a sliding bevel that is to be made in a school workshop. The blade will be made from 3 mm mild steel.

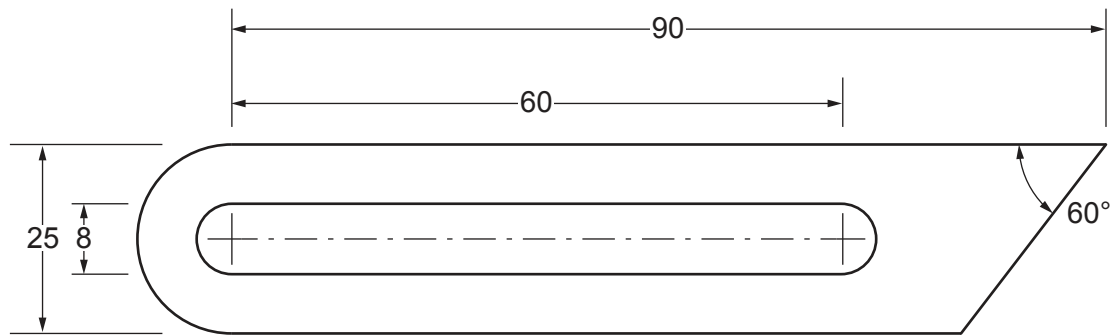


Fig. 3.1

- (a) State **two** reasons why mild steel could be used to make the blade. [2]
- (b) Use notes and sketches to describe:
- (i) how the slot could be marked out and cut out [6]
 - (ii) how the outer shape could be marked out, cut out and finished [6]
 - (iii) how the blade would be case hardened. [6]

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

Section B

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

- 4 Fig. 4.1 shows a prototype cycle storage shed that is to be used at a school. The roof is manufactured from recycled plastic and the sides from reclaimed timber.

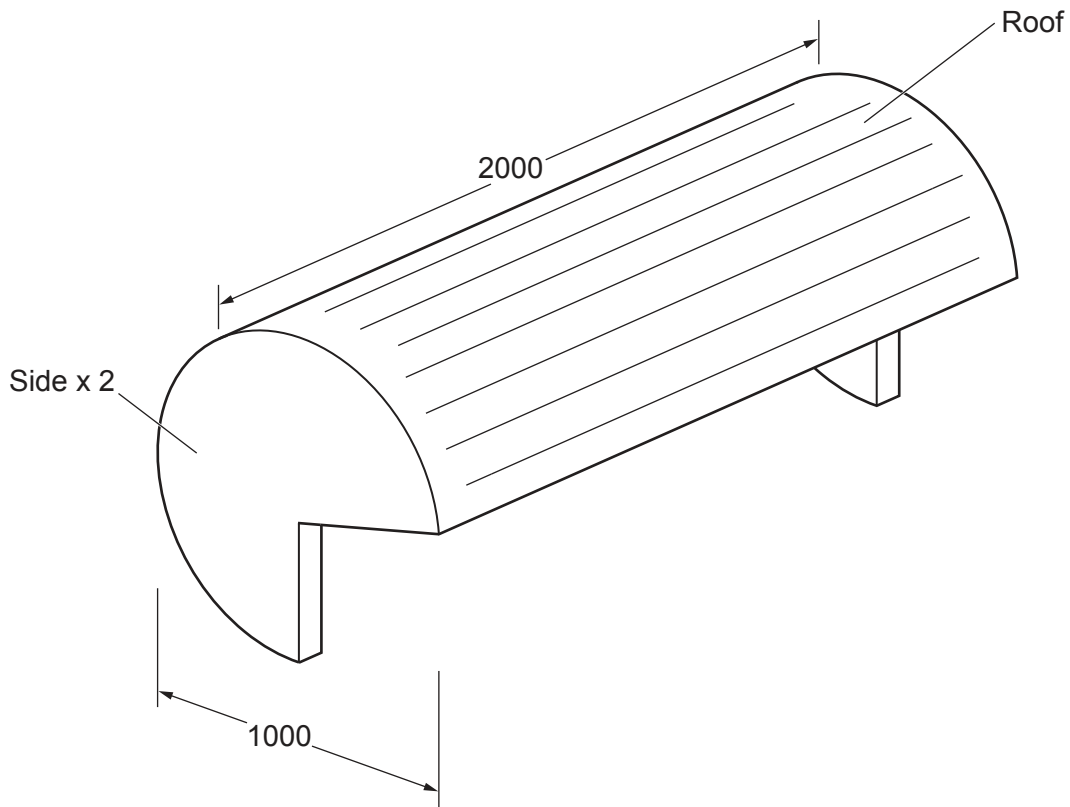


Fig. 4.1

- (a) Give **two** reasons why the roof is curved. [2]
- (b) Identify and describe **two** problems with the design of the prototype cycle storage shed. [4]
- (c) Use notes and sketches to explain how the design would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss the importance of trialling and testing prototypes such as the cycle storage shed before batch 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 gives details of a cardboard laptop stand that gives those using it a more comfortable typing position.

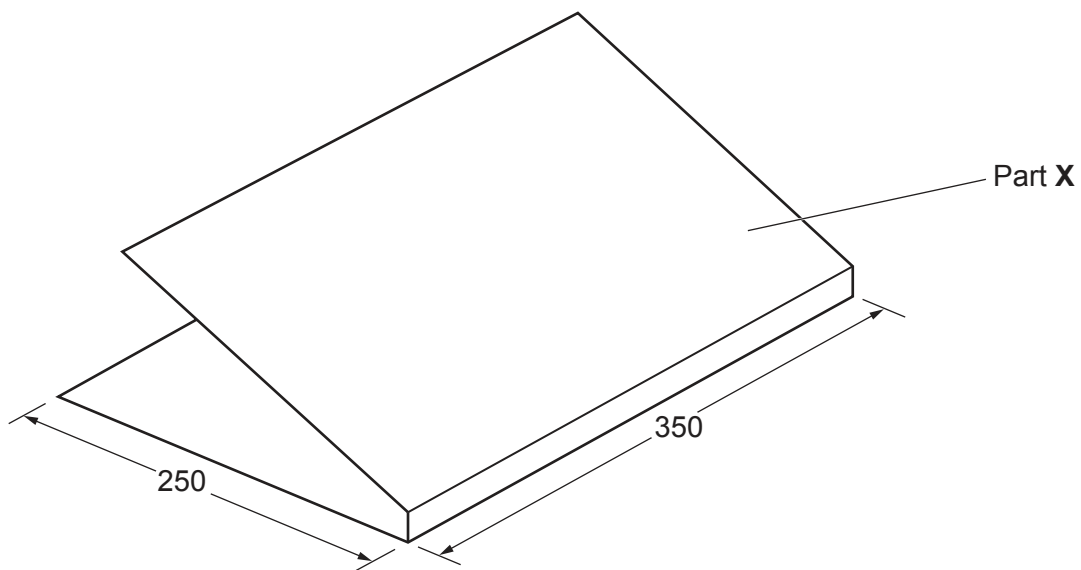


Fig. 5.1

- (a) Explain the function of Part X. [2]
- (b) Identify and describe **two** problems with the design of the cardboard laptop stand. [4]
- (c) Use notes and sketches to explain how the design would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss the benefits of using recycled cardboard to manufacture products such as the laptop stand.

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 a centre lathe that can be found in a school workshop.

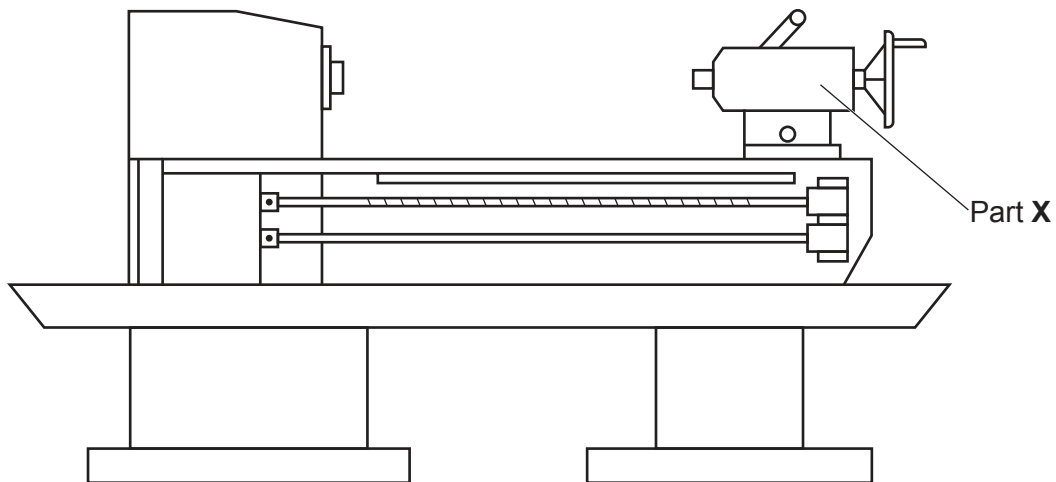


Fig. 6.1

- (a) Explain the function of Part X. [2]
- (b) Identify and describe **two** problems with the design of this centre lathe that make it difficult to use. [4]
- (c) Use notes and sketches to explain how the design would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss why machines such as the centre lathe can run at a range of speeds between 40 rpm and 3000 rpm.

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 solution. The design proposal should be annotated to give details about materials, joining methods and important sizes.

7 Fig. 7.1 shows an incomplete idea for an indoor clothes airer.

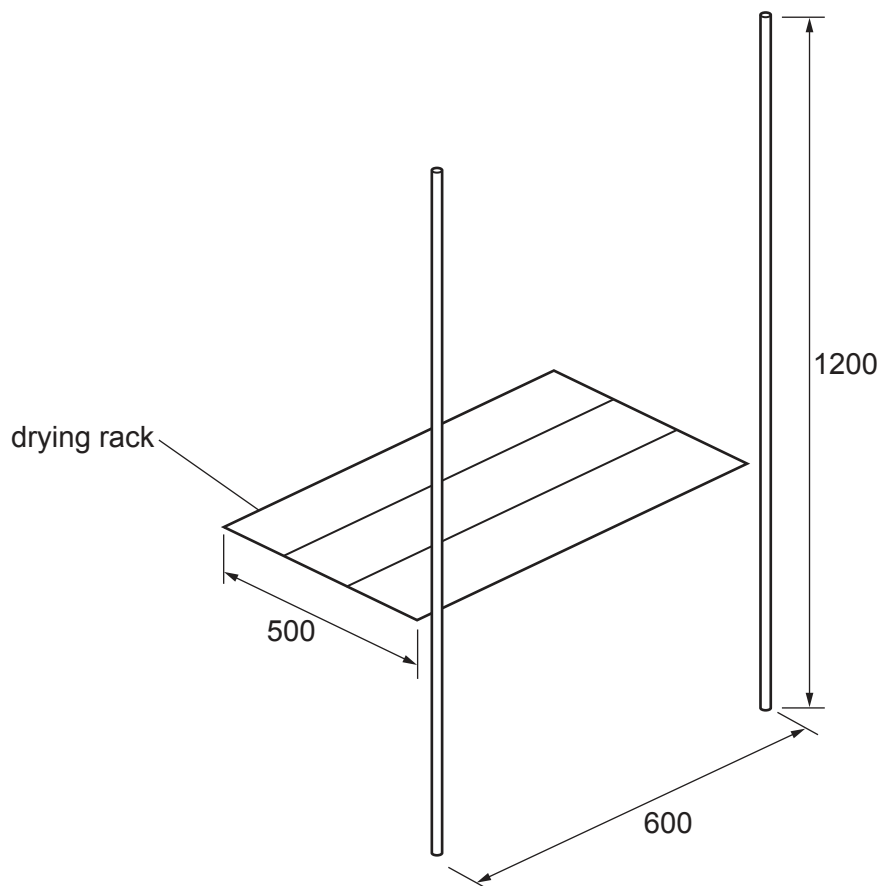


Fig. 7.1

- (a) Use notes and sketches to **develop** a design for the clothes airer. The design must allow four drying racks to be used at the same time and fold flat for storage. [20]
- (b) Use notes and sketches to **develop** a design for a base that provides stability. The base should fold flat for storage. [20]
- (c) Use notes and sketches to **develop** a design for a detachable container for clothes pegs that can be easily attached to and removed from the clothes airer. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete clothes airer which shows all the features that you have designed in **parts (a) – (c)**. [20]

8 Fig. 8.1 shows an incomplete idea for a trolley that is used for moving straw bales on a small farm.

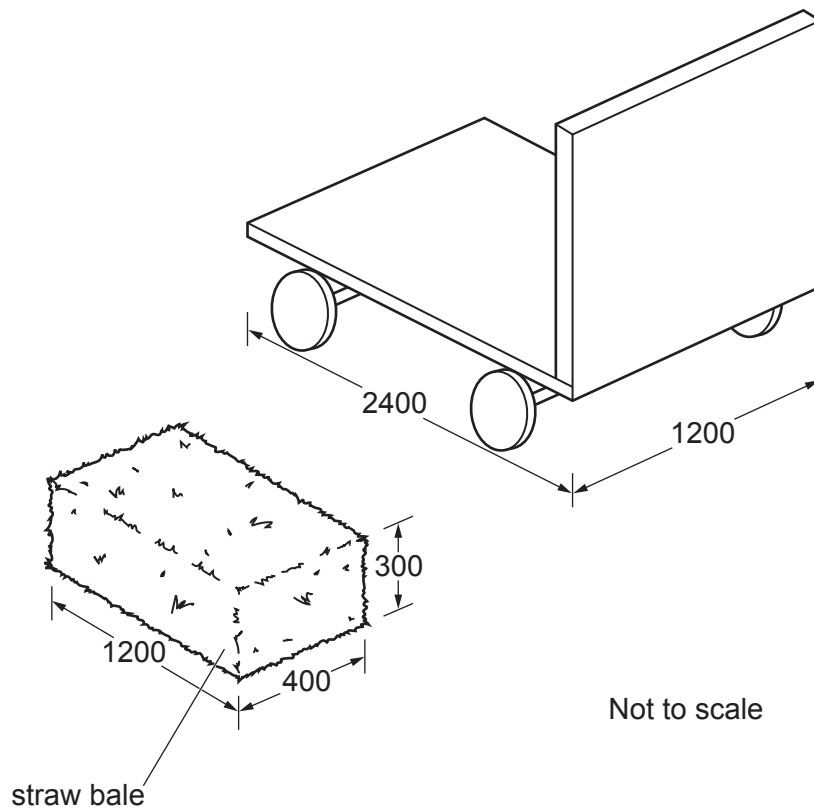


Fig. 8.1

- (a) Use notes and sketches to **develop** a design for pulling or pushing the trolley by hand. The design must include a method of steering the trolley. [20]
- (b) Use notes and sketches to **develop** a design to stop the straw bales from falling off the sides and end of the trolley. The design must allow the trolley to carry twelve bales of straw. [20]
- (c) Use notes and sketches to **develop** a design for a canopy to protect the straw bales from the weather. It must be possible to remove the canopy for ease of storage. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete trolley which shows all the features that you have designed in **parts (a) – (c)**. [20]

- 9 Fig. 9.1 shows an incomplete idea for a cardboard box to package a child's globe. The box protects and markets the product.

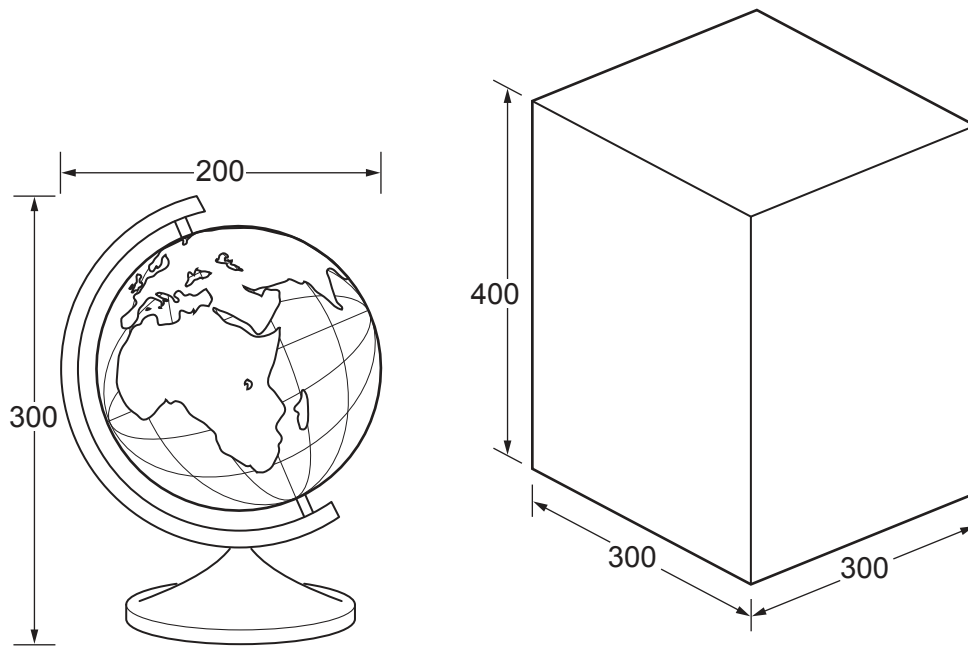


Fig. 9.1

- (a) Use notes and sketches to **develop** a design for the cardboard box. The box must be made from a one piece development (net) and have a viewing window in order to see the globe. It must be possible to open and securely close the box. [20]
- (b) Use notes and sketches to **develop** a design for the lettering and detailed graphics on the box. The name of the globe is 'The Whole World' and the lettering should be in a style that reflects the product. [20]
- (c) Use notes and sketches to **develop** a design for an insert that will prevent the globe from moving around inside the cardboard box. [20]
- (d) Produce an exploded pictorial (3D) rendered drawing of the complete cardboard box and insert with all the features that you have designed in **parts (a) – (c)**. [20]

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