

Cambridge
International
AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

CANDIDATE
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CENTRE
NUMBER

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DESIGN AND TECHNOLOGY

9705/13

Paper 1

October/November 2015

3 hours

Additional Materials:

Answer Booklet/A4 Paper

A3 Drawing Paper (2 sheets)

Extra sheets of A3 drawing paper for candidates who have used up both sides of their 2 sheets

A range of design drawing equipment

READ THESE INSTRUCTIONS FIRST

If you have been given an Answer Booklet, follow the instructions on the front cover of the Booklet.

Write your name, Centre number and candidate number on all the work you hand in.

Write in dark blue or black pen.

You may use an HB pencil, or coloured pencils/pens as appropriate, for any diagrams, graphs or rough working.

Do not use staples, paper clips, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

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 plain A3 paper.

Use **both** sides of the paper.

You may request additional sheets of A3 paper, but only if you have used up both sides of each of the 2 sheets provided.

You are advised to spend **30 minutes** on each of Sections A and B and **2 hours** on Section C.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

All dimensions are in millimetres.

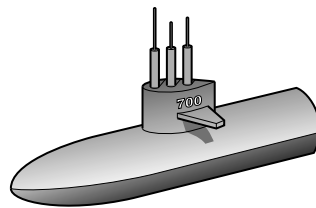
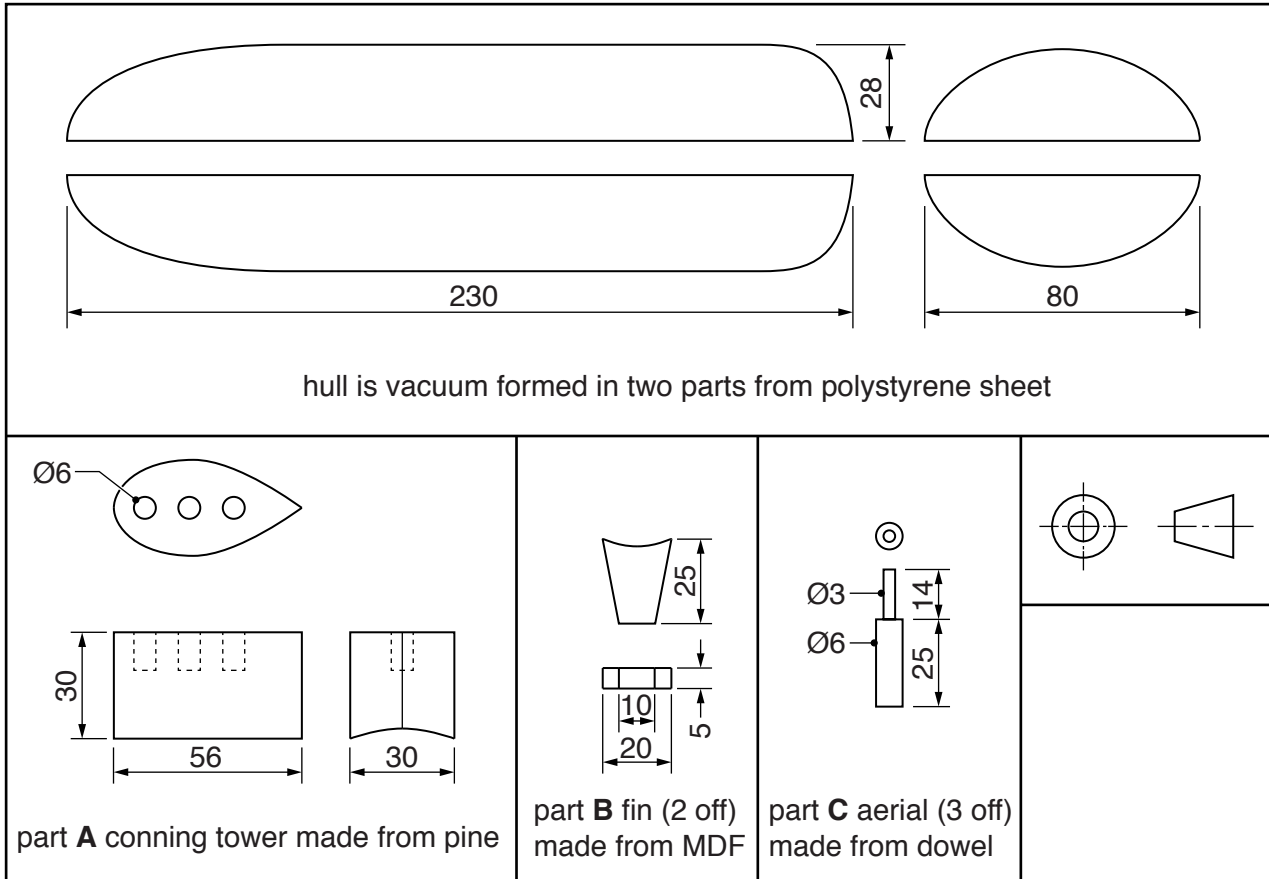
This document consists of **11** printed pages and **1** blank page.



Section A

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

- 1 Fig. 1 gives details about a toy submarine which is to be made in a school workshop.



assembled submarine

Fig. 1

(a) Name:

- (i) a suitable glue for joining together the two parts of the hull; [1]
- (ii) a suitable glue for joining together parts **A**, **B** and **C**. [1]

(b) Use notes and sketches to describe:

- (i) how one half of the hull could be vacuum formed; [6]
- (ii) how part **A** could be made; [6]
- (iii) how parts **B** and **C** 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.

- 2 Fig. 2 shows a card model of a torch which a student will show to people in order to find out what potential users of the torch think about the proposed design.

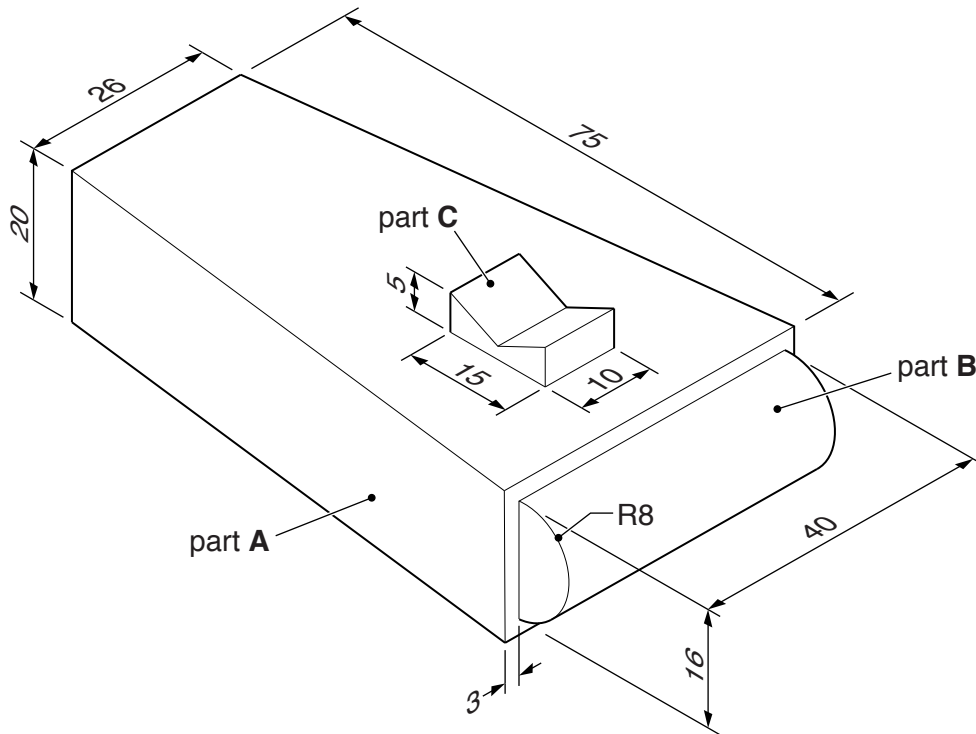


Fig. 2

- (a) State **two** ways that could be used to gather opinions about the proposed design. [2]
- (b) Each of the parts **A**, **B** and **C** is made from a one piece development (net).
Use notes and sketches to describe:
- (i) how part **A** could be marked out, cut out and assembled; [6]
 - (ii) how part **B** could be marked out, cut out, assembled and attached to part **A**; [6]
 - (iii) how part **C** could be marked out, cut out, assembled and attached to part **A**. [6]

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

5

3 Fig. 3 gives details about a holder for a smartphone which is to be made in a school workshop.

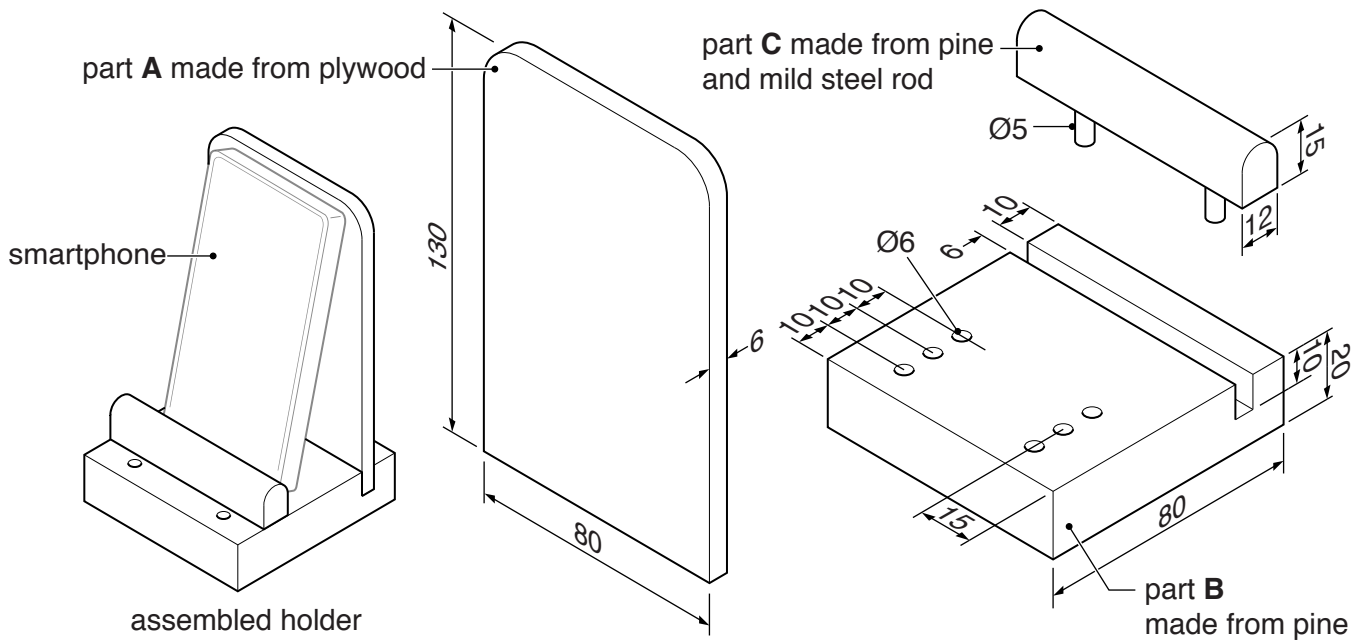


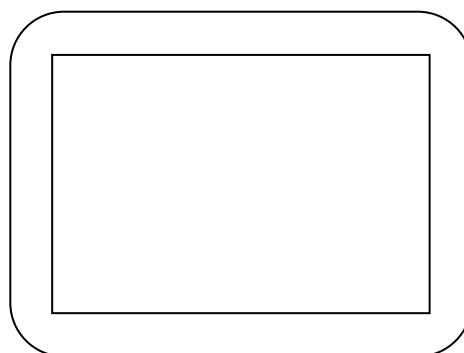
Fig. 3

(a) Use notes and sketches to describe:

- (i) how part A could be marked out, cut out and the edges of the plywood smoothed; [6]
- (ii) how the groove and holes could be made in part B; [6]
- (iii) how part C (including the metal pegs) 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.

(b) The design, with minor modification, could be used to hold a tablet like the one shown in Fig. 4.



tablet overall size 240 × 180 × 10

Fig. 4

Use notes and a sketch to show the modifications that would need to be made. [2]

Section B

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

- 4 Fig. 5 shows a test rig. The crank and slider mechanism pulls out and pushes in a drawer to test the runner mechanism.

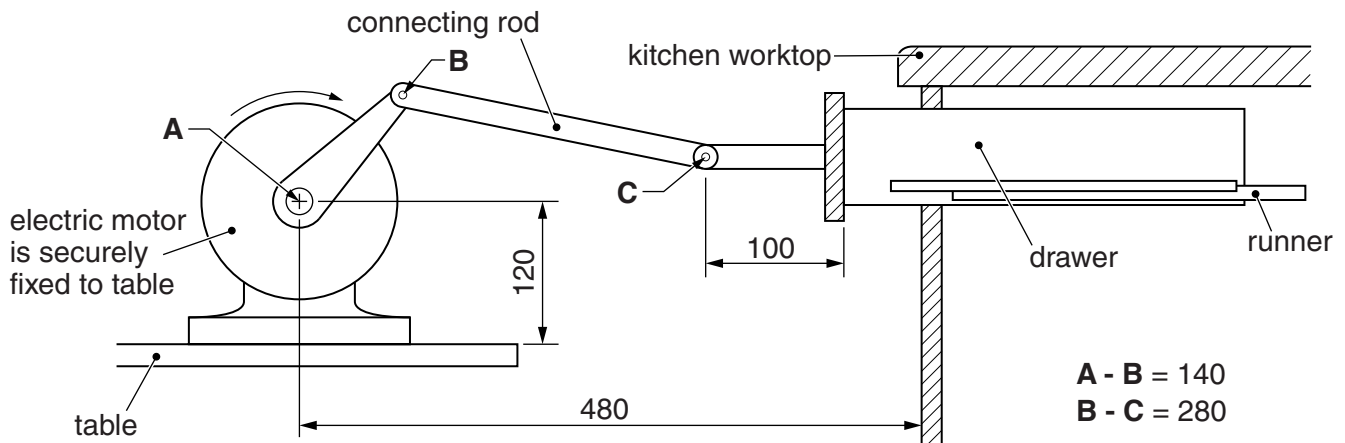


Fig. 5

- (a) Make a sketch of the crank and slider mechanism and label the crank and the slider. [2]
- (b) Identify and describe **two** problems with the design of the test rig. [4]
- (c) Using notes and sketches, explain how the design would need to be changed to overcome the two problems you have identified in (b). [6]
- (d) Discuss the importance of devising and applying appropriate tests in order to assess the potential success of a product prior to its manufacture.

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. 6 gives details about a box which is to be used to both package and display chocolate bars.

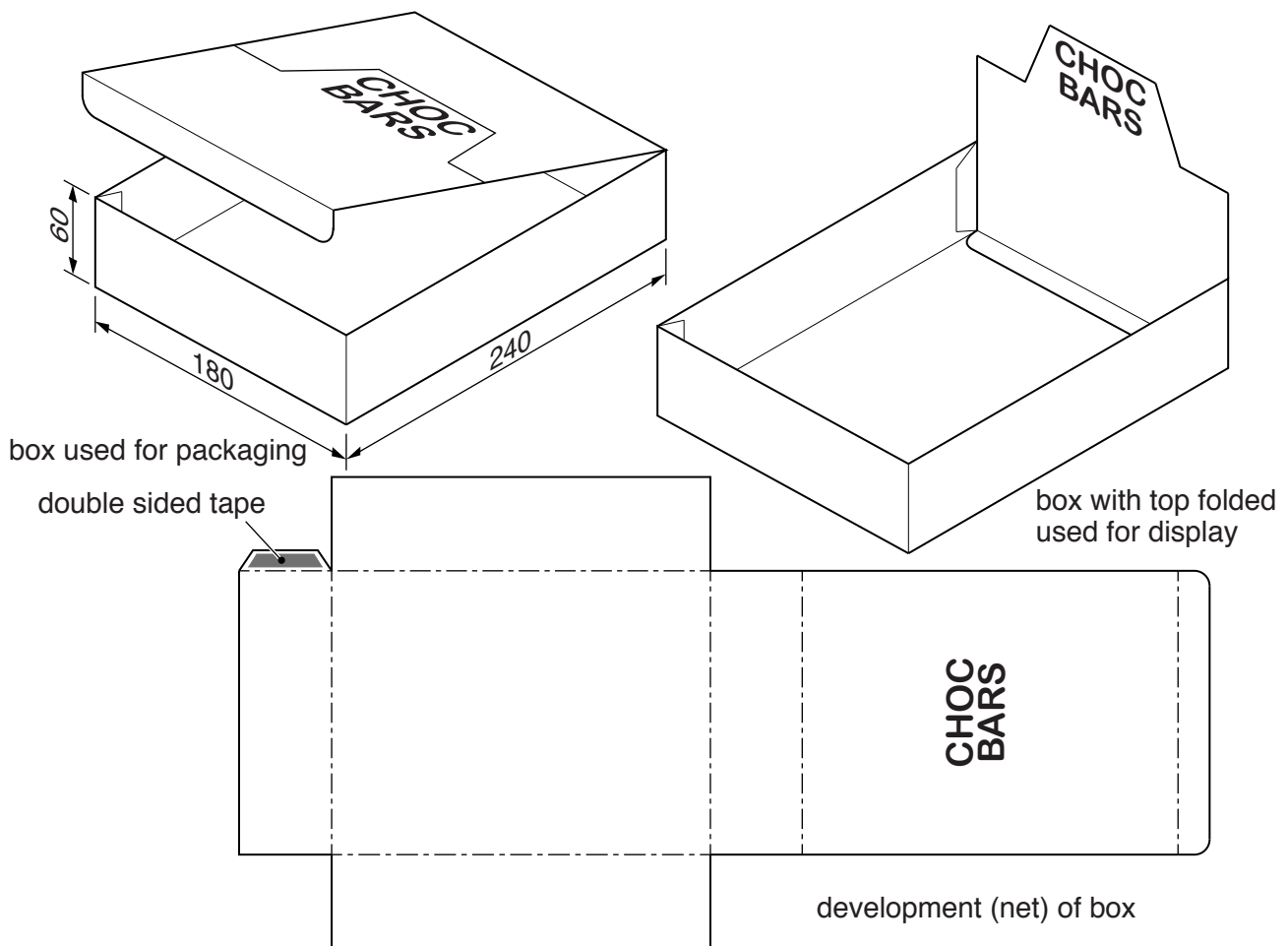


Fig. 6

- (a) Explain why double sided tape rather than glue has been used to join the corners of the box. [2]
- (b) Identify and describe **two** problems with the design of the development (net) for the box. [4]
- (c) Using notes and sketches, explain how the design would need to be changed to overcome the two problems you have identified in (b). [6]
- (d) The box has two uses, to package and to display the chocolate bars. Discuss why an increasing number of products are being designed and manufactured to have more than one use.

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. 7 shows a bathroom fitment which will be attached to a wall, it will hold four toothbrushes and a plastic beaker.

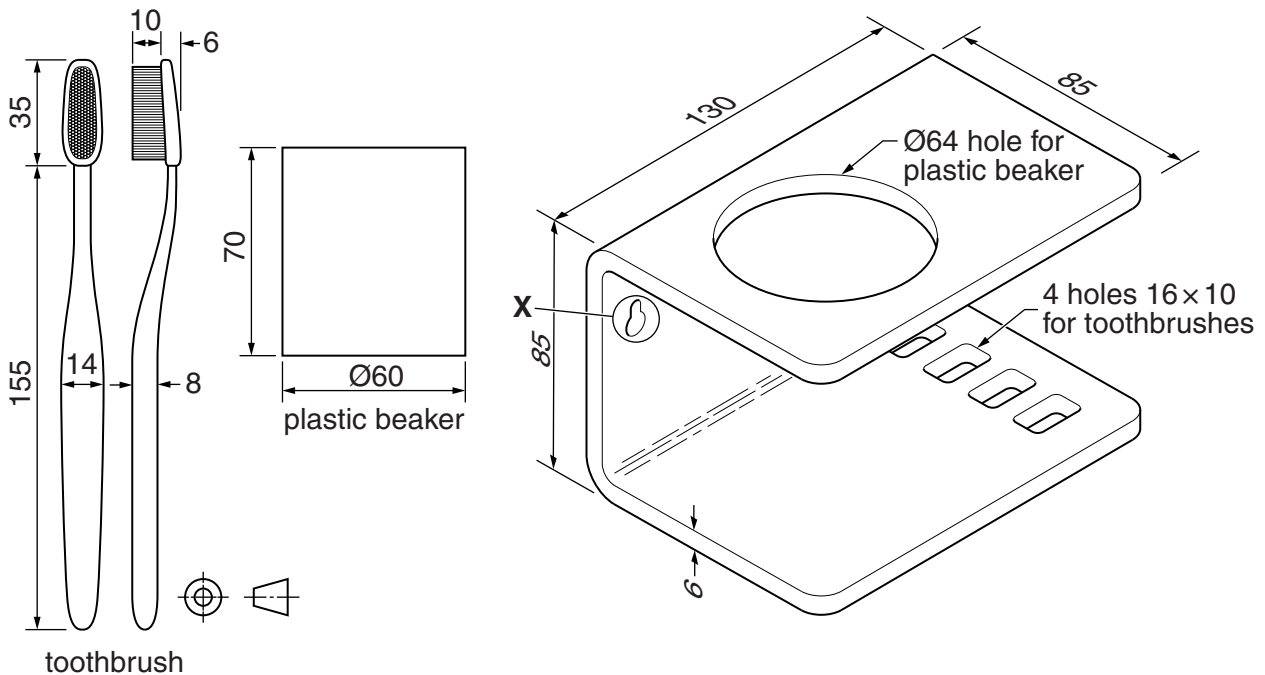


Fig. 7

- (a) Using notes and a sketch, explain the purpose of the hole shown at **X**. There is a similar hole on the right hand side of the bathroom fitment. [2]
- (b) Identify and describe **two** problems with the design of the bathroom fitment. [4]
- (c) Using notes and sketches, explain how the design would need to be changed to overcome the two problems you have identified in (b). [6]
- (d) Acrylic was chosen as a suitable material for making the bathroom fitment. Discuss the importance of selecting materials for use, based on their characteristics, properties and performance.

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

7 Fig. 8 shows an incomplete idea for a periscope.

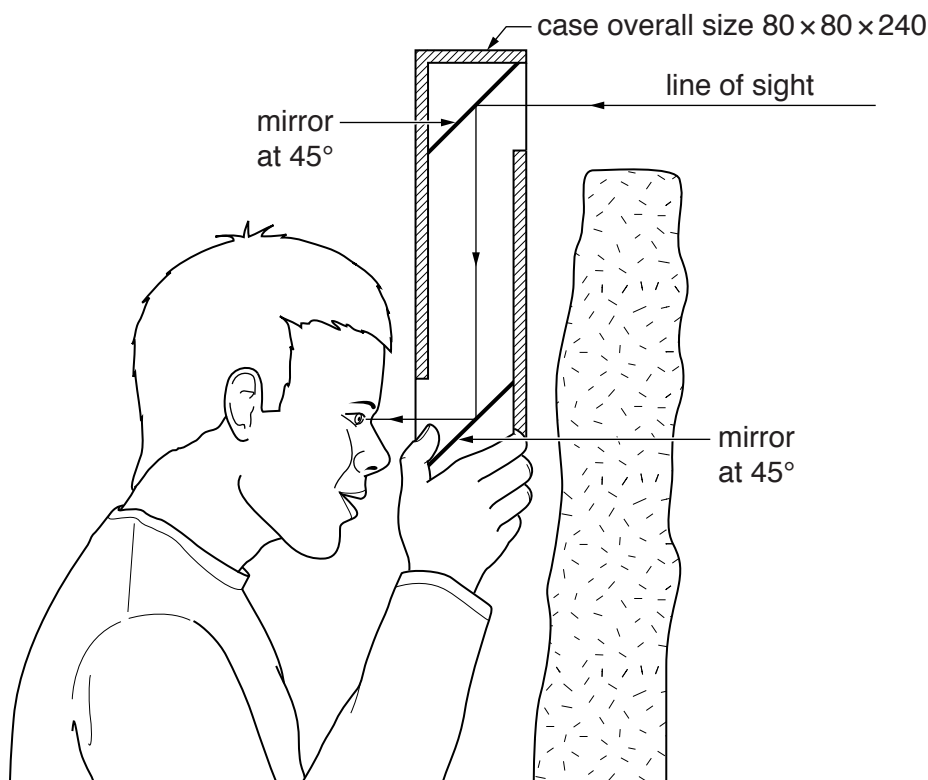


Fig. 8

- (a) Using notes and sketches, **develop** a design for the case of the periscope. It must be possible to open and securely close one side of the case, so that the mirrors can be easily removed for cleaning. [20]
- (b) Using notes and sketches, **develop** a design which fixes the mirrors inside the case but allows them to be easily removed for cleaning. [20]
- (c) Using notes and sketches, **develop** a design for a handle (or handles) which makes the periscope easier to hold when it is being used. [20]
- (d) Produce a pictorial rendered drawing of the complete periscope which shows all of the features that you have designed in **(a)–(c)**. The drawing must show one side of the case open. [20]

- 8 Fig. 9 shows an incomplete idea for a cardboard box to package a bicycle helmet.

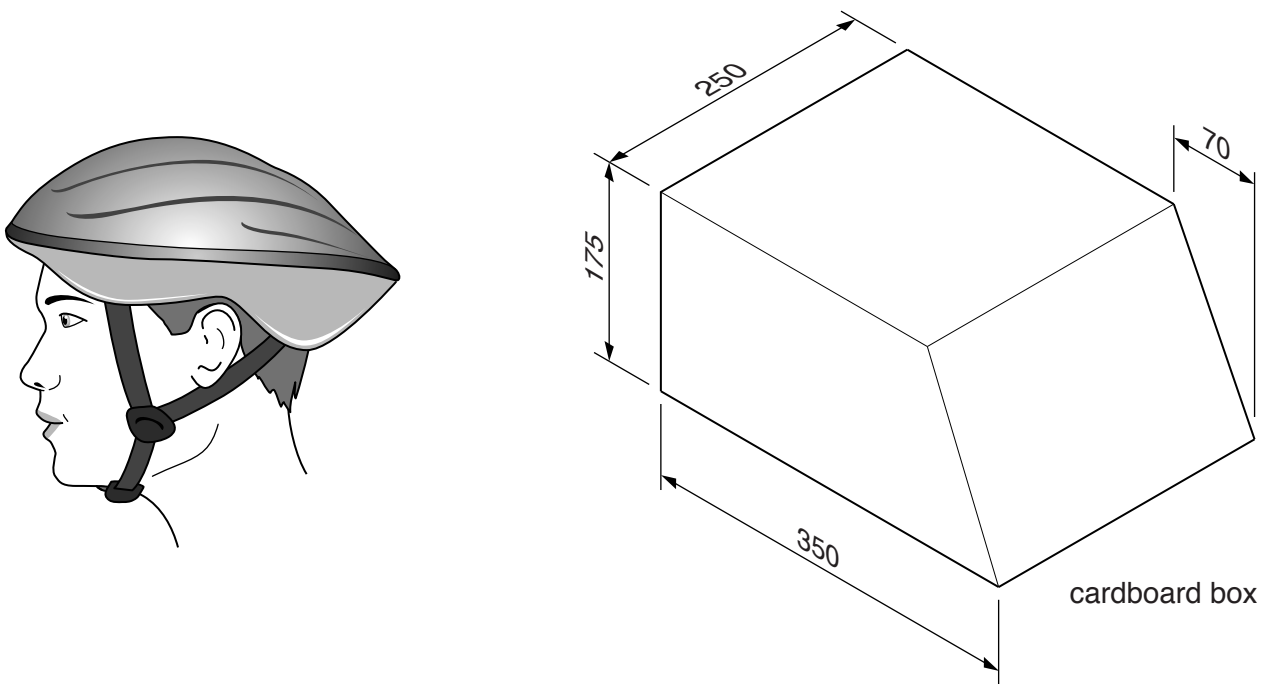


Fig. 9

- (a) Using notes and sketches, **develop** a design for the cardboard box. The box must be made from a one piece development (net) and include a window so that the helmet can be seen while in the closed packaging. Your design work must include details about the one piece development (net) required to make the box. [20]
- (b) Using notes and sketches, **develop** a design which enables the box to be easily carried. [20]
- (c) Using notes and sketches, **develop** a design for the lettering to go on the box. The company's name is '**Ride like the wind**' and the lettering should be in a style that reflects the name. [20]
- (d) Produce a pictorial rendered drawing of the complete cardboard box which shows all of the features that you have designed in (a)–(c). The drawing must show the box open. [20]

- 9 Fig. 10 shows an incomplete idea for a child's wooden tricycle.

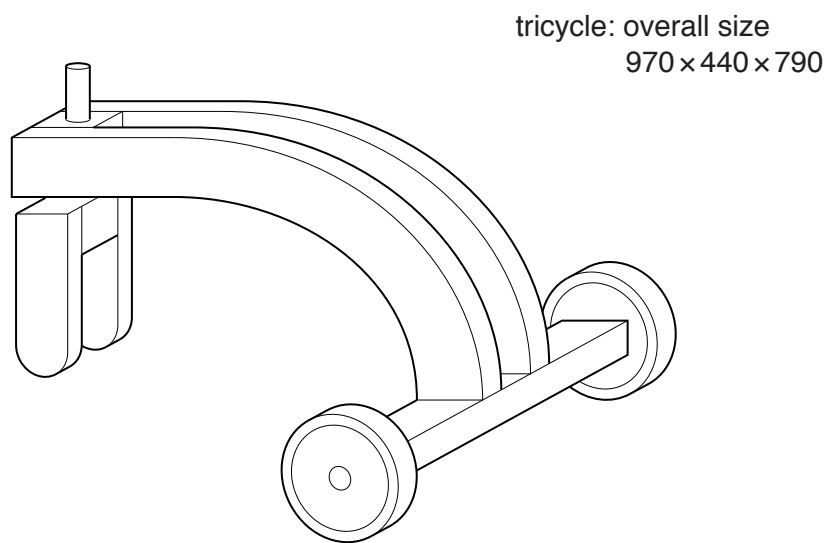


Fig. 10

- (a) Using notes and sketches, **develop** a design for a seat that can be adjusted and fixed at different heights. This must include a method of joining the seat to the tricycle. [20]
- (b) Using notes and sketches, **develop** a design for the handlebars. This must include a method of joining the handlebars to the tricycle. [20]
- (c) Using notes and sketches, **develop** a design for the front wheel and the pedals. This must include a method of joining the wheel and the pedals to the tricycle. [20]
- (d) Produce a pictorial rendered drawing of the complete wooden tricycle which shows all of the features that you have designed in (a)–(c). [20]

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