

DESIGN AND TECHNOLOGY

9705/13

Paper 1

October/November 2016

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 **10** printed pages and **2** blank pages.

Section A

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

- 1 Fig. 1 gives details about a bowl, made from sheet copper, which is to be produced in a school workshop.

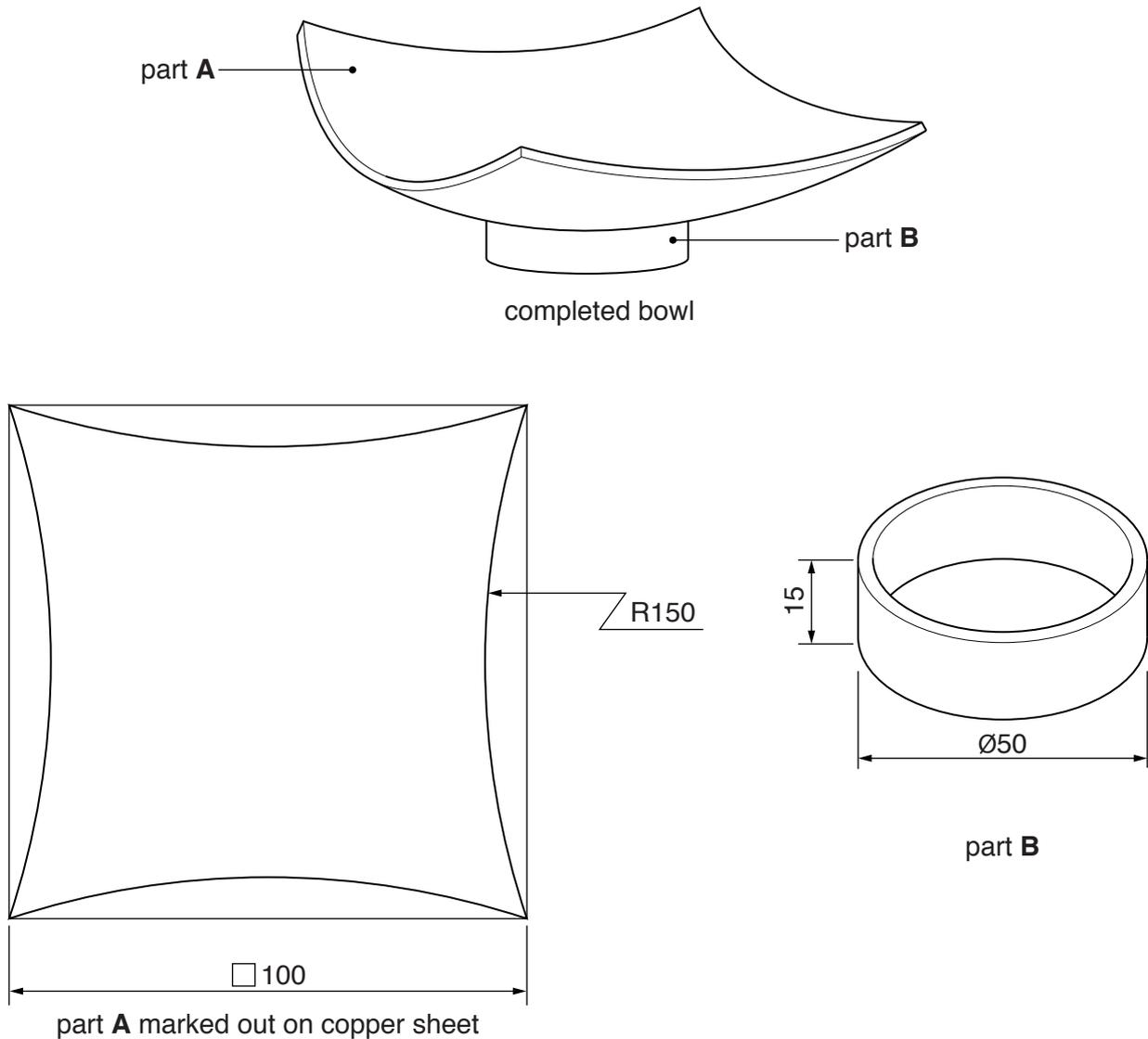


Fig. 1

- (a) State **two** properties of copper. [2]
- (b) Use notes and sketches to describe:
- (i) how part **A** could be marked out, cut out and the edges of the copper sheet smoothed; [6]
 - (ii) how part **A** could be annealed and then formed into the required shape; [6]
 - (iii) how parts **A** and **B** could be soldered together. [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 gives details about a model of a house, made from card, which is to be produced in a school workshop.

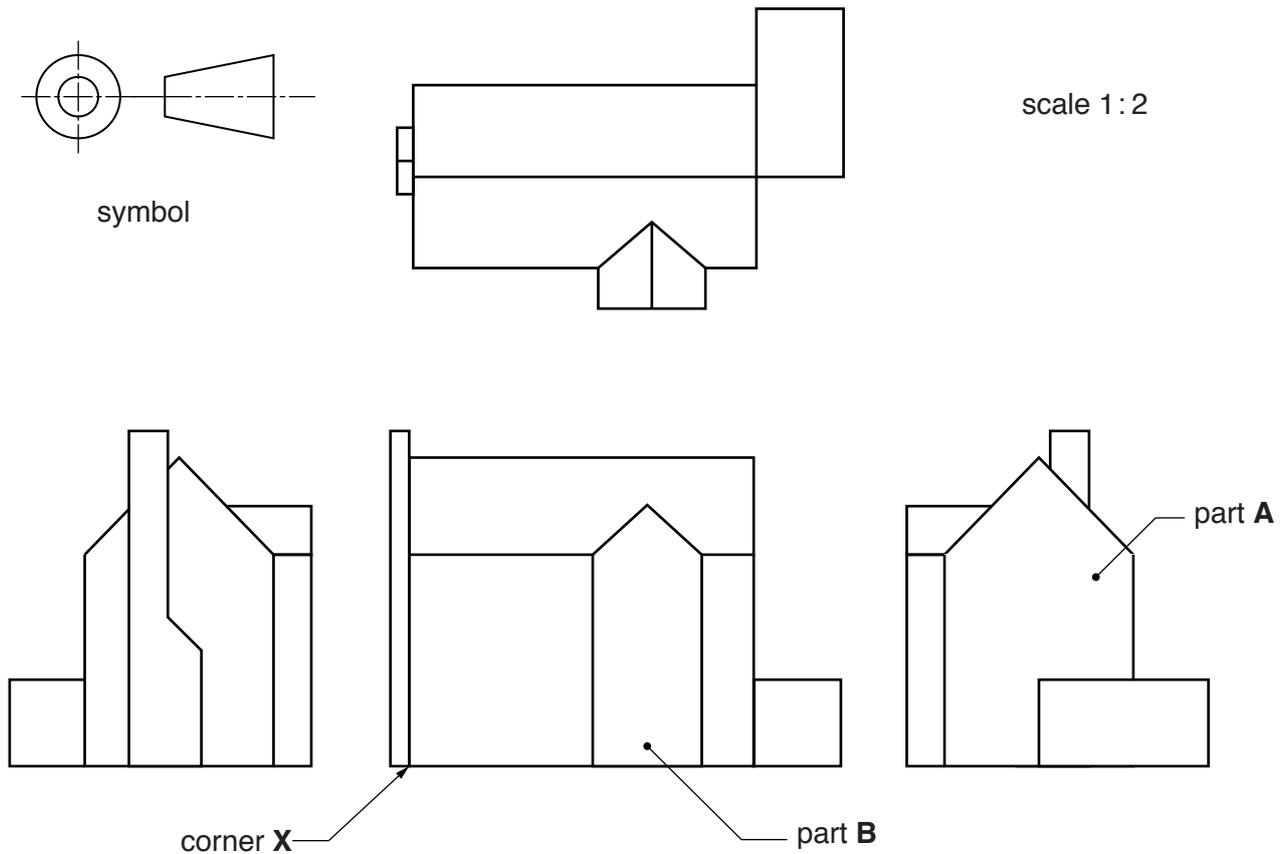


Fig. 2

(a) State:

- (i) the type of two dimensional drawing that has been used to draw the house; [1]
 (ii) the meaning of the symbol. [1]

(b) Sketch a pictorial (3D) view of the house with corner **X** nearest to you. [6]

(c) Use notes and sketches to describe:

- (i) how the one piece development (net) required to make part **A** could be marked out, cut out and assembled; [6]
 (ii) how the one piece development (net) required to make part **B** could be marked out, cut out, assembled and joined 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.

- 3 Fig. 3 gives details about a bicycle storage rack, made from 12 mm thick plywood, which is to be produced in a school workshop. The rack will be fixed to a wall using two metal brackets.

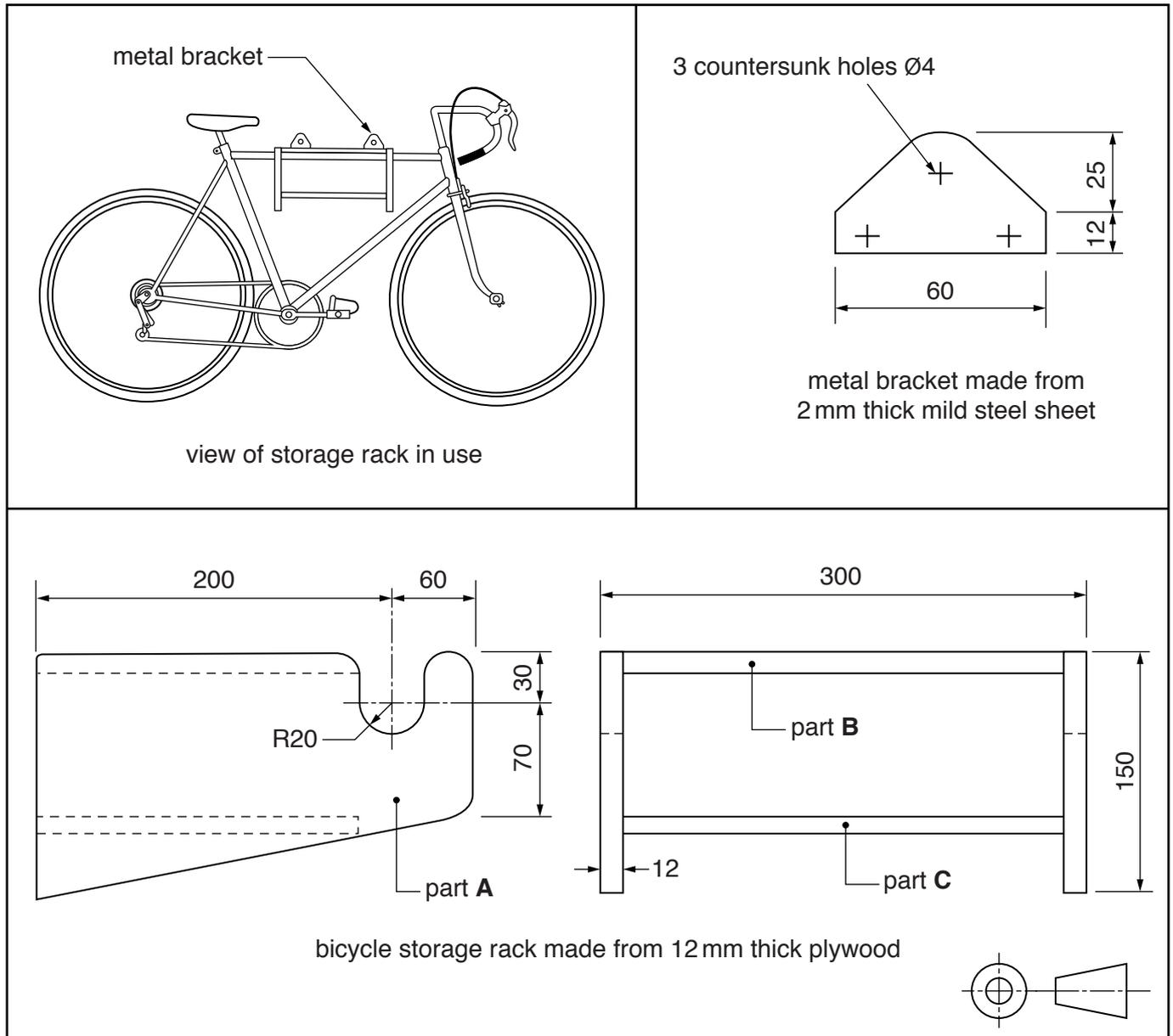


Fig. 3

- (a) Use a sketch and notes to explain how plywood is constructed. [2]
- (b) 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 parts **A**, **B** and **C** could be joined together using countersunk screws. [6]
 - (iii) how the metal bracket 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.

Section B

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

- 4 Fig. 4 shows a mould which is used in the injection moulding process.

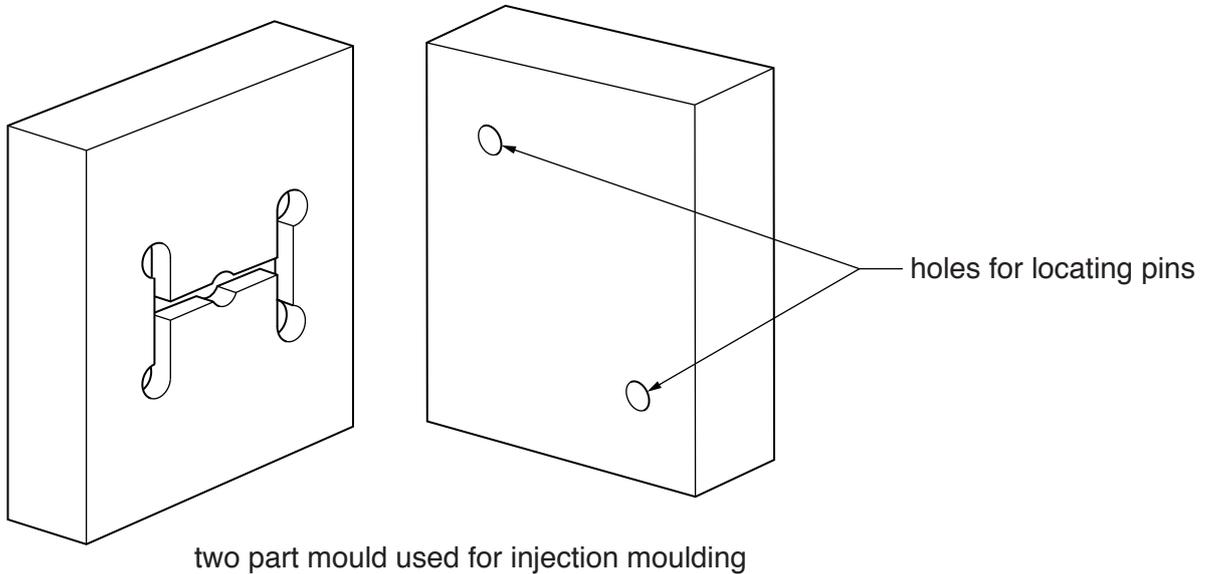


Fig. 4

- (a) Explain why the mould is made in two parts. [2]
- (b) Identify and describe **two** problems with the design of the mould. [4]
- (c) Using notes and sketches, explain how the design of the mould would need to be changed to overcome the two problems you have identified in (b). [6]
- (d) Discuss why injection moulding is generally used for the mass production of a product rather than to produce individual products or very small batches of a product.

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 gives details about the packaging for a bottle of perfume.

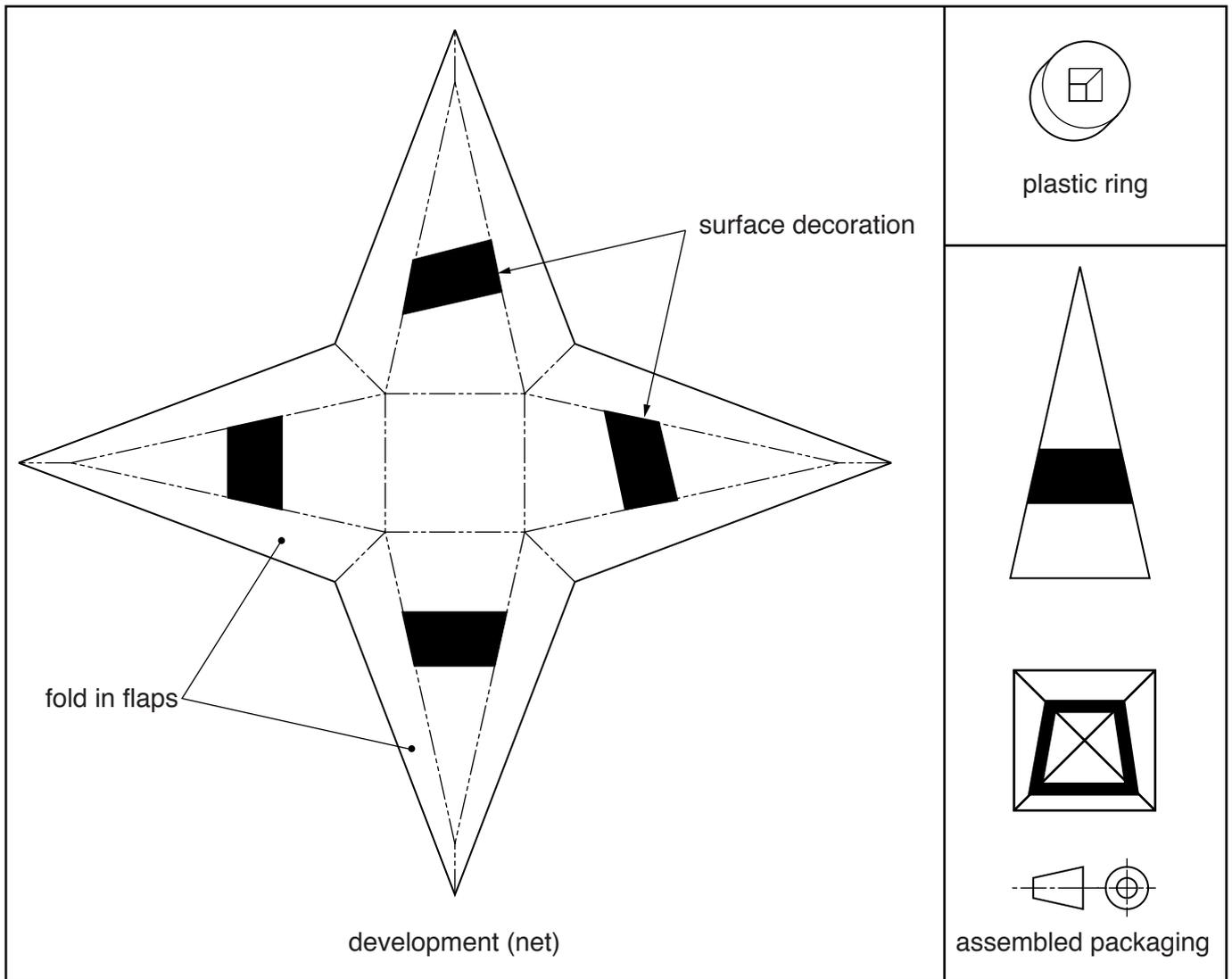


Fig. 5

- (a) Explain the function of the plastic ring. [2]
- (b) Identify and describe **two** problems with the development (net) of the packaging. [4]
- (c) Using notes and sketches, explain how the development (net) would need to be changed to overcome the two problems you have identified in (b). [6]
- (d) Discuss the reasons why products are packaged.

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 gives details about a mechanical toy made from wood.

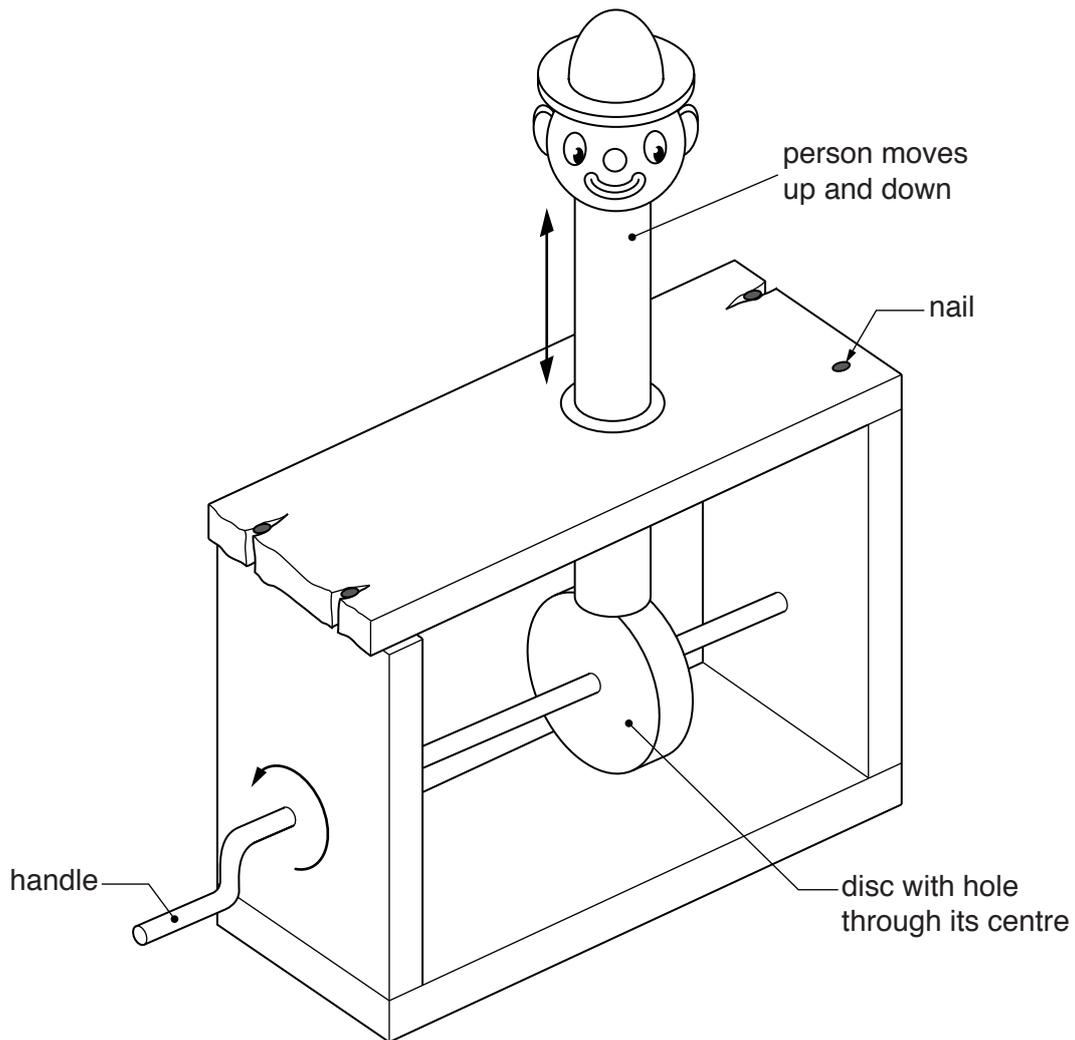


Fig. 6

- (a) Name the **two** types of motion that are produced when the mechanical toy is operated. [2]
- (b) Identify and describe:
- (i) **one** problem related to the quality of the mechanical toy's design; [2]
 - (ii) **one** problem related to the quality of the mechanical toy's manufacture. [2]
- (c) Using notes and sketches, explain how the two problems you have identified in (b) could be overcome. [6]
- (d) Discuss the relationship between the quality of a product's design and the quality of 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]

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 shows an incomplete idea for a cart which will hold two children and be pulled along by an adult.

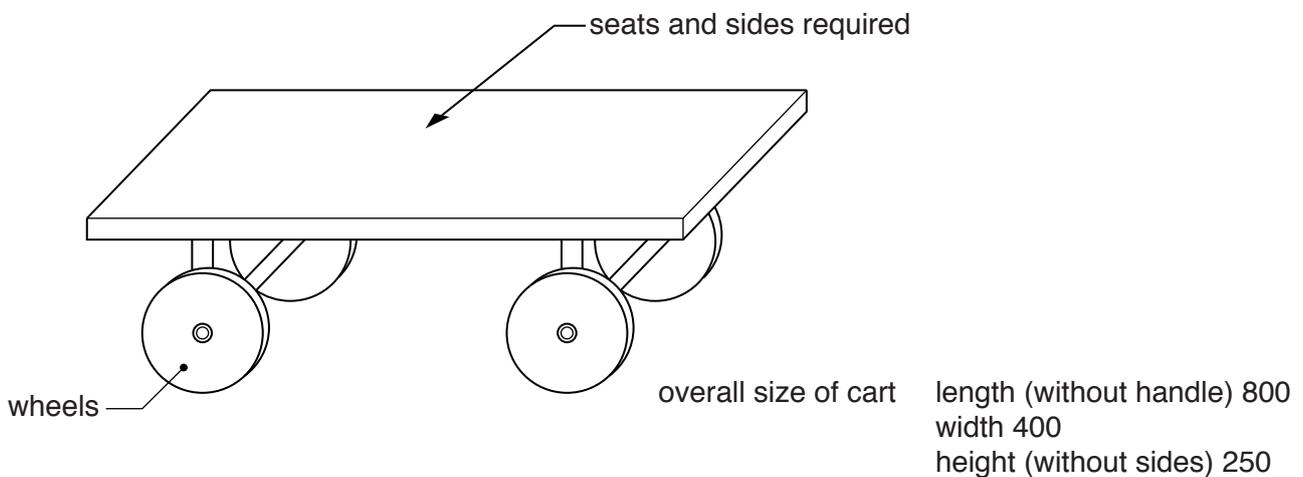


Fig. 7

- (a) Using notes and sketches, **develop** a design for the top section of the cart. The design must include seating for two children and sides to prevent children falling from the cart. [20]
- (b) Using notes and sketches, **develop** a design for the wheels. The design must include a method of attaching the wheels to the cart. [20]
- (c) Using notes and sketches, **develop** a design which allows the cart to be pulled and steered. [20]
- (d) Produce a pictorial rendered drawing of the complete cart which shows all of the features that you have designed in **(a)–(c)**. [20]

- 8 Fig. 8 shows an incomplete idea for a point of sale display stand which will be used to promote a smartphone.
Most of the design will be made from card.

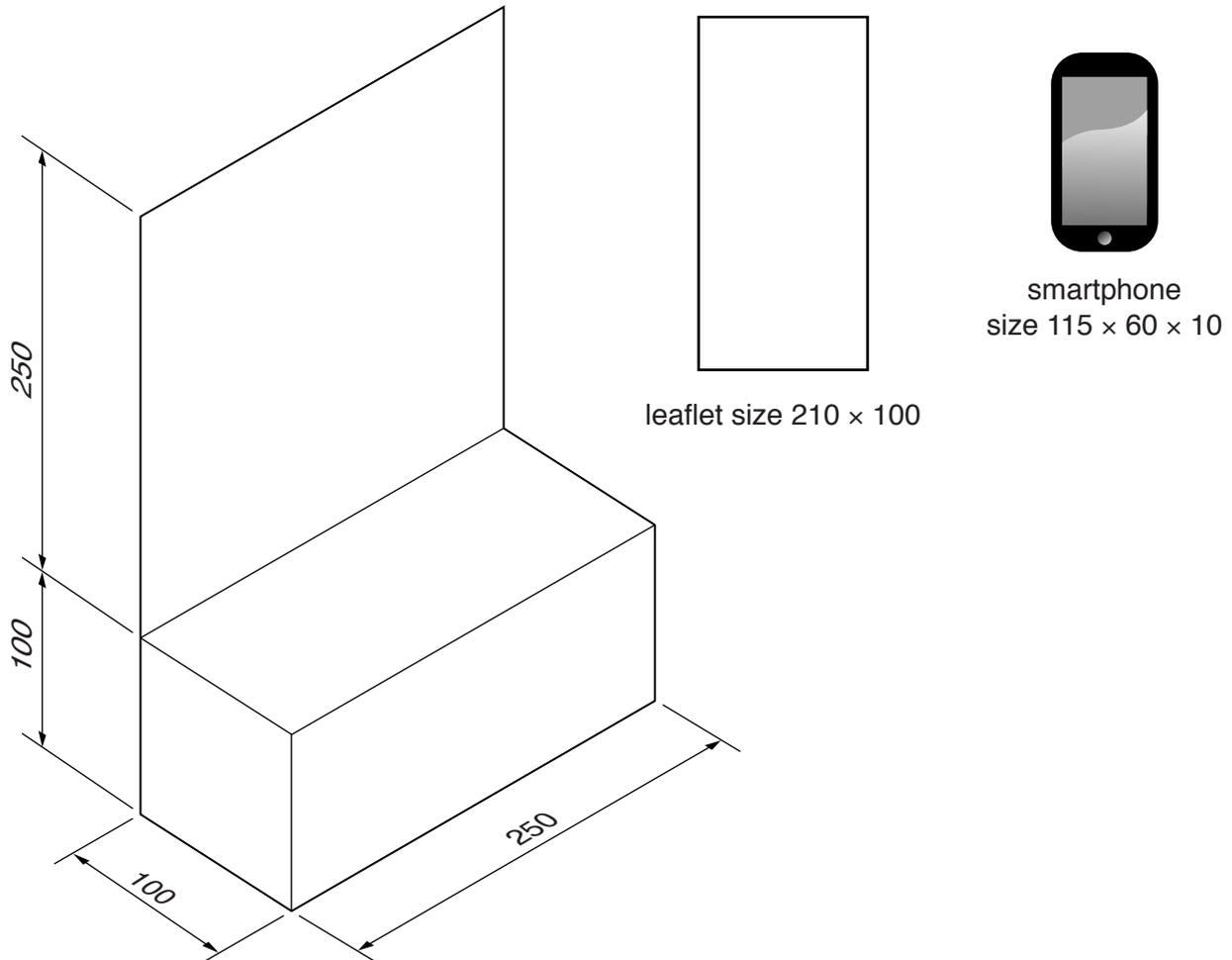


Fig. 8

- (a) Using notes and sketches, **develop** a design for a holder for a smartphone. The design must enable the holder to hook over the top of the display stand and allow most of the front of the smartphone to be visible. [20]
- (b) Using notes and sketches, **develop** a design for a leaflet holder made from card. The design must enable the leaflet holder to be attached to the display stand without the use of glue or other additional materials. [20]
- (c) Using notes and sketches, **develop** a design for the lettering to go on the display stand. The company's slogan is '**Our phones let you speak to the world**' and the lettering should be in a style that reflects the slogan. [20]
- (d) Produce a pictorial rendered drawing of the complete point of sale display stand which shows all of the features that you have designed in (a)–(c).
Do not include the smartphone or the leaflet in your drawing. [20]

- 9 Fig. 9 shows an incomplete idea for a storage unit to hold twelve sets of the drawing equipment which is illustrated.

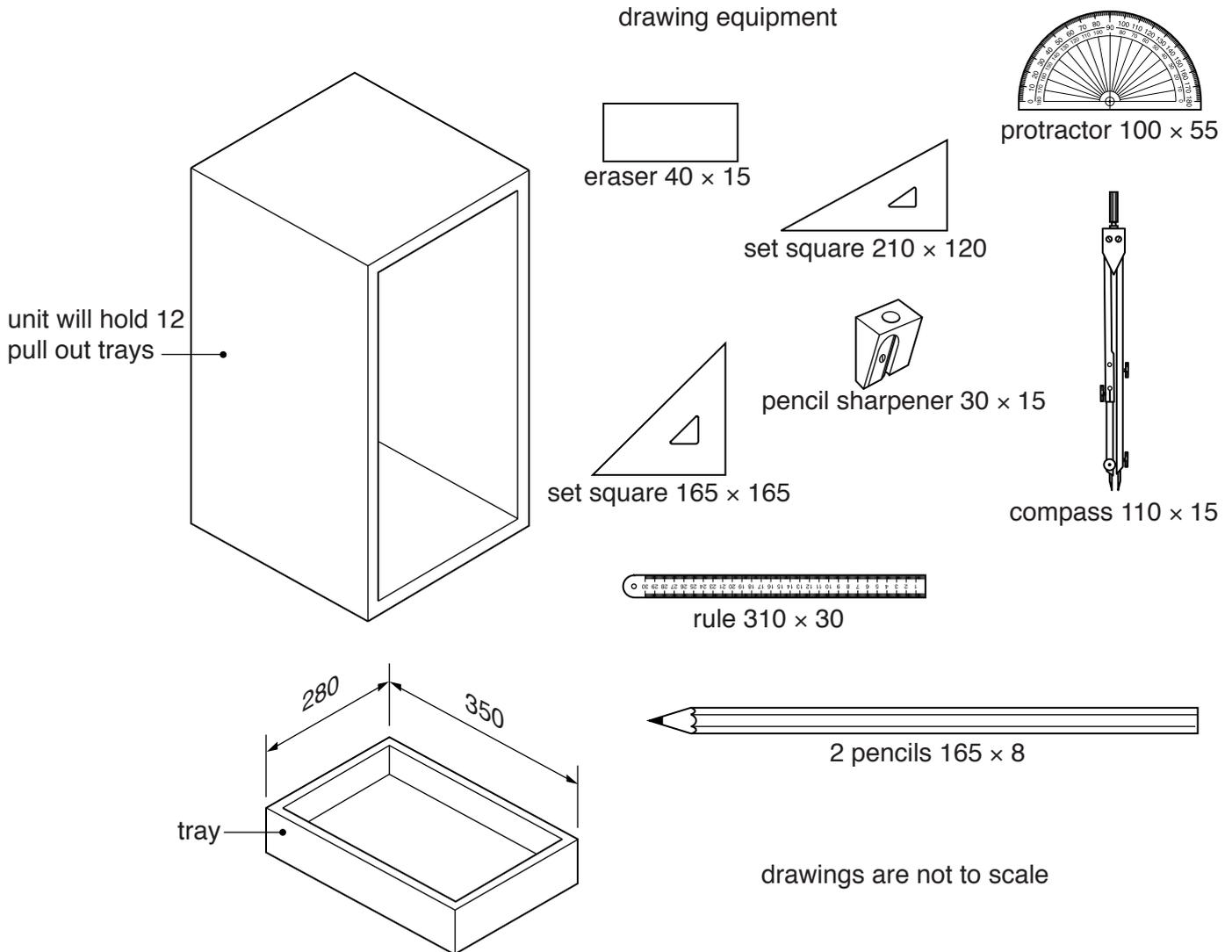


Fig. 9

- (a) Using notes and sketches, **develop** a design for a unit which will hold twelve pull out trays. The design must include a feature which enables individual trays to slide in and out of the unit. [20]
- (b) Using notes and sketches, **develop** a design for a tray to hold one set of drawing equipment. The design must include a handle. [20]
- (c) Using notes and sketches, **develop** a design for the interior of the tray which will prevent individual items of drawing equipment moving when the tray is being carried. [20]
- (d) Produce a pictorial rendered drawing of the complete storage unit which shows all of the features that you have designed in (a)–(c). One of the trays should be shown removed from the unit. Do not include the drawing equipment in your drawing. [20]

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