



Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

DESIGN AND TECHNOLOGY

9705/13

Paper 1

October/November 2014

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 **13** printed pages and **3** blank pages.

Section A

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

- 1 Fig. 1 shows an incomplete design for a solar powered outdoor light which is to be made in a school workshop. The light will be hung on a wall.

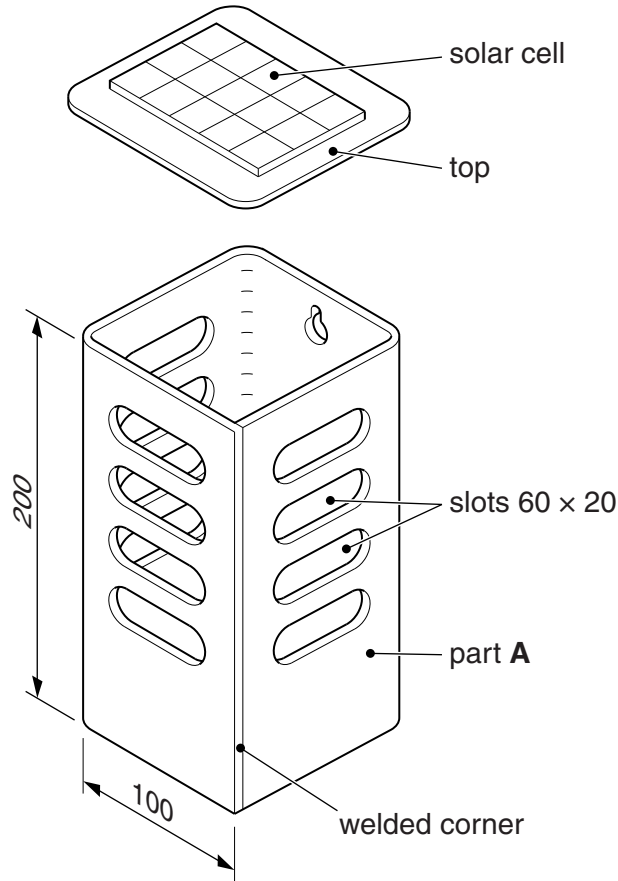


Fig. 1

- (a) Give **two** reasons why solar power has been chosen for the design rather than mains electricity. [2]
- (b) Use notes and sketches to describe:
- (i) how one of the slots in part **A** could be made and the edges of the mild steel smoothed; [6]
 - (ii) how three of the corners of part **A** could be bent; [6]
 - (iii) how the fourth corner could be welded. [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 toy rocket which is to be made in a school workshop.

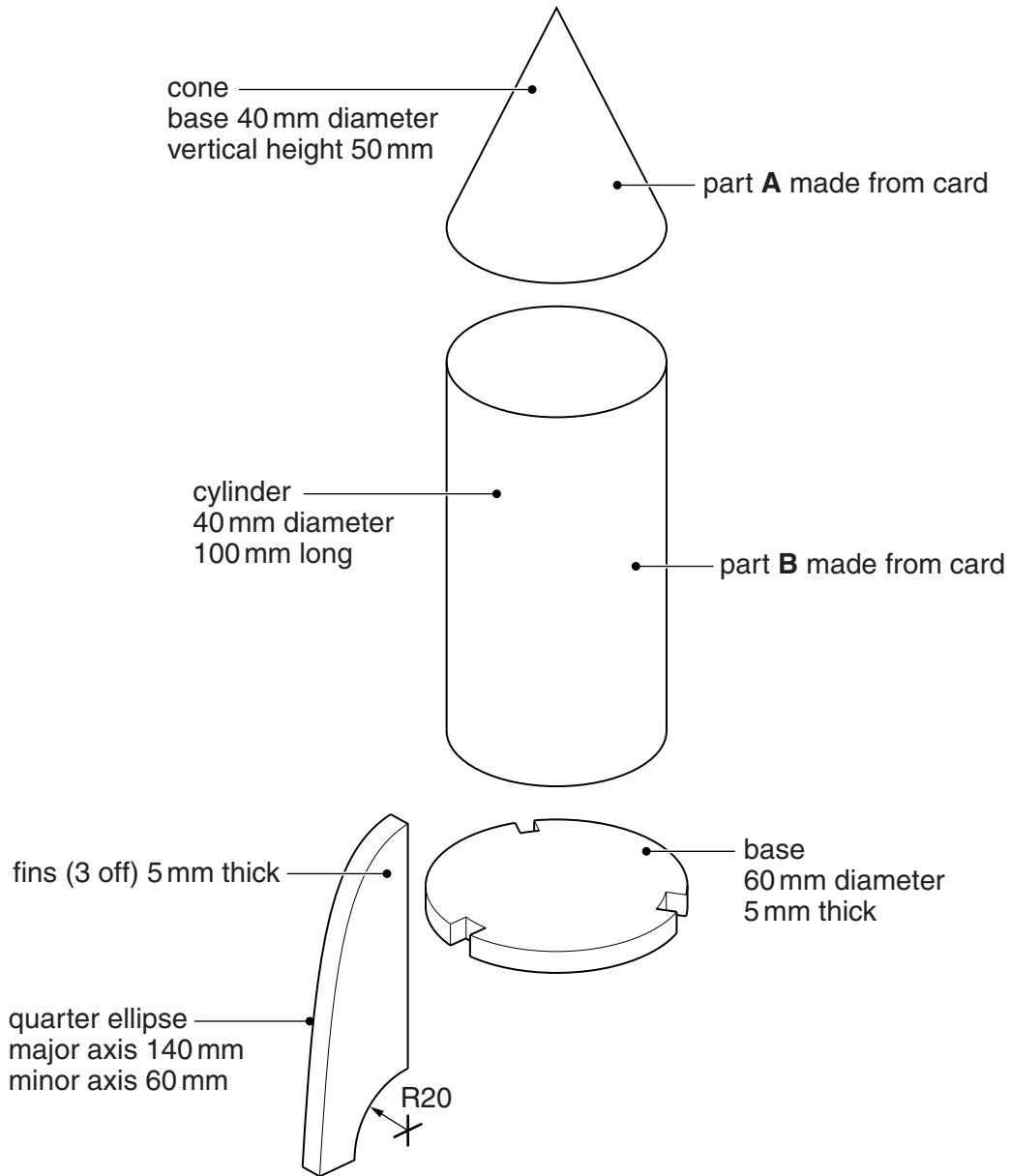


Fig. 2

(a) Name:

- (i) a suitable glue that could be used to join the pieces of card; [1]
- (ii) a suitable sheet material (other than card) that could be used to make the fins and base. [1]

(b) Use notes and sketches to describe:

- (i) how the two pieces of card required to make part **A** could be marked out, cut out and assembled; [6]
- (ii) how the three pieces of card required to make part **B** could be marked out, cut out and assembled; [6]
- (iii) how the three fins and the base could be marked out on a piece of sheet material $155 \times 75 \times 5$; [3]
- (iv) how the base could be cut out. [3]

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 shows a menu board which is to be made in a school workshop.

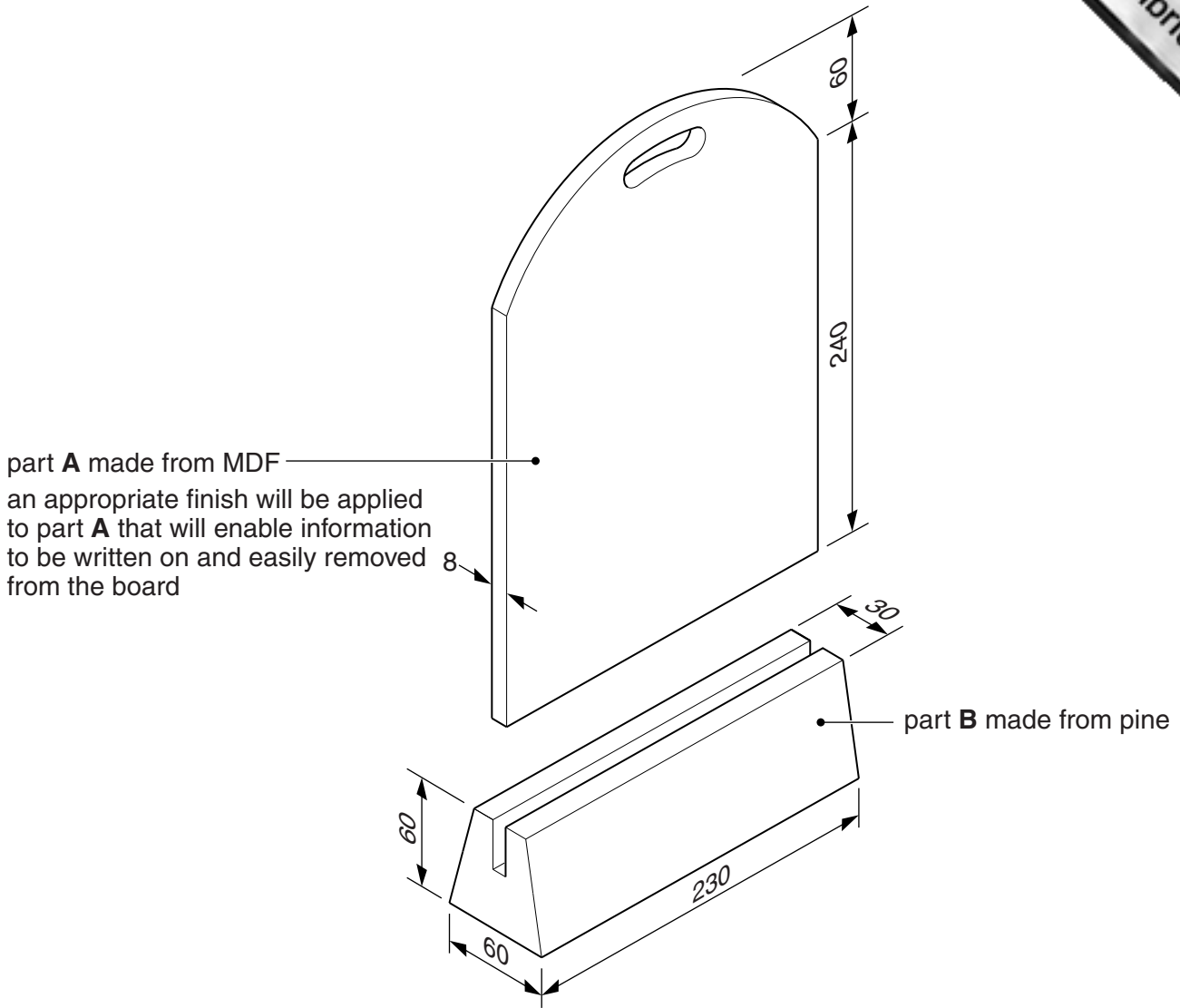


Fig. 3

- (a) Describe a method that will enable information to be hand written onto the menu board and easily removed. [2]
- (b) Use notes and sketches to describe:
 - (i) how part A could be cut out and the edges of the MDF smoothed; [6]
 - (ii) how part B could be made; [6]
 - (iii) how a varnished finish could be applied to part B. [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 'flat-pack' table made from 15 mm thick plywood. The three parts of the table join together without the use of any additional materials.

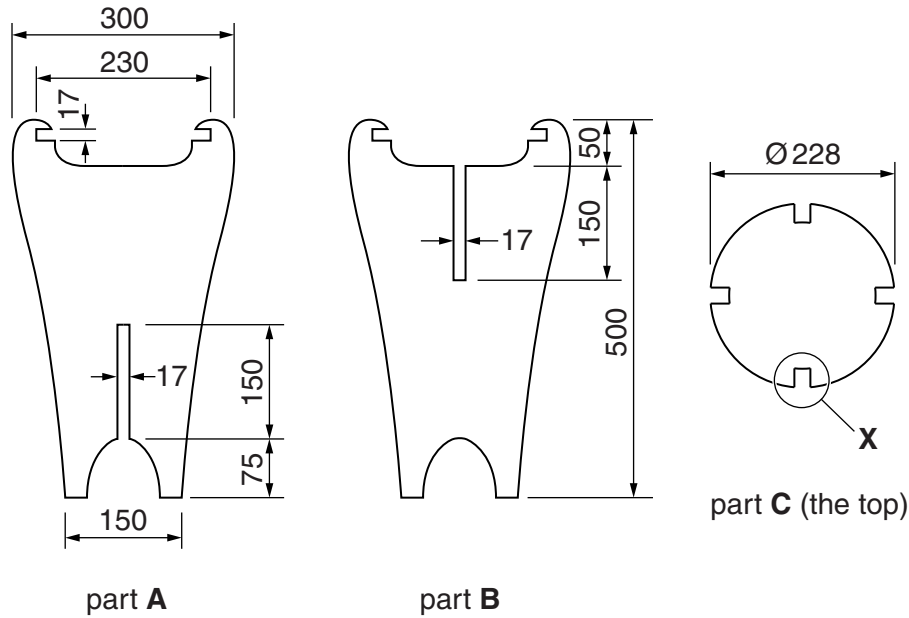


Fig. 4

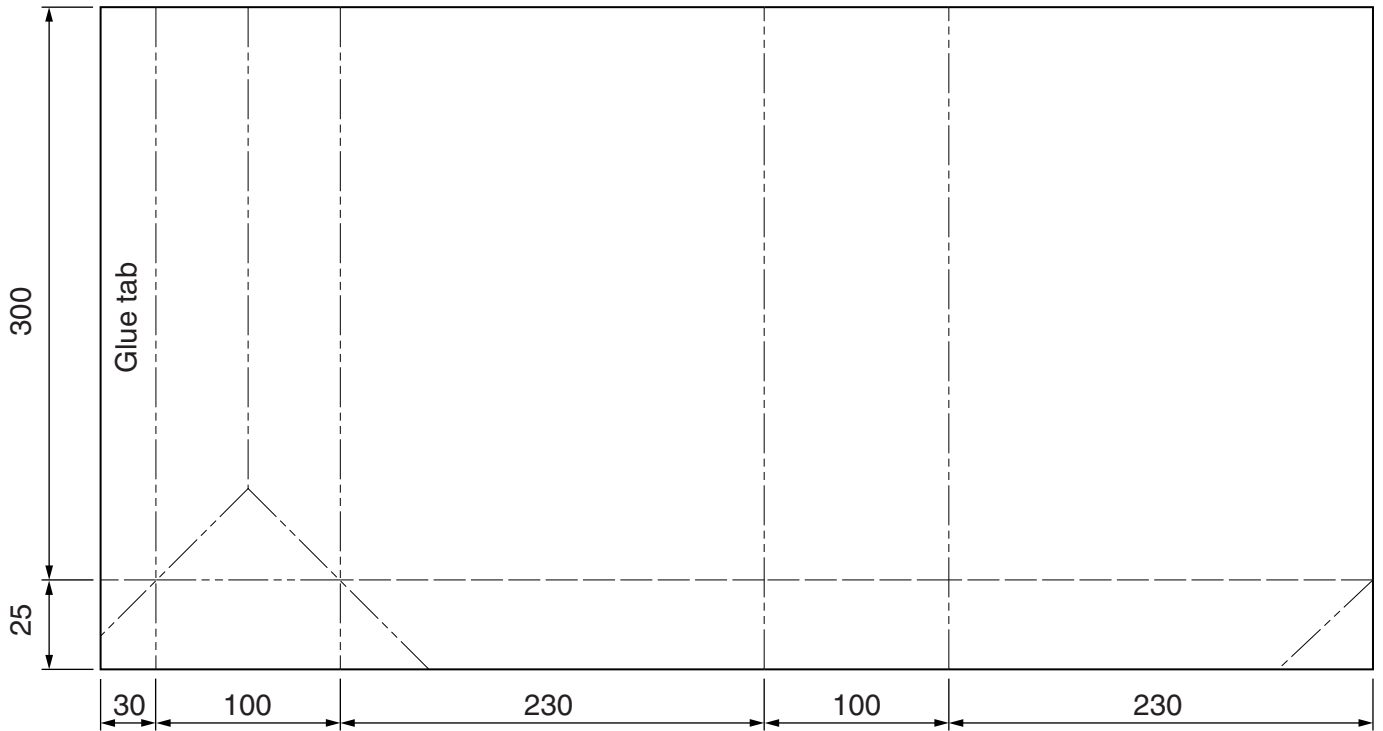
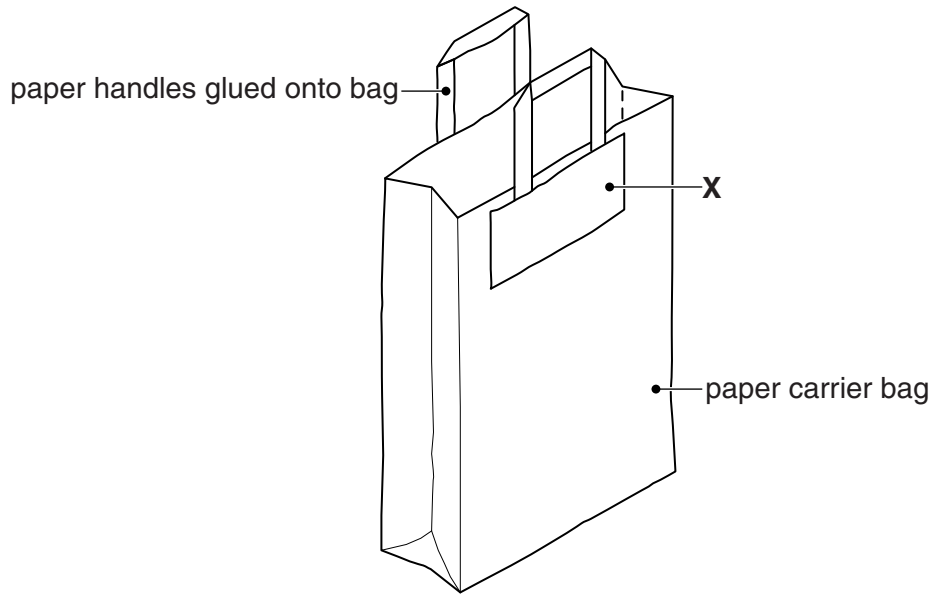
- (a) Explain the purpose of the design feature shown at X. [2]
- (b) Identify and describe **two** problems with the design of the table. [4]
- (c) Using notes and sketches, describe how the design would need to be changed to overcome the two problems you have identified in (b). [6]
- (d) Discuss the benefits to the customer of buying and using 'flat-pack' furniture.

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]

8

5 Fig. 5 gives details of a paper carrier bag.



development (net) required to make carrier bag

Fig. 5

- (a) Explain the purpose of the piece of paper shown at X. [2]
- (b) Identify and describe **two** problems with the development (net) of the carrier bag. [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]

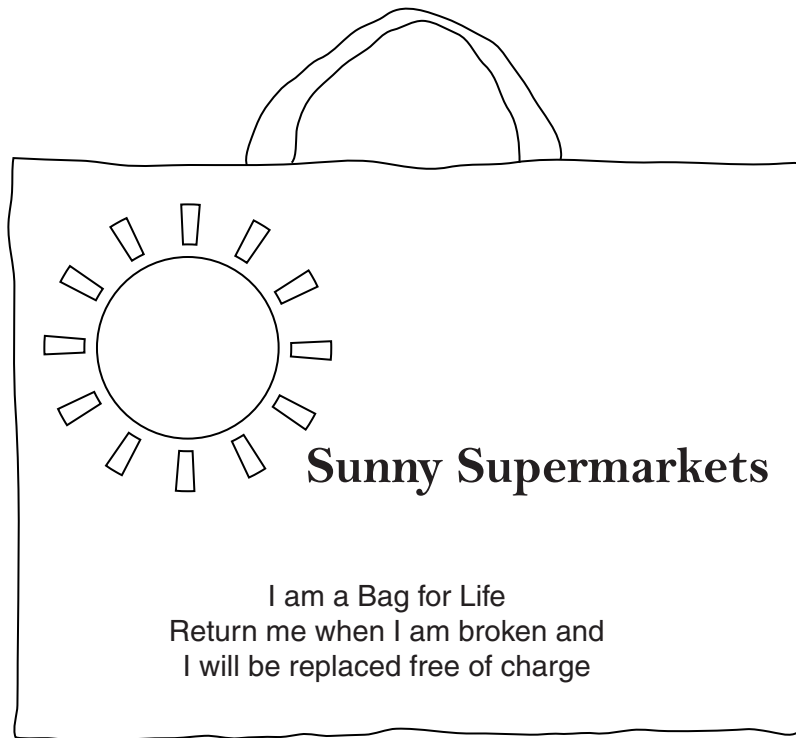


Fig. 6

(d) Fig. 6 shows a 'bag for life'. This type of bag is generally larger and stronger than the free bags that shops sometimes give their customers. An increasing number of shops operate a 'bag for life scheme'. This involves the customer initially buying, at a low cost, a 'bag for life' which is then replaced free of charge when it breaks and is returned to the shop. Discuss the benefits of this system.

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 dowel joint and a dowelling jig.

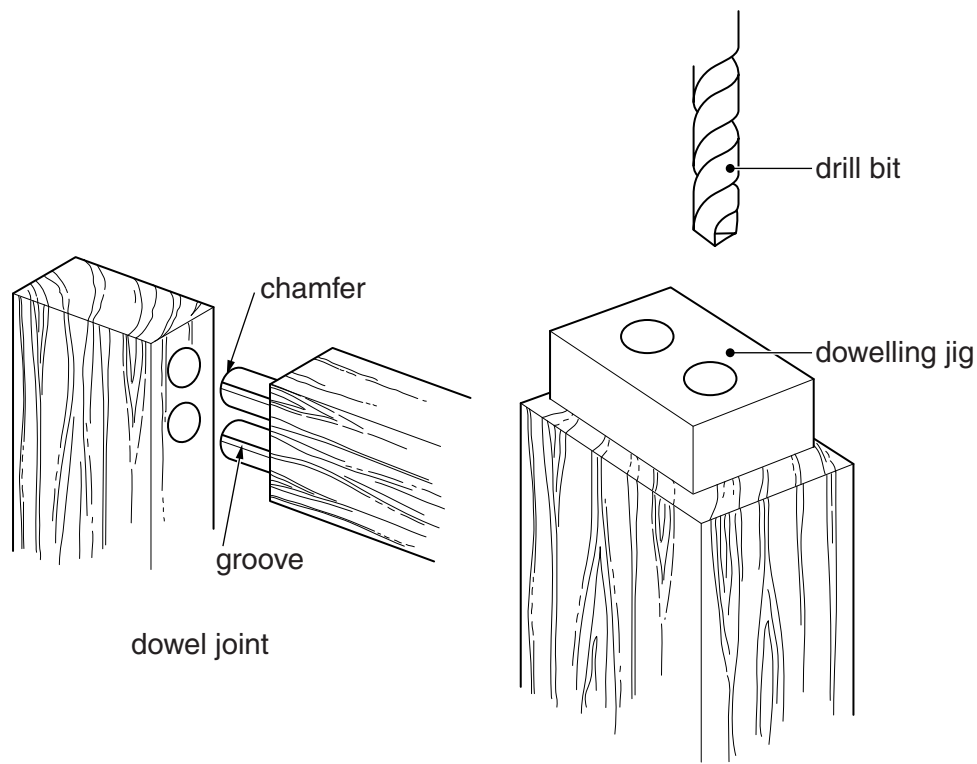


Fig. 7

- (a) State why:
 - (i) the end of the dowel has been chamfered; [1]
 - (ii) a groove has been cut along the length of the dowel. [1]
- (b) Identify and describe **two** problems with the design of the dowelling jig. [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 merits of using jigs when batch producing products.

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. 8 shows an incomplete design for a sun lounger.

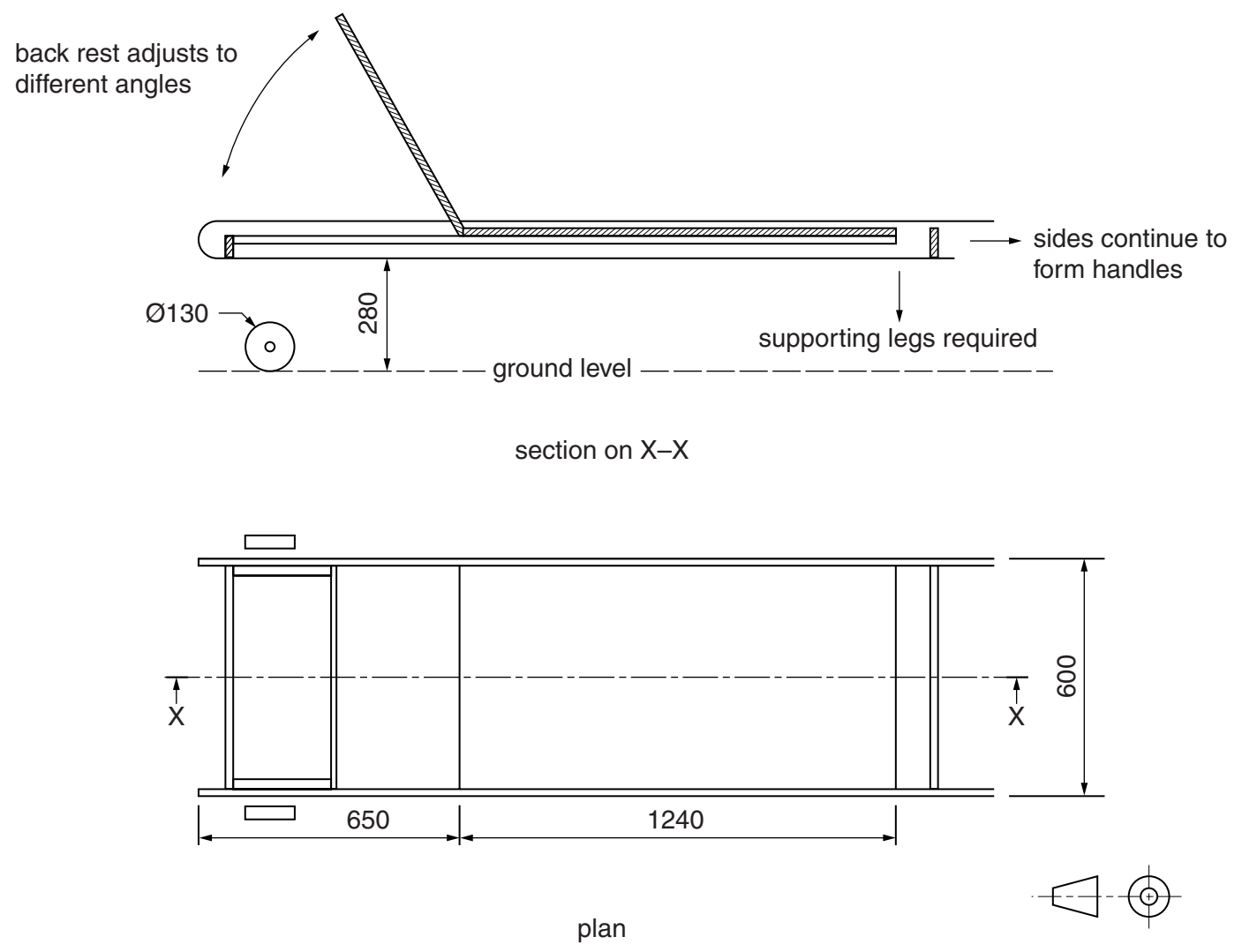
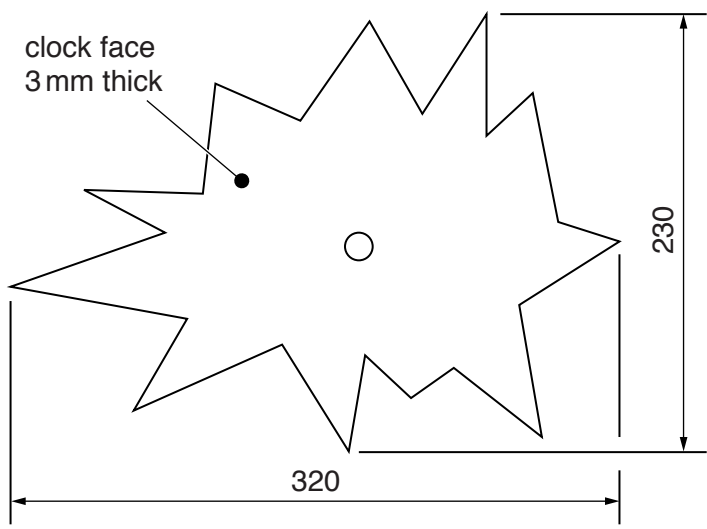


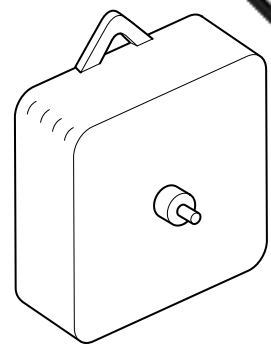
Fig. 8

- (a) Using notes and sketches, **develop** a design which allows the back rest to be adjusted and fixed at different angles.
- (b) Using notes and sketches, **develop** designs for the handles and the supporting legs.
- (c) Using notes and sketches, **develop** designs for the wheels and a method of attaching them to the sun lounger. [20]
- (d) Produce a pictorial rendered drawing of the complete sun lounger which shows all of the features that you have designed in (a) – (c). The back rest should be shown in a raised position. [20]

8 Fig. 9 shows an incomplete idea for a self assembly clock kit.



idea for face of clock



clock movement
overall size 67 x 55 x 30

Fig. 9

- (a) Select **one** of the following words.
SPLAT!, BANG!, SPLASH!, KA-POW!, CRASH!, BASH!
Using notes and sketches, **develop** a design for the lettering to go onto the clock face. The lettering should have a 3D appearance and be in a style that reflects your chosen word. [20]
- (b) Using notes and sketches, **develop** a design for the face of the clock and a set of three hands. Your design for the face of the clock should be similar but **not** identical to the given idea shown in Fig. 9. [20]
- (c) Using notes and sketches, **develop** a design for a clear plastic blister pack to package the clock kit. Separate spaces should be provided for:
 - the clock face;
 - the hands;
 - the clock movement. [20]
- (d) Produce a pictorial rendered drawing of the complete packaged clock kit which shows all of the features that you have designed in (a) – (c). [20]

9 Fig. 10 shows an incomplete design for a free standing mirror.

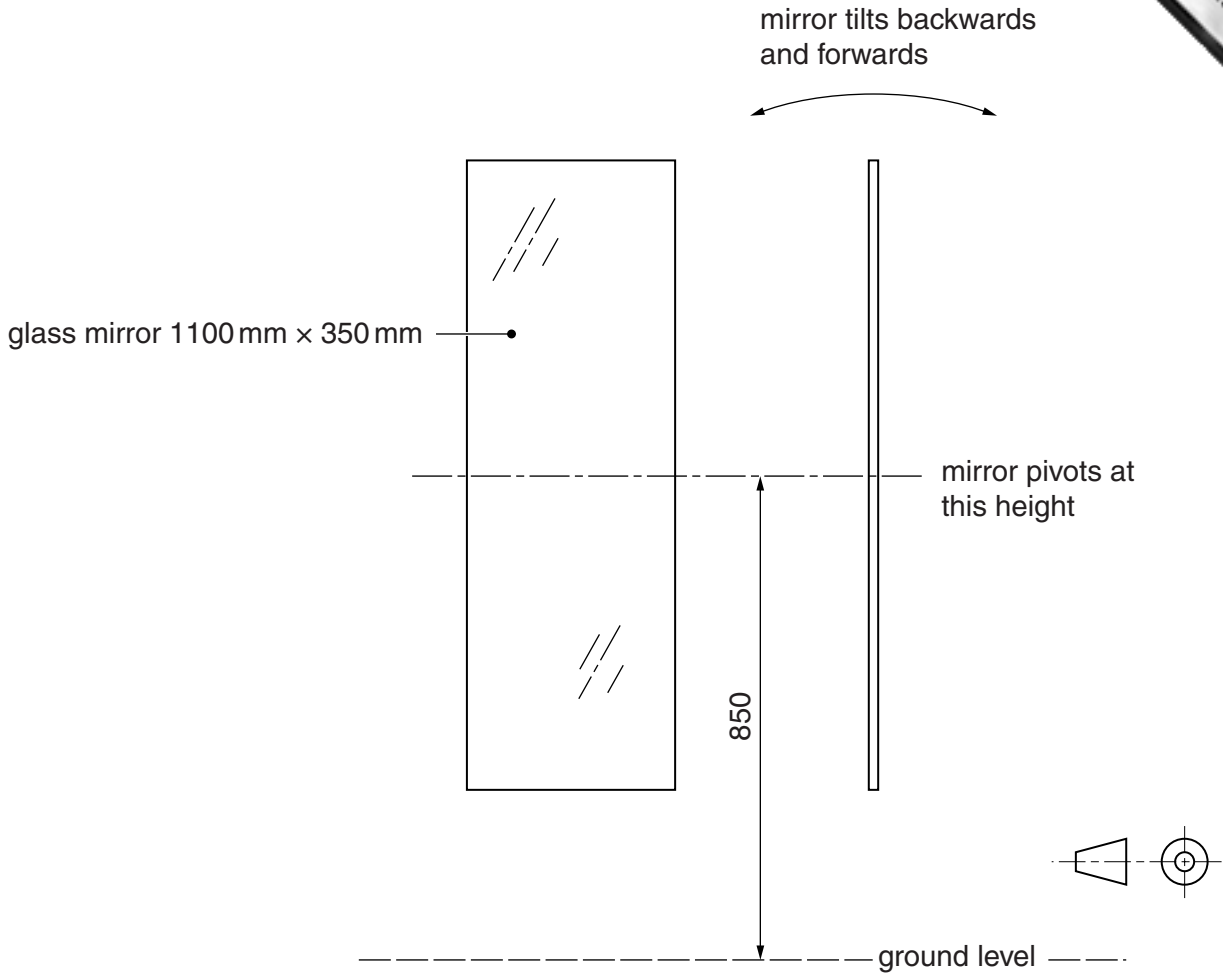


Fig. 10

- (a) Using notes and sketches, **develop** a design for a frame for the glass mirror. [20]
- (b) Using notes and sketches, **develop** a design for a stand to support the frame that you have designed in (a). [20]
- (c) Using notes and sketches, **develop** a design which attaches the frame to the stand and allows the frame to be adjusted and fixed at different angles. [20]
- (d) Produce a pictorial rendered drawing of the complete free standing mirror which shows all of the features that you have designed in (a) – (c). [20]

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