

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
DESIGN AND TECHNOLOGY**

A564

Resistant Materials

Technical aspects of designing and making

Candidates answer on the question paper.

OCR supplied materials:

None

Other materials required:

None

**Monday 10 January 2011
Afternoon**

Duration: 1 hour 15 minutes



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Answer **all** the questions.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- All dimensions are in millimetres.
- Your quality of written communication is assessed in questions marked with an asterisk (*).
- This document consists of **16** pages. Any blank pages are indicated.

Section A

Answer **all** questions.

1 Fig. 1 shows views of a glass mirror with a front and back made from MDF.

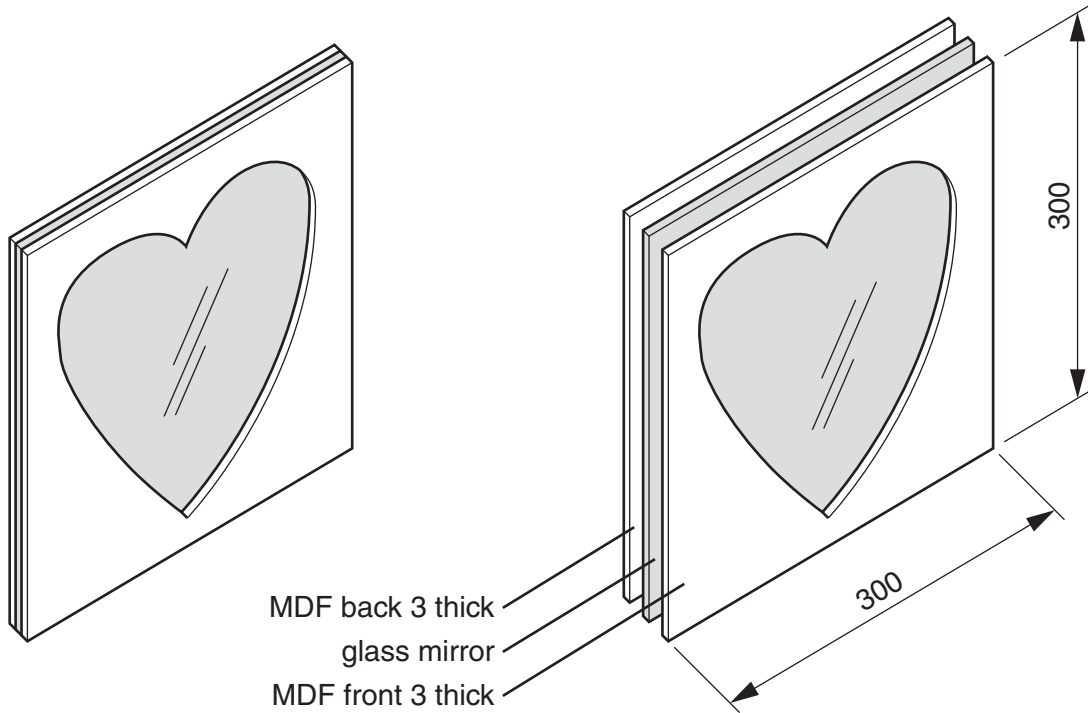


Fig. 1

(a) Complete the table below by describing the processes used to produce the heart shape in the MDF front.

Stage	Processes	Tools / items of equipment
1		Template
2		Saw tooth bit
3		Coping saw
4		Half-round file

[4]

(b) Give **one** reason why the MDF front would be finished with paint rather than clear varnish.

..... [1]

(c) The glass mirror will be fixed to the MDF by means of epoxy resin adhesive [glue].

Describe how:

(i) the epoxy resin adhesive would be prepared;

.....
.....
..... [2]

(ii) the glass mirror and MDF would be held together while the epoxy resin adhesive sets.

.....
.....
..... [2]

(d) Use sketches and notes to design a fitting that could be attached to the MDF back so that the mirror could be fixed to a wall.

[3]

[Total: 12]

Turn over

- 2 Fig. 2 shows views of an incomplete design for a push along toy made mainly from wood.

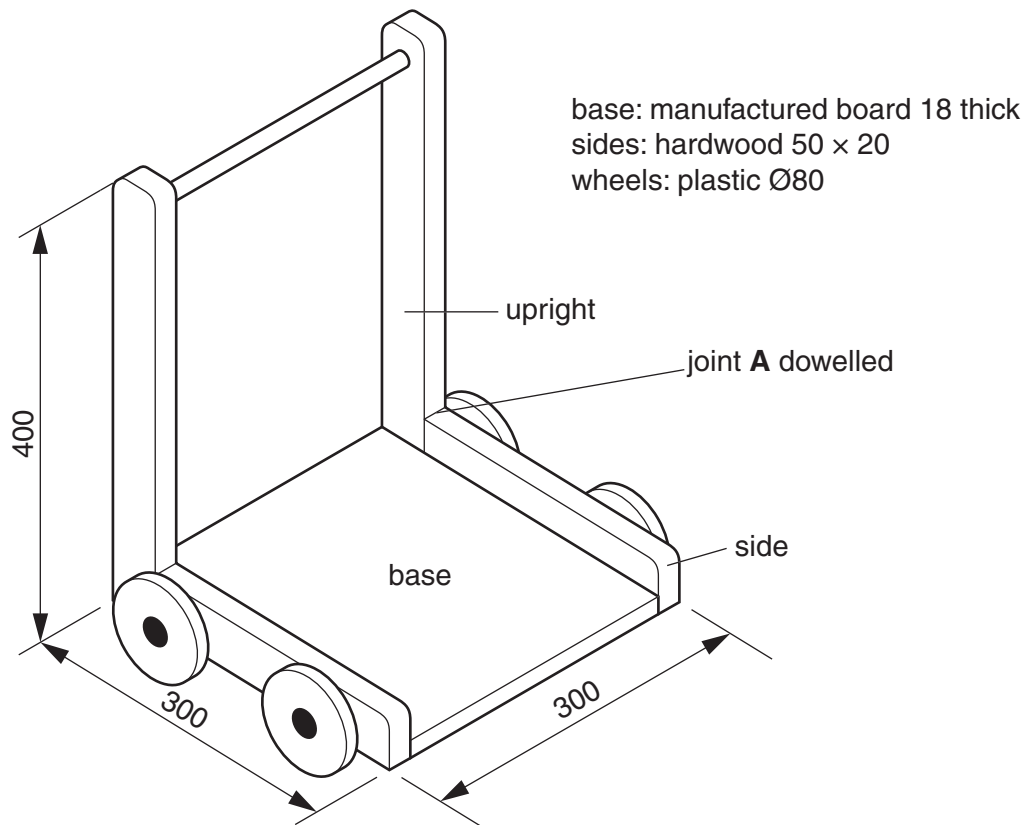


Fig. 2

- (a) Use sketches and notes to show how the doweled joint at **A**, between the side and upright, could be strengthened.

- (b) When the toy is pushed by a child, there is a danger that the toy will tip backwards as shown in Fig. 3.

Use sketches and notes to design a safety feature to prevent the toy from tipping backwards.

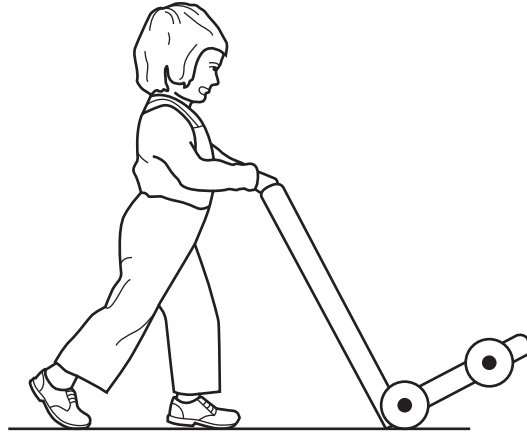


Fig. 3

3 Fig. 4 shows a towel rack designed to fit over a radiator.

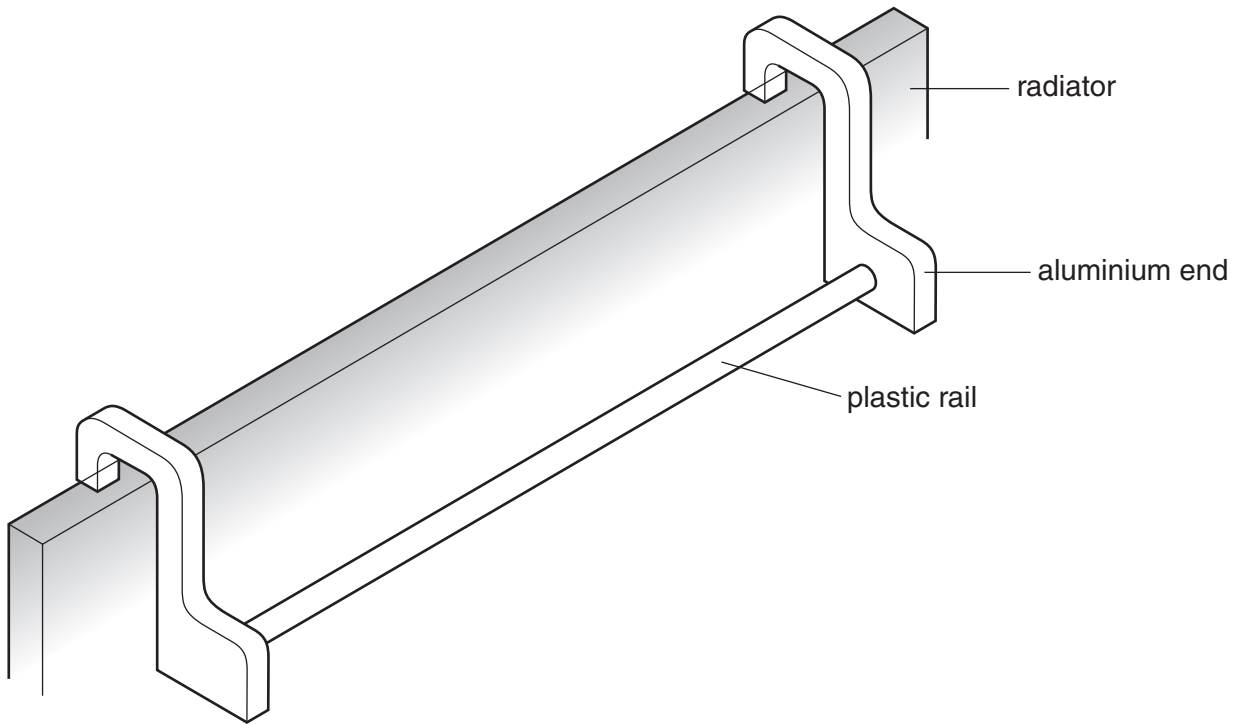


Fig. 4

(a) Give **one** benefit of using a plastic rail for the towel rack.

..... [1]

(b) State **one** item of research a designer would need to consider when designing the towel rack.

..... [1]

(c) The aluminium ends are made by die-casting.
Give **two** benefits of using the die-casting process to produce the aluminium ends.

1

.....

2

..... [2]

(d) The rail is made from plastic tube.

Fig. 5 shows the plastic tube positioned for fitting to one of the aluminium ends.

Show on Fig. 5 how the plastic tube could be located and secured to the aluminium end.

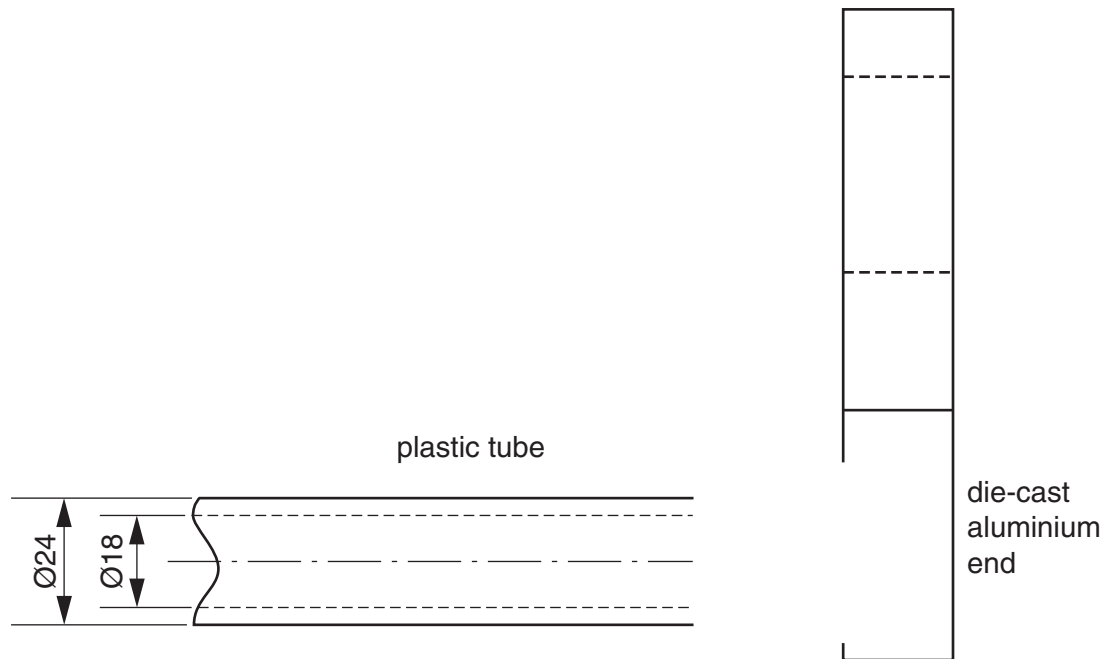


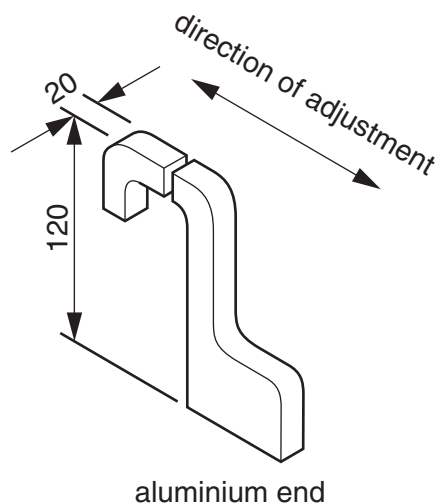
Fig. 5

[3]

(e) Use sketches and notes to show how the aluminium ends could be modified to make them adjustable to fit over radiators of different thickness.

Your modification must include:

- the method of locking the adjustment
- the materials and fittings used.



[5]

[Total: 12]

Section B

Answer **all** questions.

- 4 Fig. 6 shows a remote control holder made from 4 mm thick acrylic.

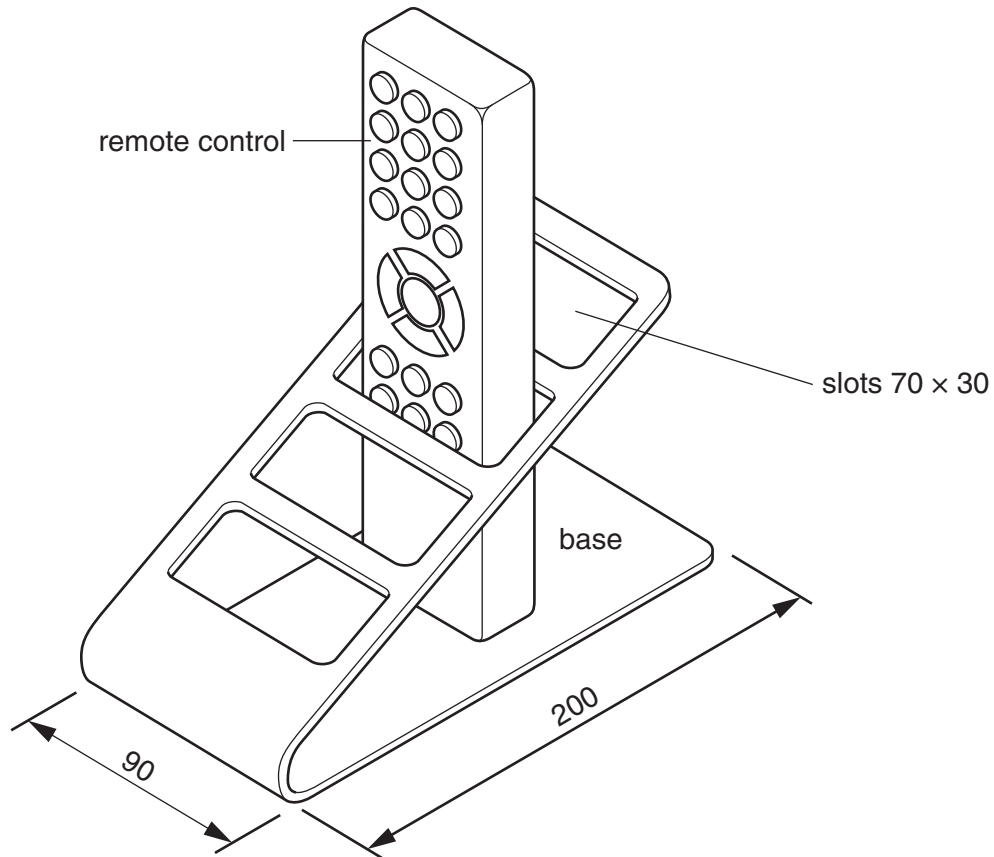


Fig. 6

- (a) The remote control holder shown in Fig. 6 will be made by hand in a school workshop. Complete the table below to describe the processes used when planning the manufacture of the remote control holder shown in Fig. 6.

Stage	Processes
1	Mark out the positions for the bend
2	
3	
4	
5	Polish the edges using the polishing mop

[3]

(b) When the remote controls are placed in the holder they slide around on the base. Use sketches and notes to show how this problem could be solved.

[3]

(c) The shape of the remote control holder could be cut out from a single piece of acrylic using a CNC machine.

(i) Name a CNC machine capable of cutting out the shape of the remote control holder.

..... [1]

(ii) Describe the process of cutting out the remote control holder using a CNC machine.

.....
.....
.....
.....
.....
.....
..... [3]

(d) The remote control holder could be modelled using 'rapid prototyping'.
Give **two** benefits of using rapid prototyping to model the remote control holder.

1

.....

2

..... [2]

[Total: 12]

- 5 Fig. 7 shows views of a wall-mounted bench used outdoors. The bench is supplied as three separate parts for self-assembly.

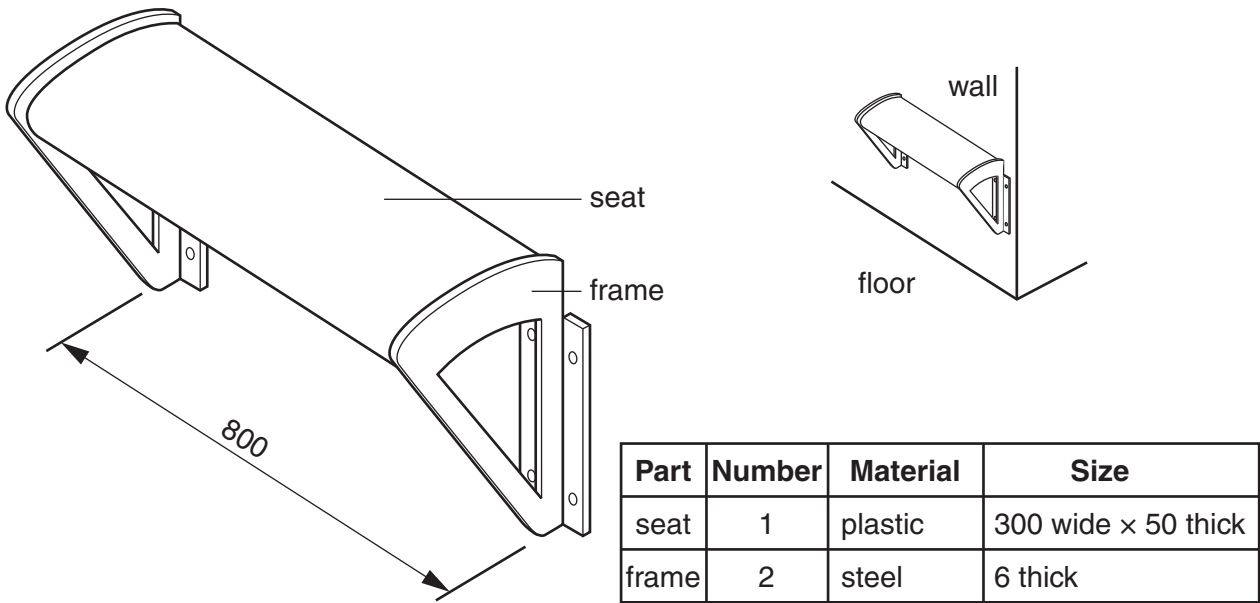


Fig. 7

- (a) Explain how anthropometric data would be used to decide the height at which the bench should be fixed to the wall.

.....

.....

.....

..... [2]

- (b) Use sketches and notes to show how the seat could be joined **and** fixed to the frames.

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