

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**DESIGN AND TECHNOLOGY**

**6043/01**

Paper 1 Technology

October/November 2005

**2 hours 30 minutes**

Additional Materials: Answer Booklet/Paper  
Plain paper  
Sketching equipment

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.  
Write in dark blue or black pen on both sides of the paper.  
You may use a soft pencil for any diagrams, graphs or rough working.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

**Part A**

Answer **all** questions

**Part B**

Answer **four** questions.

Answer **one** question from Section 1, **two** questions from Section 2, and **one** other question from either Section.

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.

Use sketches where appropriate to help answer any question.

You are advised to spend no longer than 45 minutes on Part A and 1 hour 45 minutes on Part B.

This document consists of **13** printed pages and **3** blank pages.

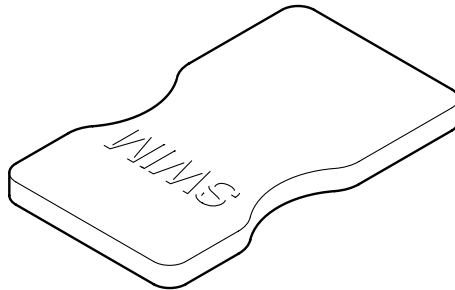


**Part A**

You are advised to spend no more than 45 minutes on this part.

Attempt **all** questions.

- 1 Fig. 1 shows a swimming aid used by children.



**Fig. 1**

Name a suitable plastic for making the swimming aid. Give a reason for your choice. [2]

- 2 Sketch the following:

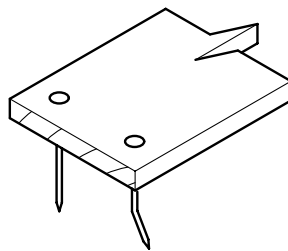
(a) a round headed nail;

(b) an oval nail. [3]

- 3 Explain the term 'working model' as used in developing a design solution. [3]

- 4 Explain briefly why each of the situations shown in Fig. 2 could be dangerous.

(a) Nails left sticking out of a piece of timber.



**Fig. 2a**

(b) Oil spilt on the floor.

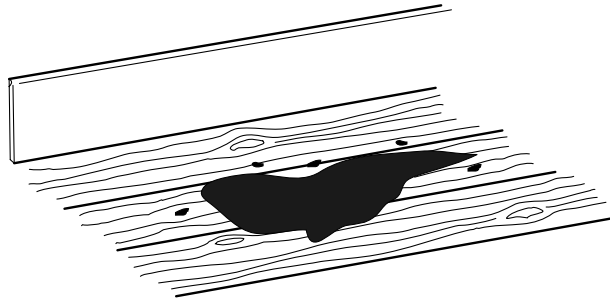


Fig. 2b

(c) A machine vice left on the corner of the bench.

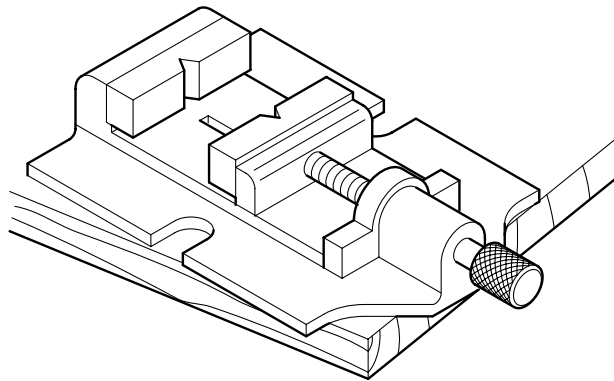


Fig. 2c

[3]

5 Name the two metals that form brazing rod or spelter.

[2]

6 Give a reason why each of the situations given in Fig. 3 can waste materials.

(a) The lid left off a tin of polyurethane paint.

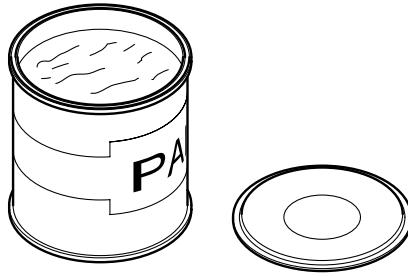


Fig. 3a

(b) Shapes to be cut marked out on a material.

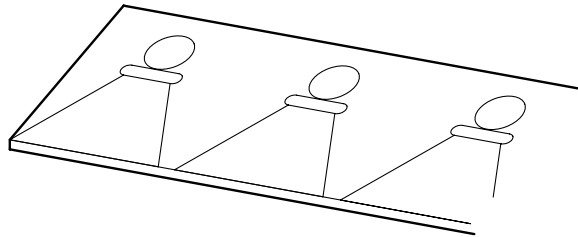


Fig. 3b

(c) Cutting out of a complex object rather than casting.

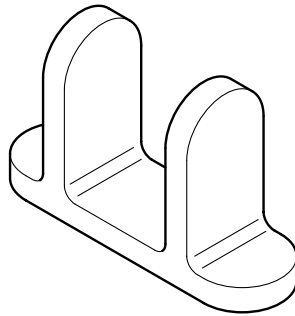


Fig. 3c

[3]

7 State **two** methods that can be used to sharpen blunt tools.

[2]

- 8 The metal parts shown in Fig. 4 have been drilled in preparation for threading. Name each of the features.

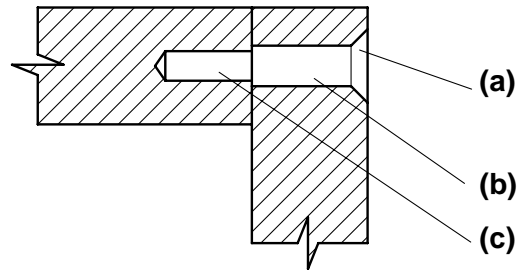


Fig. 4

[3]

- 9 Fig. 5 shows details of a protective plastic corner.

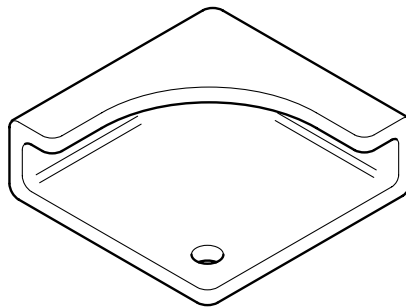


Fig. 5

- (a) Give **two** reasons why plastic has been chosen rather than metal or wood.
- (b) Give **two** reasons why injection moulding would be a suitable method of production. [4]
- 10 State which abrasive paper/cloth would be used for smoothing a:
- (a) wooden stool;
- (b) metal gate. [2]

## Part B

You are advised to spend at least 1 hour 45 minutes on this part of the examination.

Attempt **four** questions including **one** from Section 1, **two** from Section 2 and **one** further question from either section.

## Section 1 – Tools and Materials

11 (a) A poor approach to safety can cause problems in the workshop.

- (i) Identify a problem with each of the situations given in Fig. 6 and explain how each could be dangerous. [6]

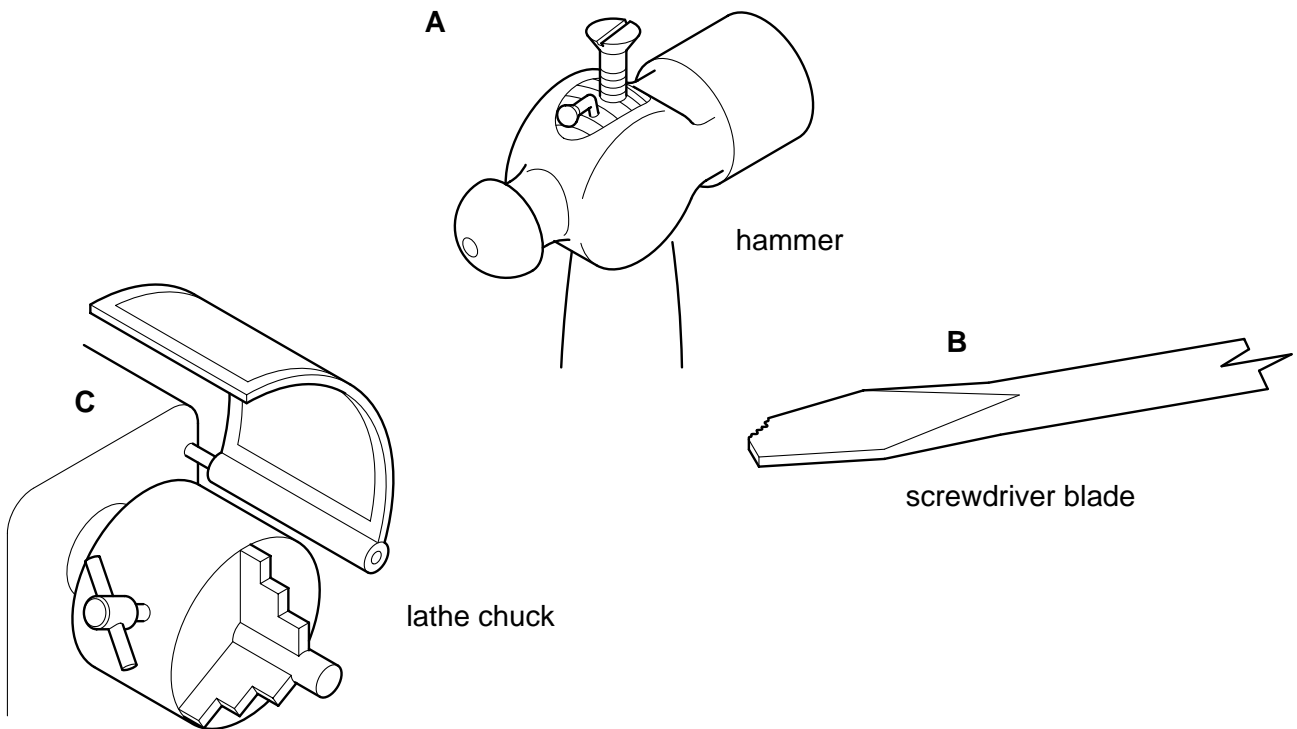


Fig. 6

- (ii) Using notes and sketches, describe how each danger given in part (a)(i) could be made safe. [6]

(b) With the aid of sketches explain why the following are needed:

- (i) 'set' on a saw;
- (ii) 'rake and clearance' on a machining tool. [5]

**12** The type of surface finish applied to any project depends on the use, the surface appearance and the material to be covered.

**(a)** Copy the chart shown below and complete the missing parts.

| Type of Finish             | Material used on                      | One Advantage                                  | One Disadvantage                           |
|----------------------------|---------------------------------------|--|--|
| [Example]<br>French Polish | Mainly hardwoods<br>such as mahogany. | Produces a high gloss<br>finish for furniture. | Final finish will not<br>stand up to heat. |
| Acrylic Paint              |                                       |  |  |
| Bees Wax                   |                                       |  |  |
| Polythene Dip Coating      |                                       |  |  |
| Polyurethane Lacquer       |                                       |  |  |
| Burnt Oil                  |                                       |  |  |

[15]

**(b)** Describe how a paint brush that has been used to apply an oil-based gloss paint would be cleaned. [2]

13 Fig. 7 shows the design for a playing piece which is part of an outdoor game.

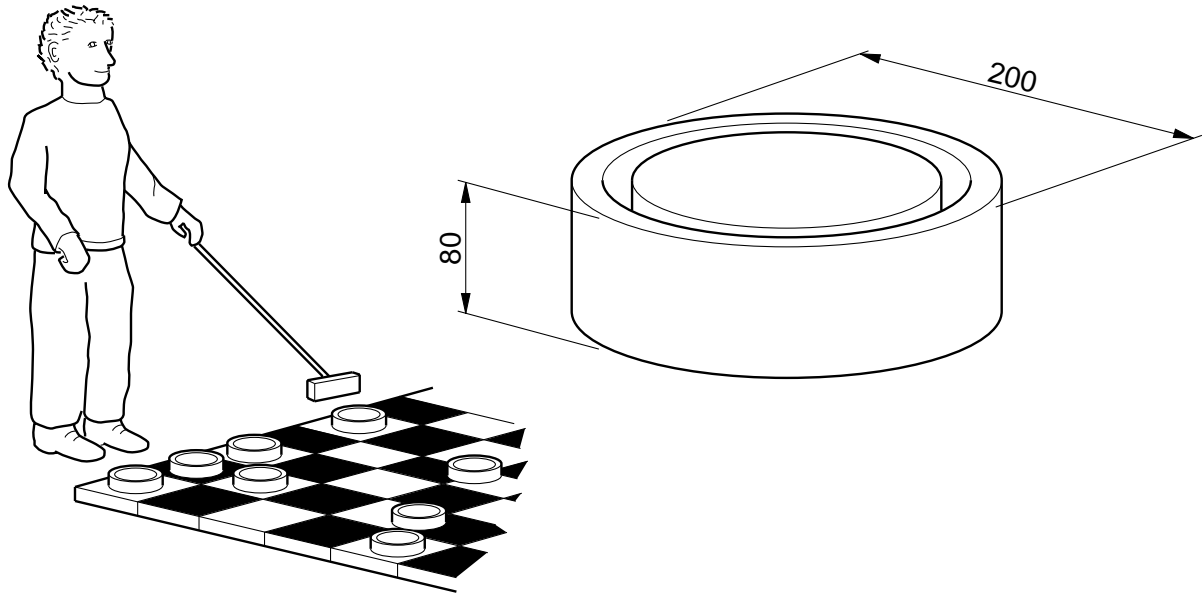


Fig. 7

- (a) State **two** properties that a material should have to be suitable for the playing piece. [2]
- (b) The following materials have been considered but then rejected. Give reasons why they are unsuitable.
- (i) Cast iron.
  - (ii) Chipboard.
  - (iii) Polyester resin. [6]
- (c) Suggest a suitable material for the playing piece and sketch the tools or equipment that would be used to produce the shape. [5]
- (d) The shape of the playing piece shown in Fig. 7 may be difficult to manufacture by some processes. Using a sketch, explain how the shape could be modified to ease manufacture and reduce possible faults. [4]



## Section 2 – Processes

14 An aid to help children understand letters and construct words is shown in Fig. 8.

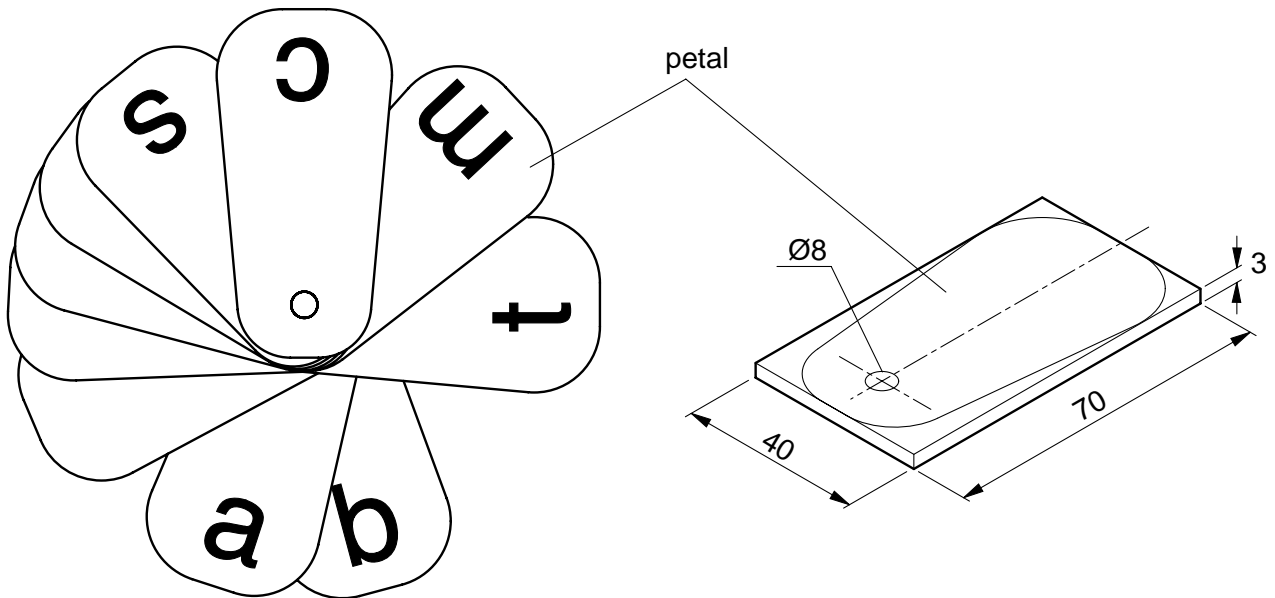


Fig. 8

- (a) Name **two** properties a material should have to make it suitable for the aid. [2]
- (b) Choose a suitable material and, using notes and sketches, describe the following stages of making the aid.
- (i) Marking out the shape of one petal.
  - (ii) Holding the material and drilling the Ø8 hole.
  - (iii) Removing the waste and finishing the edge of the petal. [15]

15 Choose **two** of the tasks shown in Fig. 9 and, using notes and sketches, describe how each is carried out.

(a) **Turning** a teak coat peg.

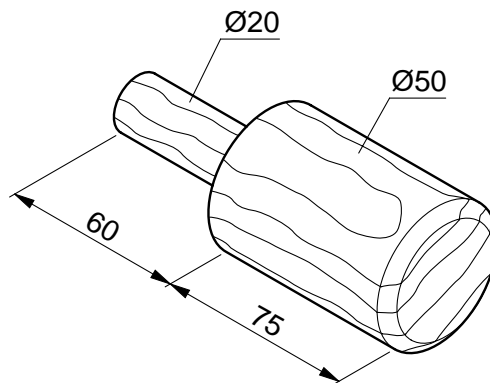


Fig. 9a

(b) **Case hardening** a mild steel tack lifter.

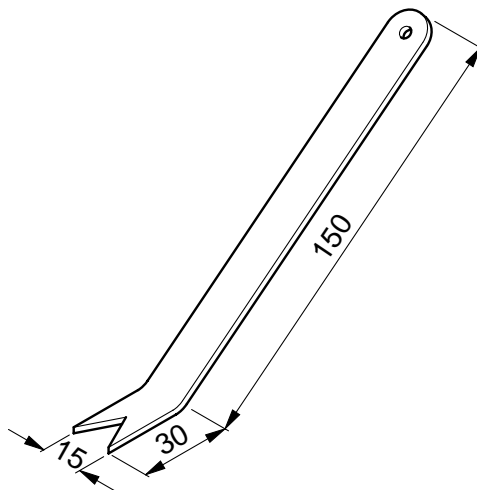


Fig. 9b

(c) **Vacuum forming** a polypropylene dog bowl.

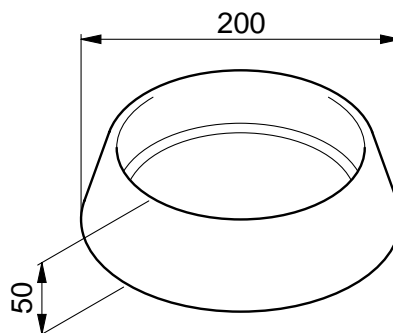


Fig. 9c

16 Fig. 10 shows the design for a wall-mounted magazine holder.

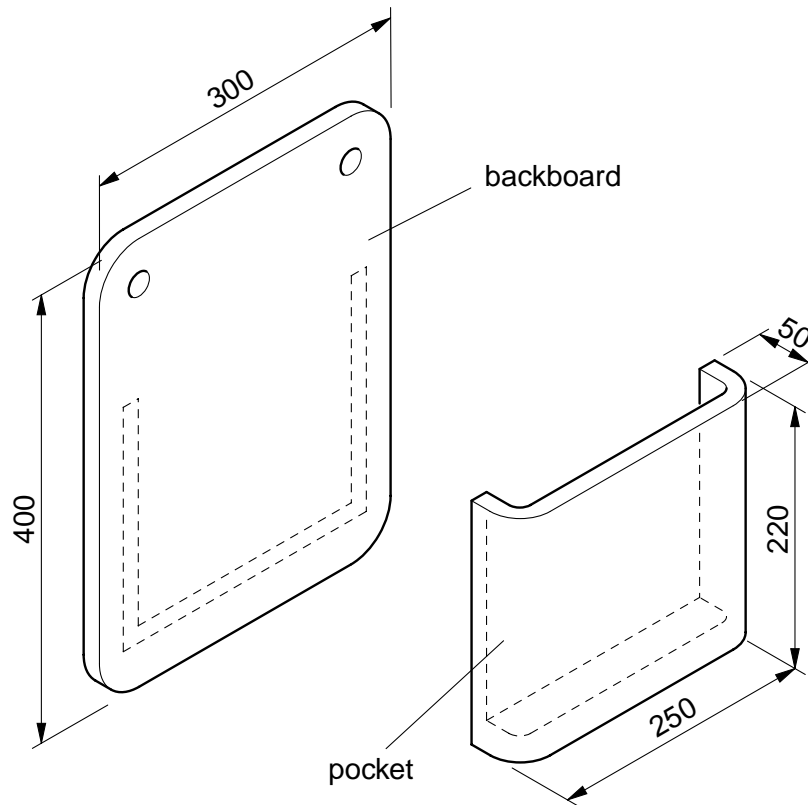


Fig. 10

- (a) State a suitable sheet material and give **one** reason for your choice. [2]
- (b) For the material chosen in (a), describe with the aid of notes and sketches the following processes:
- (i) making the pocket; [8]
- (ii) joining the pocket to the backboard. [4]
- (c) With the aid of sketches show how the pocket could be further improved to allow better access for cleaning. [3]

17 A small scooter is shown in Fig. 11.

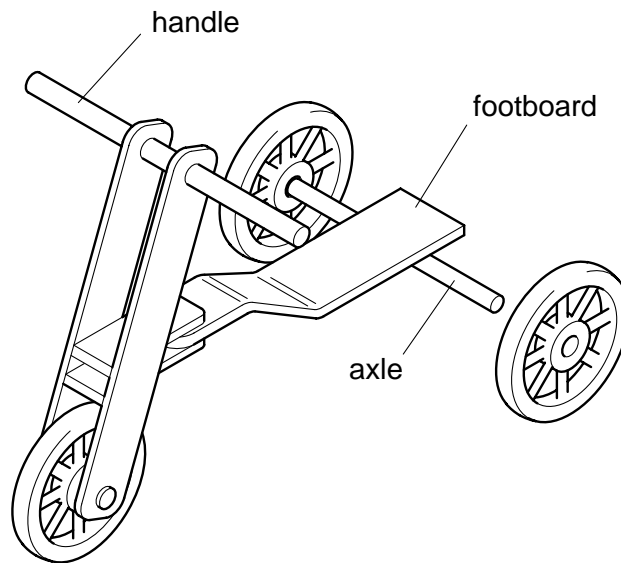


Fig. 11

- (a) A number of improvements to the basic design are being considered. Identify the **four** major improvements to the footboard shown in Fig. 12 and suggest the reasons for each change.

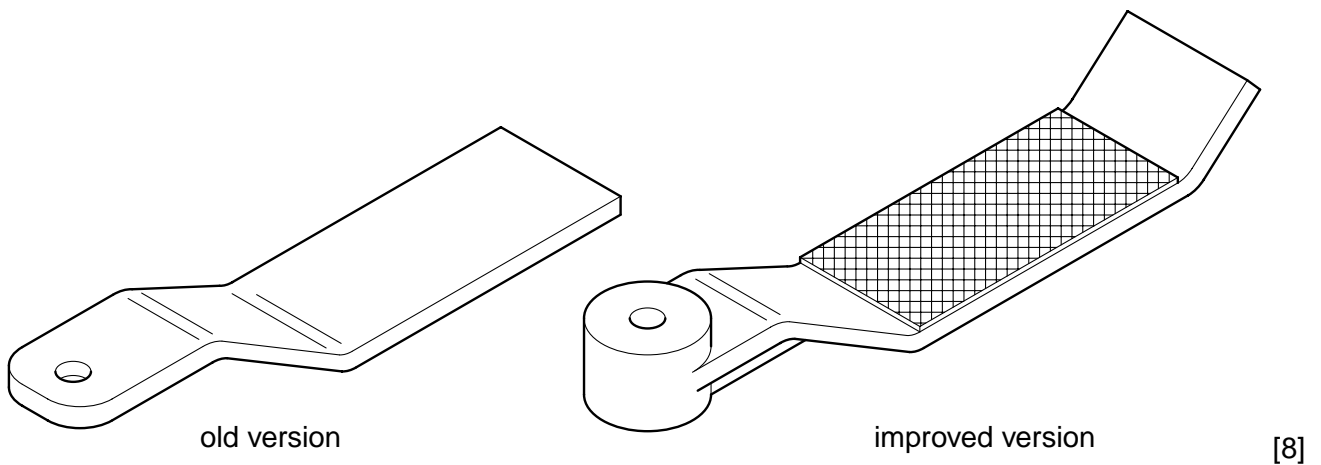


Fig. 12

- (b) Using notes and sketches, describe **two** possible ways of fixing the mild steel back axle to the footboard. [6]
- (c) With the aid of sketches show how the handle could be improved. [3]

18 Fig. 13 shows a design for a paint roller.

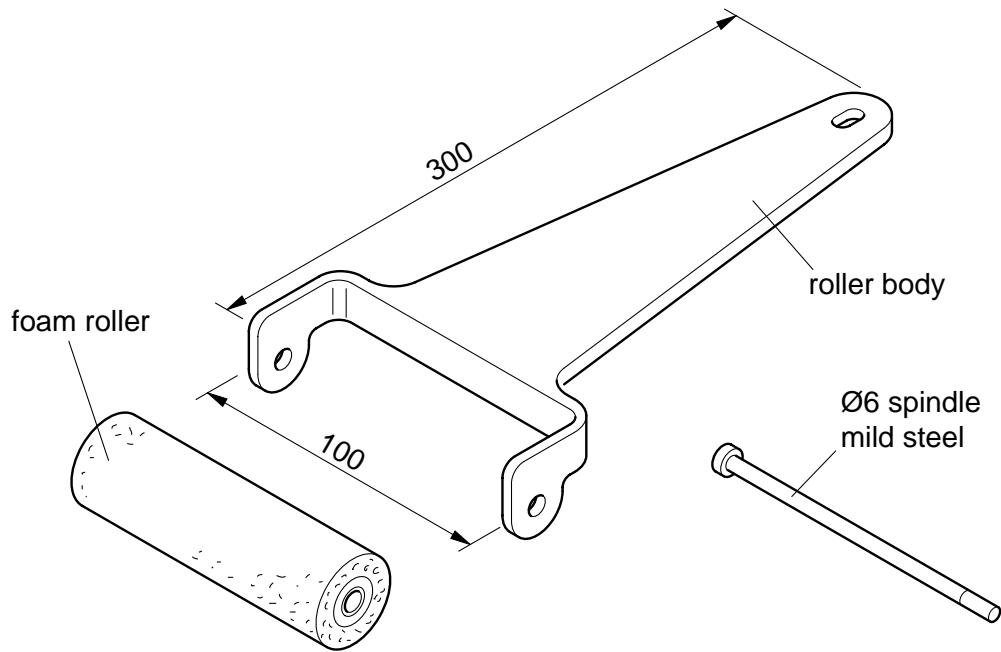


Fig. 13

- (a) Explain why the following properties would be important when choosing a material for the paint roller body:
- (i) lightweight;
  - (ii) water resistant. [4]
- (b) With the aid of notes and sketches, describe in detail how the paint roller body could be produced using a material of your own choice. [8]
- (c) One end of the Ø6 spindle for holding the foam roller is to be threaded for a length of 10 mm. Describe how this would be done. [5]





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