

Candidate Name

Centre Number

Candidate
Number

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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS****General Certificate of Secondary Education****DESIGN AND TECHNOLOGY
(RESISTANT MATERIALS TECHNOLOGY)****1956/4****PAPER 4 HIGHER TIER**

Thursday

16 JUNE 2005

Afternoon

1 hour 15 minutes

Candidates answer on the question paper.
No additional materials are required.

TIME 1 hour 15 minutes**INSTRUCTIONS TO CANDIDATES**

Write your name, Centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

INFORMATION FOR CANDIDATES

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

Dimensions are given in millimetres unless stated otherwise.

Question 2, product analysis, is based on the theme 'Domestic Bedside Lighting' printed in the specification.

Total marks for this paper is **50**.

FOR EXAMINER'S USE	
1	
2	
3	
4	
5	
TOTAL	

This question paper consists of 12 printed pages.

1 Fig. 1 shows an office chair.

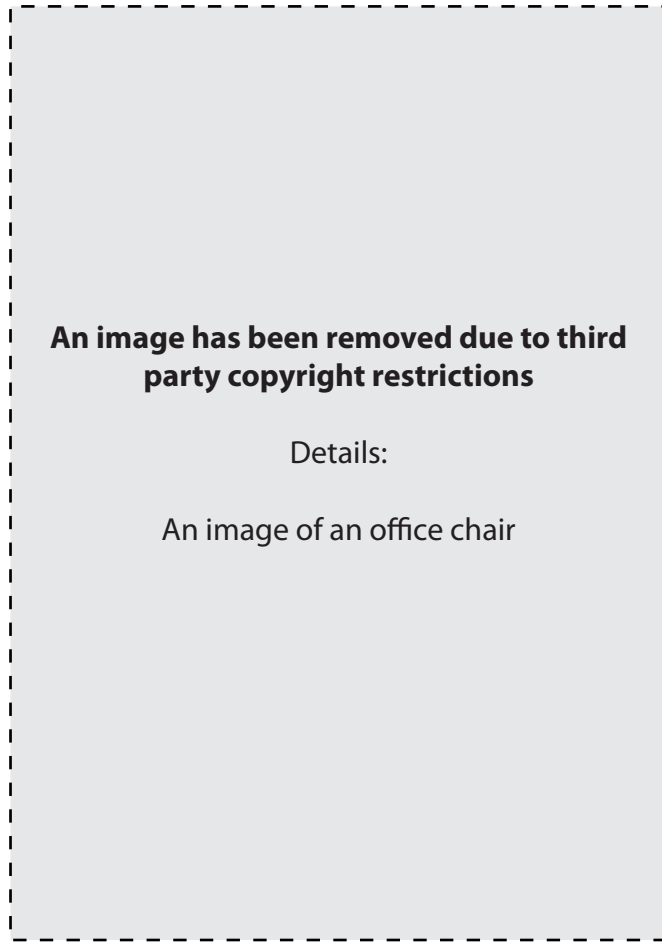


Fig. 1

(a) State two ways in which ICT could be used during the design of the chair.

1 _____

2 _____

[2]

(b) The office chair is manufactured and sold as a self-assembly product.

(i) State two advantages to the consumer of buying a self-assembly product.

1 _____

2 _____ [2]

(ii) State two advantages to the manufacturer of making self-assembly products.

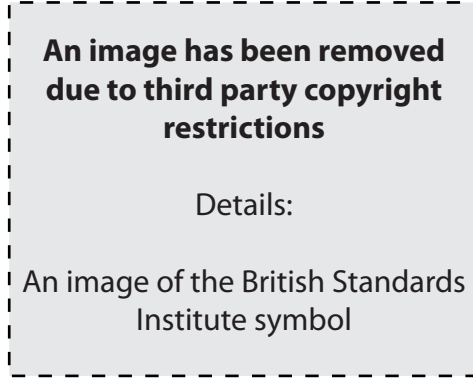
1 _____

2 _____ [2]

- (c) Name one tool that the consumer of a self assembly product might need to use to assemble the product.

_____ [1]

Many products display the following British Standards Institute (BSI) symbol.



- (d) Explain the purpose of this symbol.

_____ [1]

The manufacturer uses a just in time (JIT) production system.

- (e) Give two advantages to the manufacturer of using a JIT production system.

1 _____

2 _____

[2]

- 2 This question is based on the theme of Domestic Bedside Lighting. Fig. 2 shows two different industrially manufactured bedside lights. The lampshades and fittings have been removed.

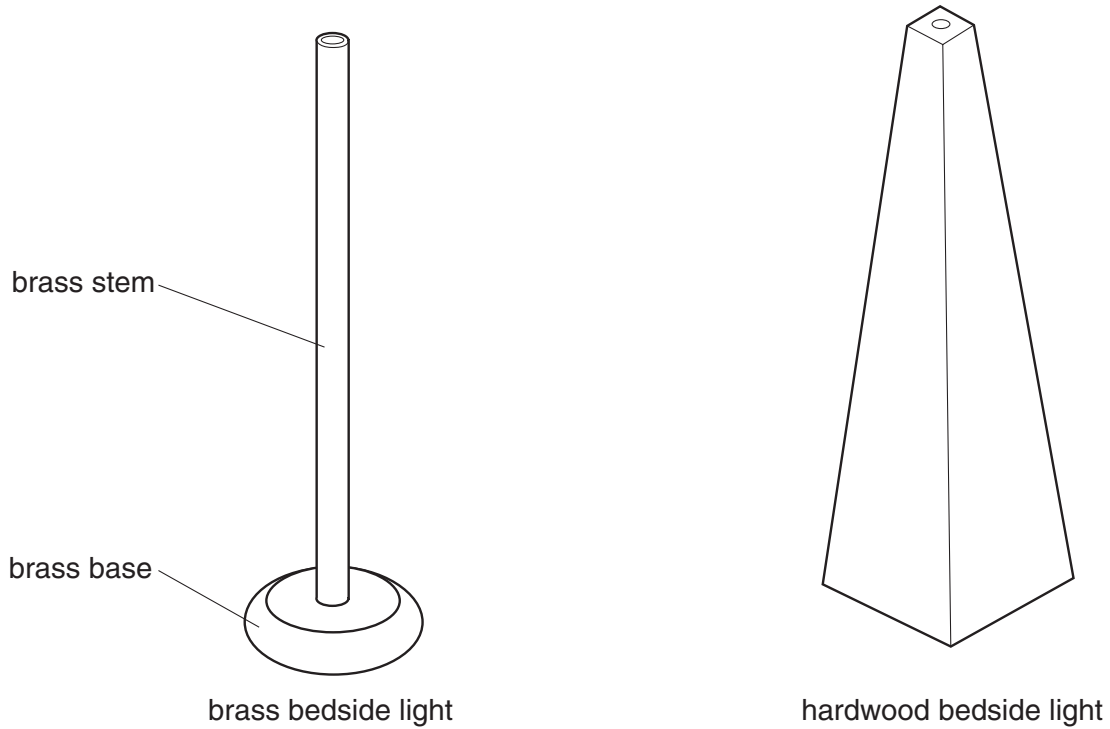


Fig. 2

Part of a specification for a bedside light is shown below.

A bedside light must:

- be electrically safe;
- have a surface finish that would protect it;

(a) Add **two** more points to the specification.

- _____
- _____ [2]

(b) Suggest **two** possible problems a consumer might encounter when using a bedside light.

- 1 _____
- _____
- 2 _____
- _____

[2]

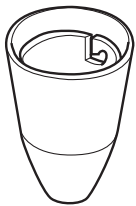
- (c) State **one** method of permanently attaching the stem to the base of the brass bedside light.

_____ [1]

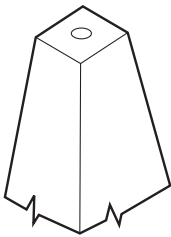
- (d) Other than the cost of the material suggest **one** reason why the brass bedside light would be more expensive to manufacture in quantity than the hardwood bedside light.

_____ [1]

- (e) Fig. 3 shows the top of the hardwood bedside light and a plastic bulb holder. Use sketches and notes to show how the bulb holder could be attached to the top of the hardwood bedside light.



bulb holder

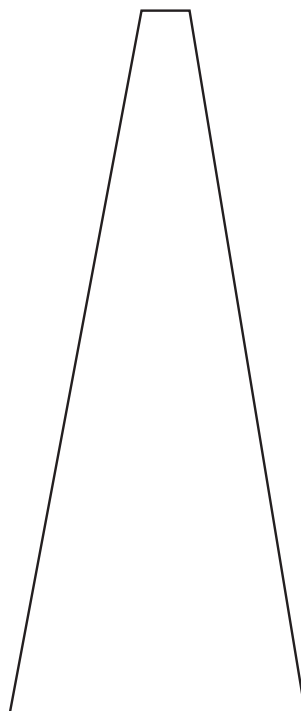


top of the hardwood
bedside light

Fig. 3

[2]

- (f) Complete the drawing below to show how provision could be made for the electric cable in the hardwood bedside light.



- 3 Fig. 4 shows a level crossing barrier for a model railway layout. It is made mainly from wood.

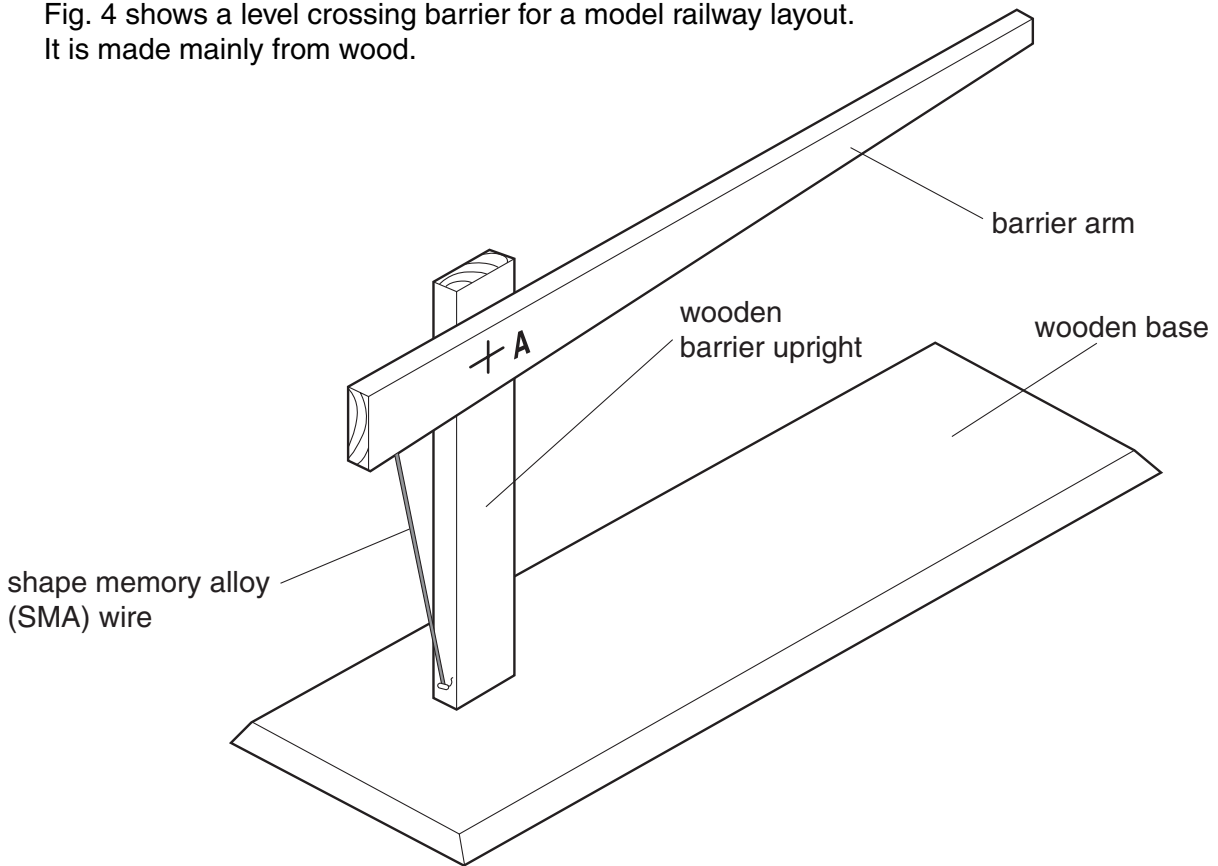
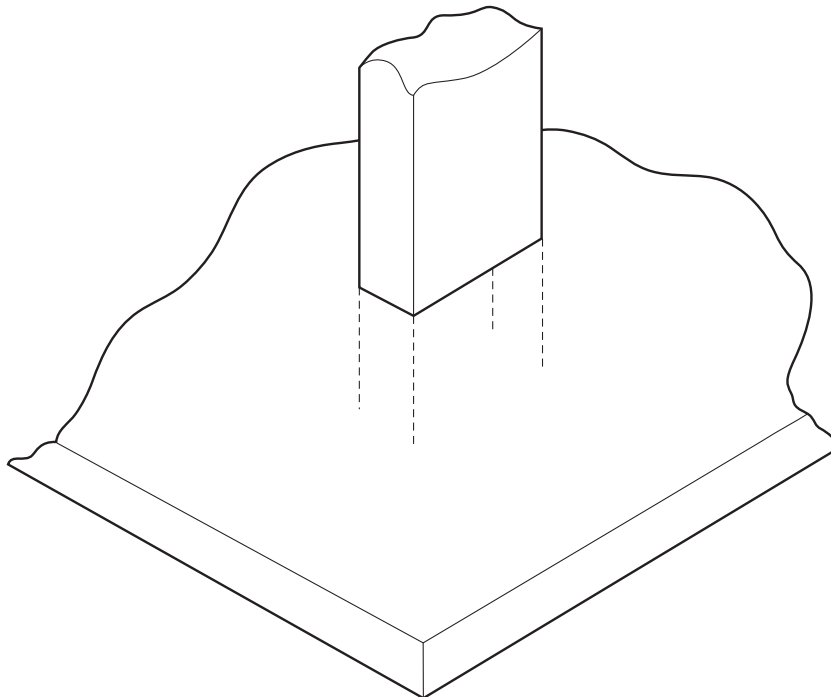


Fig. 4

- (a) Complete the drawing below to show how the barrier upright could be joined to the base.



(b) Using sketches and notes show how the barrier arm in Fig. 4 could be made to:

- pivot at **A**;
- stop at the horizontal position as shown.

[4]

A length of shape memory alloy (SMA) wire is attached to the barrier arm and the barrier upright as shown in Fig. 4. The movement of the barrier arm is controlled by the SMA wire.

(c) Explain how the SMA wire is used to control the movement of the barrier arm.

[4]

- 4 Fig. 5 shows two views of a child's string operated toy made mainly from 6 mm plywood. When the string is pulled the eyes move.

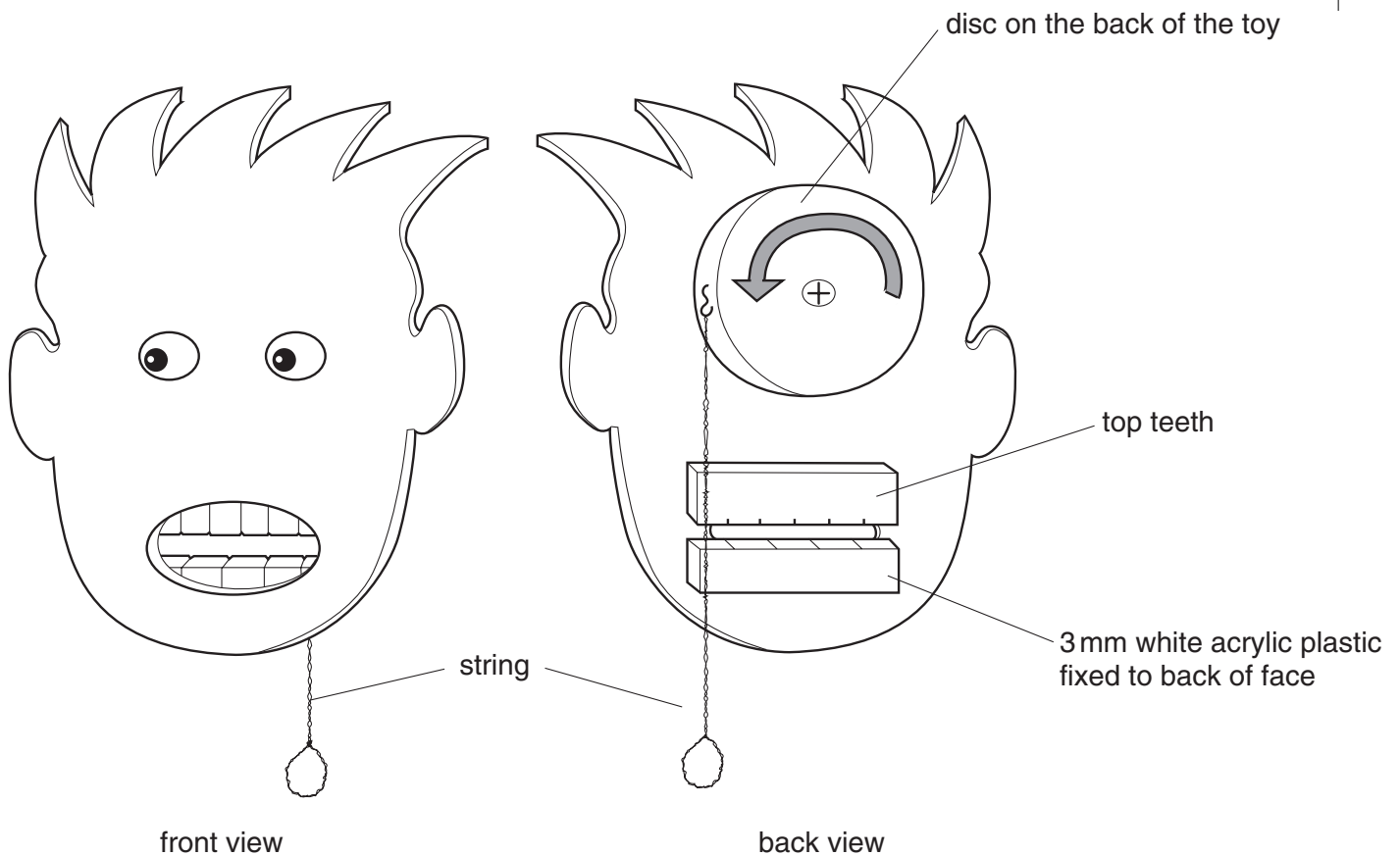
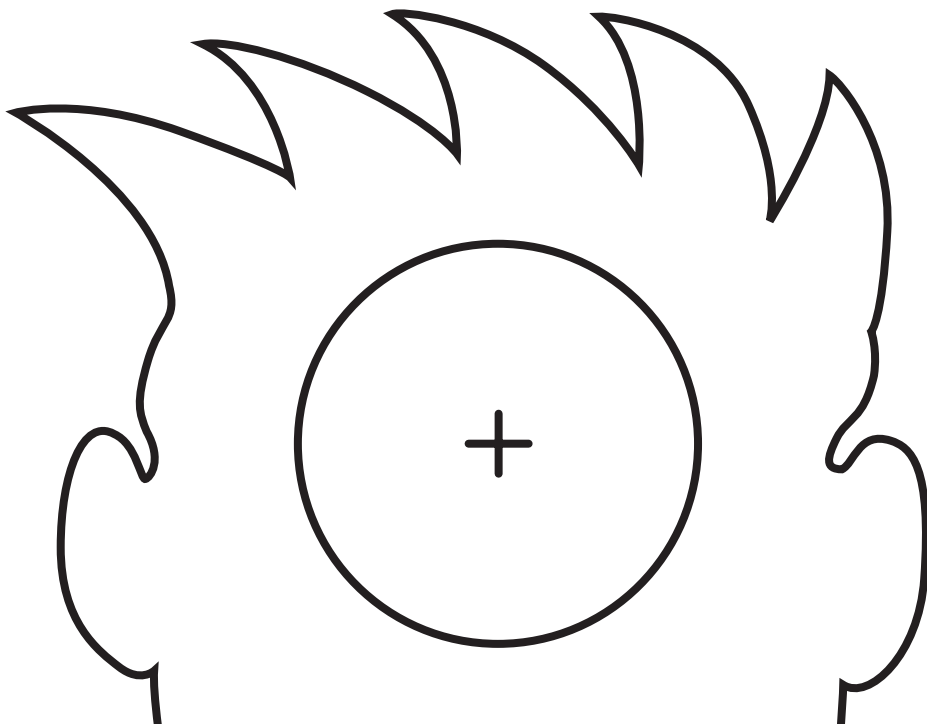


Fig. 5

- (a) On the drawing below use sketches and notes to show:
- a method of stopping the disc from rotating too far;
 - a method of returning the disc to the starting position.

You may modify the disc.

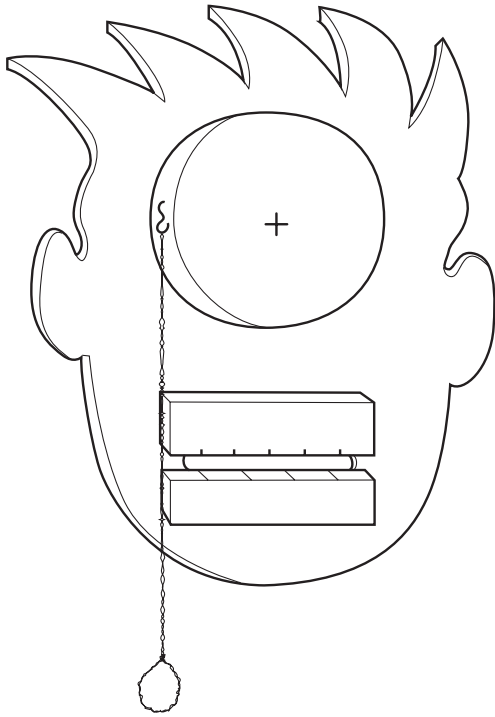


(b) Use sketches and notes to show a modified design of the toy shown in Fig. 5 so that:

- the moving parts are protected;
- the toy is easy to hold when pulling the string.

Include details of:

- materials;
- constructions;
- fittings.



- 5 Fig. 6 shows views of a metal ladder.

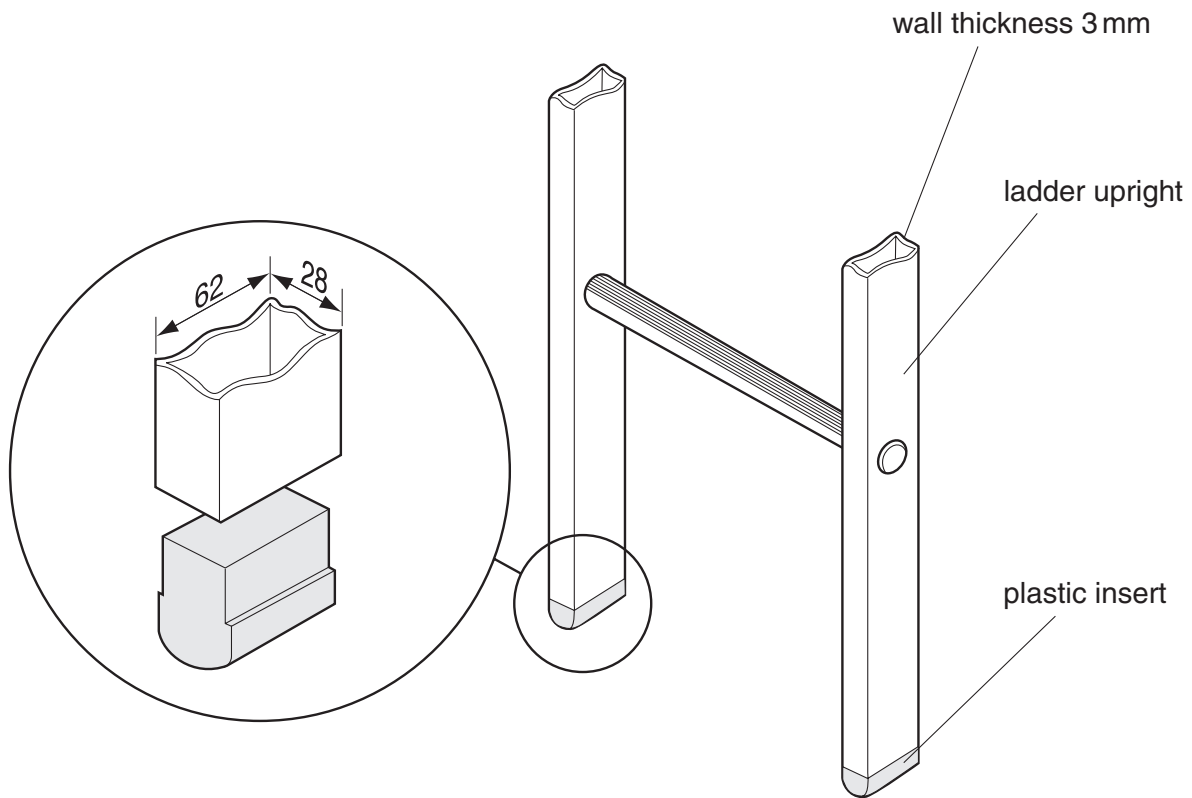


Fig. 6

- (a) The plastic insert is fixed into the end of the ladder upright using a 'friction fit'. Explain what is meant by a 'friction fit'.

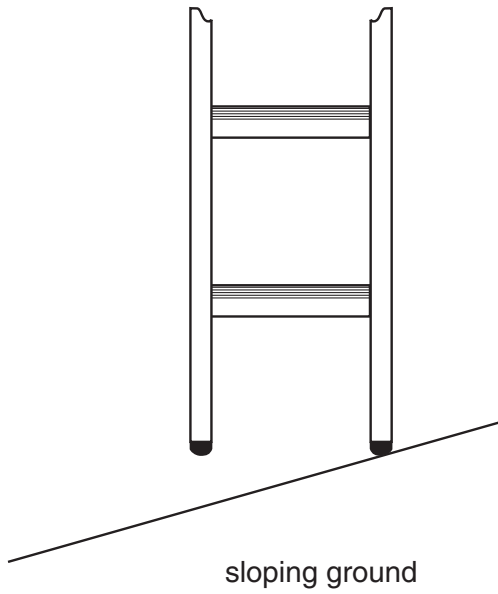
_____ [2]

- (b) Consideration needs to be given when selecting materials such as metal for ladders to be used outdoors. One factor to be considered is the need to withstand wet conditions. Suggest **two** other factors.

1 _____

2 _____ [2]

- (c) Using sketches and notes, design a device which can be attached to one ladder upright to allow the ladder to be used on different ground slopes. You should consider adjustability, safety and the security of your device.



Copyright Acknowledgement:

The British Standards Kitemark symbol was used with permission from the British Standards Institute.