



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER



**DESIGN AND TECHNOLOGY**

**0445/32**

Paper 3 Resistant Materials

**October/November 2016**

**1 hour**

Candidates answer on the Question Paper.

No Additional Materials are required.

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.

Write in blue or black pen.

You may use an HB pencil 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 **all** questions in this section.

**Section B**

Answer **one** question in this section.

You may use a calculator.

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.

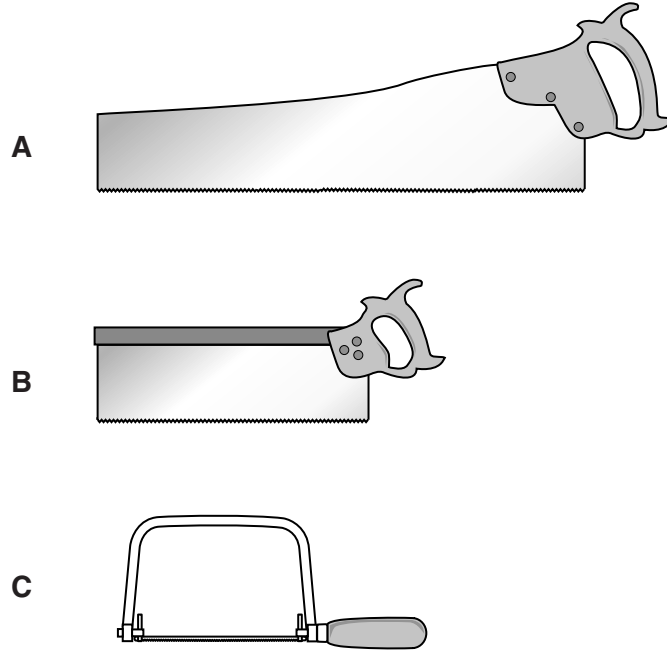
The total of the marks for this paper is 50.

This document consists of **18** printed pages and **2** blank pages.

**Section A**

Answer **all** questions in this section.

1 Fig. 1 shows three saws used to cut wood.



**Fig. 1**


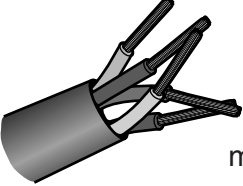

Name each of the saws **A**, **B** and **C**.

**A** .....

**B** .....

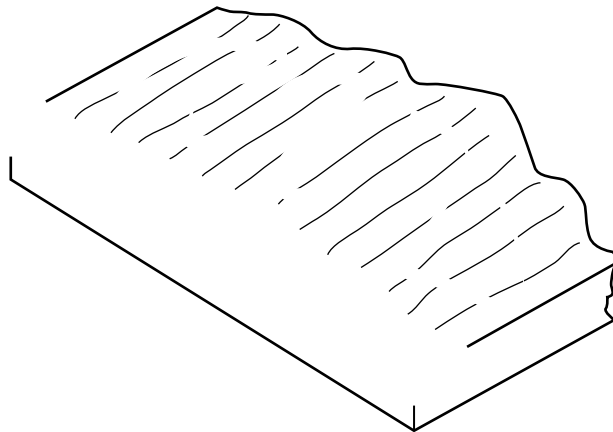
**C** ..... [3]

2 Complete the table below by naming a specific material for each product.

Product	Specific material
 <p data-bbox="550 459 715 495">metal spoon</p>	
 <p data-bbox="550 694 687 730">metal wire</p>	
 <p data-bbox="550 907 703 943">plastic bowl</p>	

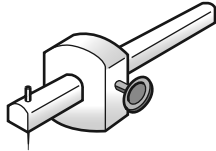
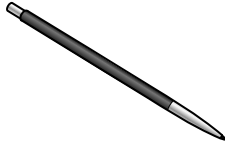
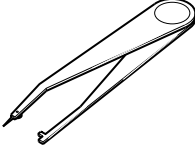
[3]

3 Complete the drawing below to show a half lap joint.



[2]

4 Complete the table below by naming each of the marking out tools.

Marking out tool	Name
	
	
	

[3]

5 Fig. 2 shows a length of wood with three slots marked out.

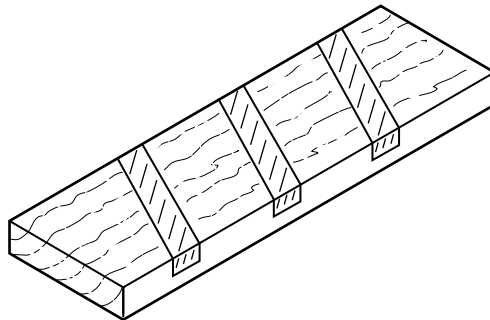


Fig. 2

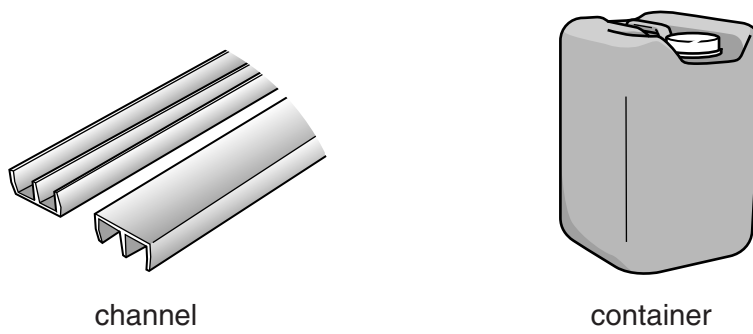
(a) Give **one** reason why the lines would be marked out using a marking knife rather than a pencil.

..... [1]

(b) Name a tool that could be used with a marking knife to mark all the lines at the same angle across the grain of the wood.

..... [1]

6 Fig. 3 shows two products made from plastic.



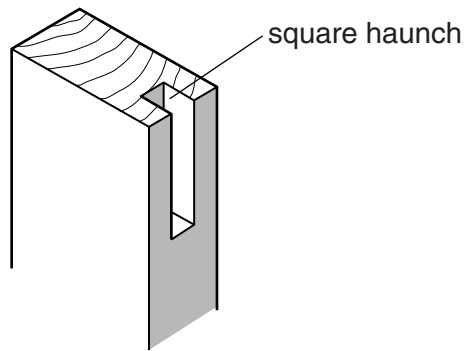
**Fig. 3**

Name the moulding process used to make each product.

channel ..... [1]

container ..... [1]

7 Fig. 4 shows a mortise with a square haunch.



**Fig. 4**

(a) Draw a square haunch tenon that would fit into the square haunch mortise shown in Fig. 4.

[2]

(b) Describe the purpose of the square haunch.

..... [1]

8 Fig. 5 shows two different types of drill bit.

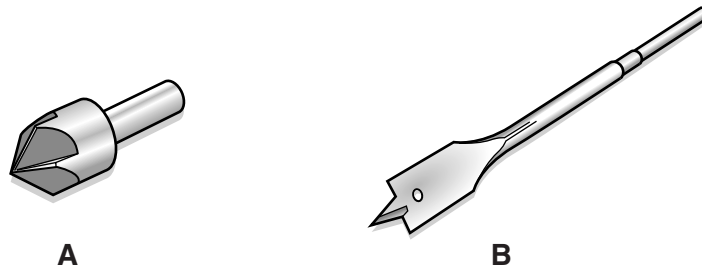


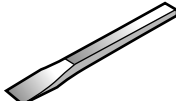

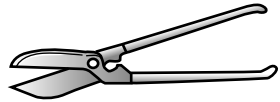
Fig. 5

Name the drill bits **A** and **B** shown in Fig. 5.

**A** .....

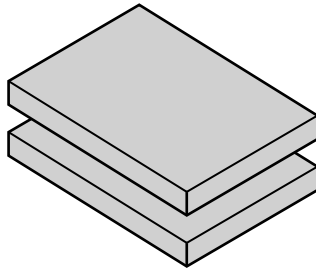
**B** ..... [2]

9 Complete the table by naming each tool or item of equipment used to cut sheet metal.

Tool or item of equipment	Name
	
	
	

[3]

10 Fig. 6 shows two pieces of resistant material.



**Fig. 6**

Name a suitable adhesive that could be used to join the two pieces of material shown above when made from:

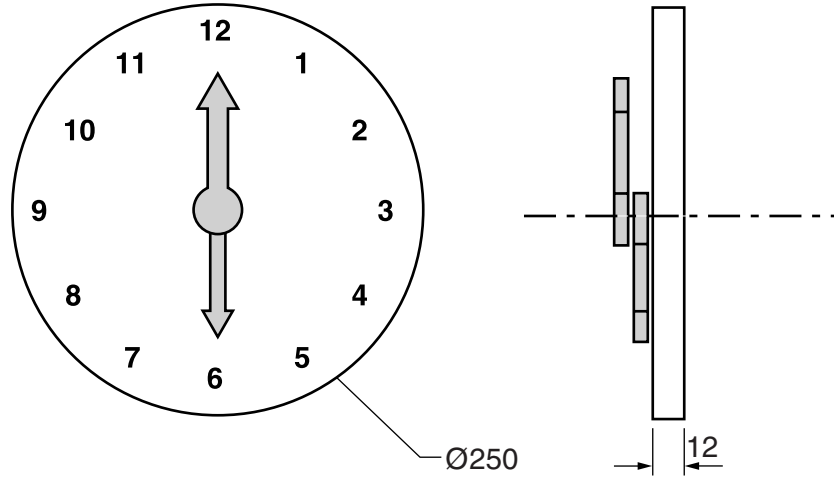
(a) pine .....

(b) steel ..... [2]

**Section B**

Answer **one** question in this section.

- 11** Fig. 7 shows views of a clock used to teach children how to tell the time. The clock face is made from plywood and the clock hands are made from acrylic. The clock hands will be moved by the teacher.



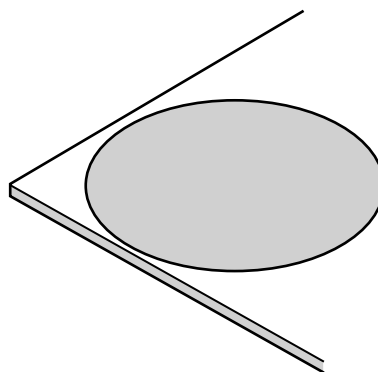
**Fig. 7**

- (a)** Give **two** specification points for the clock.

1 .....

2 ..... [2]

- (b) (i)** Fig. 8 shows the clock face marked out on a sheet of 12 thick plywood. The shape will be cut out using a jigsaw.



**Fig. 8**

Give **two** safety precautions that must be taken when using a jigsaw.

1 .....

2 ..... [2]



(ii) Describe how the shape could be made round and the edges made smooth after it has been cut out with a jigsaw.

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

(c) Fig. 9 shows one clock hand marked out on 5 thick acrylic.

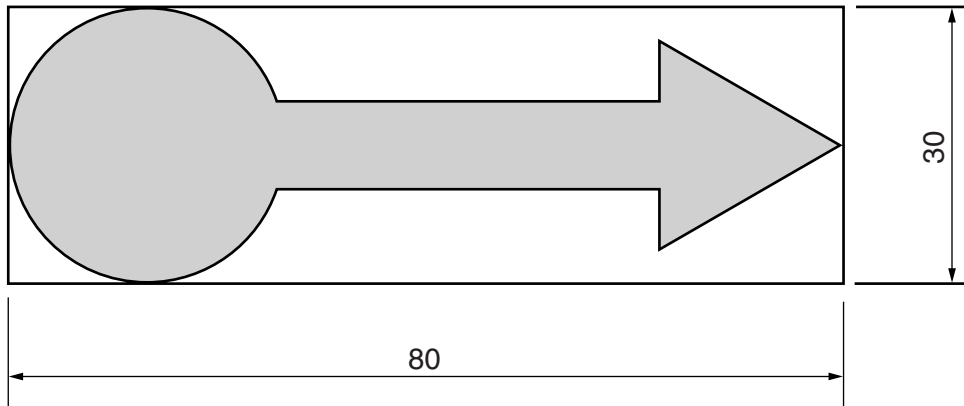


Fig. 9

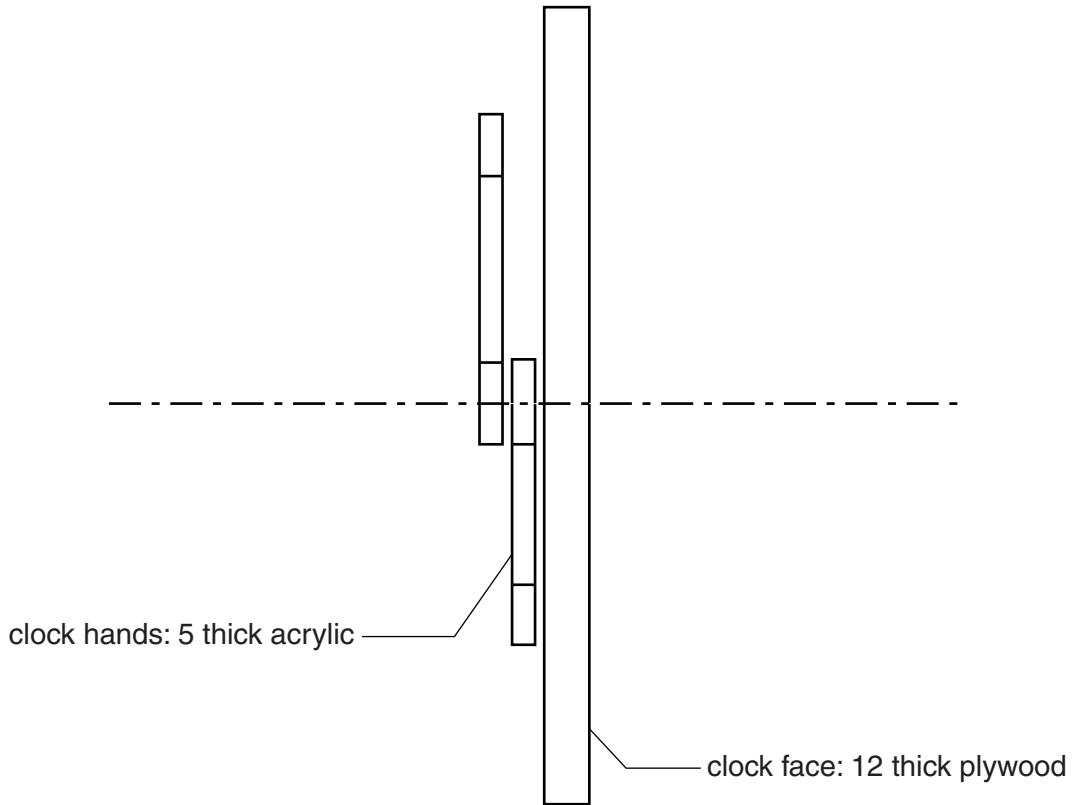
Use sketches and notes to show how the clock hand could be cut out and the edges finished to a high quality.

[4]

(d) Give **one** benefit of using acrylic for the clock hands.

..... [1]

- (e) Add sketches and notes to the drawing below to show how the clock hands could be fitted to the clock face.  
The teacher must be able to move the clock hands.



[3]

- (f) The numbers on the clock face could be designed by CAD (Computer Aided Design) and made using CAM (Computer Aided Manufacture).  
Give **one** benefit of using:

CAD to design the numbers;

..... [1]

CAM to make the numbers.

..... [1]

- (g) Use sketches and notes to show how the clock could be made to stand on its own. Include details of materials, constructions and fittings used.

[5]

- (h) Use sketches and notes to show how the clock could be made to fit to a wall instead of standing on its own. Include details of materials, constructions and fittings used.

[4]

12 Fig. 10 shows a wall-mounted shelf unit.

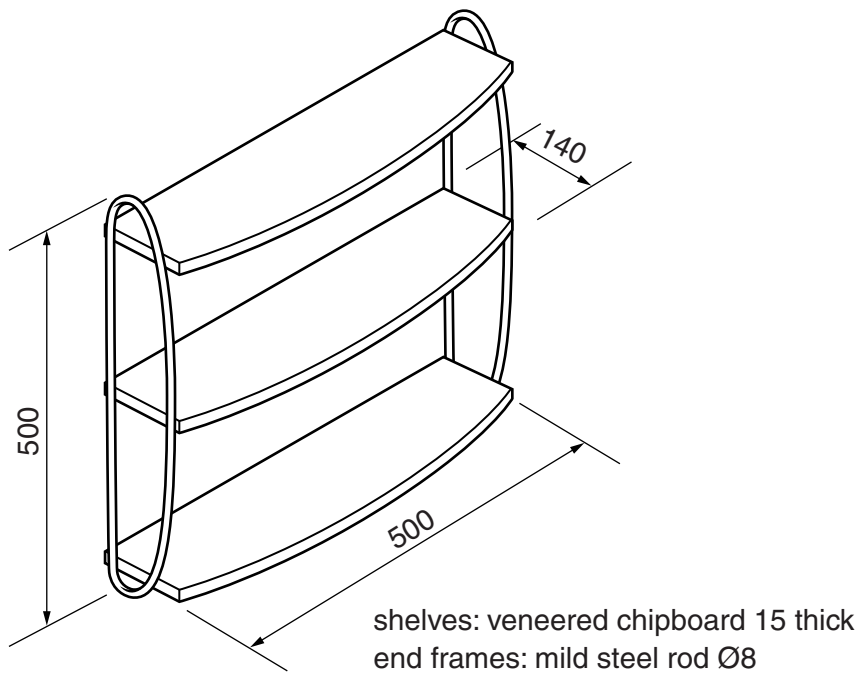


Fig. 10

(a) Give **two** advantages of using veneered chipboard rather than solid wood for the shelves of the wall-mounted shelf unit.

- 1 .....
- 2 ..... [2]

(b) Fig. 11 shows a wooden former around which the mild steel rod will be bent to the shape of the end frame.

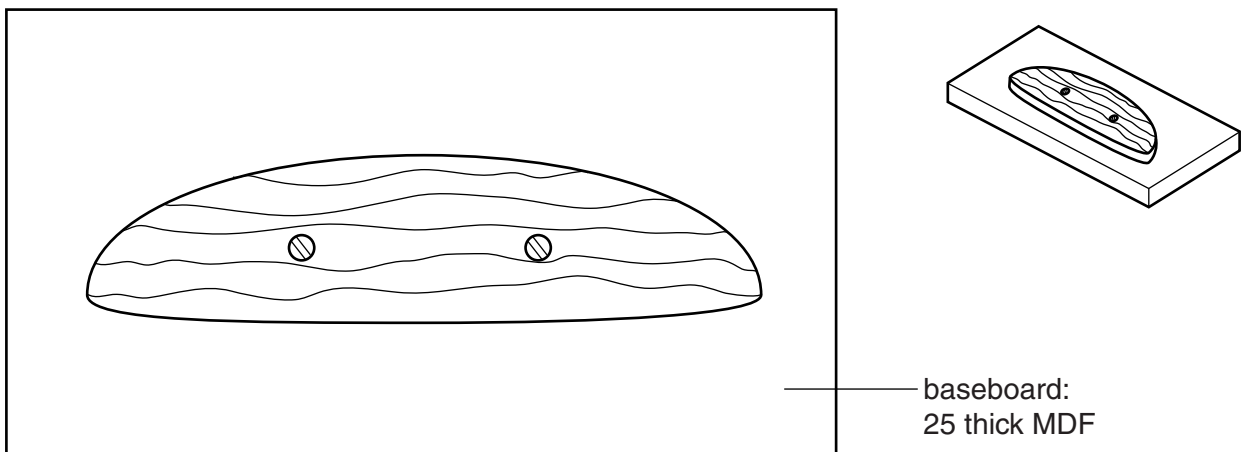


Fig. 11

(i) Add sketches and notes to Fig. 11 to show how the mild steel rod could be held against the former while it is bent to shape. [3]

- (ii) When shaping the mild steel rod it can become work hardened. Explain what is meant by the term 'work hardened'.

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

- (c) Fig. 12 shows the two ends of a length of Ø8 mild steel rod. The mild steel rod has been bent to the shape of the end frame. The ends will be brazed together.

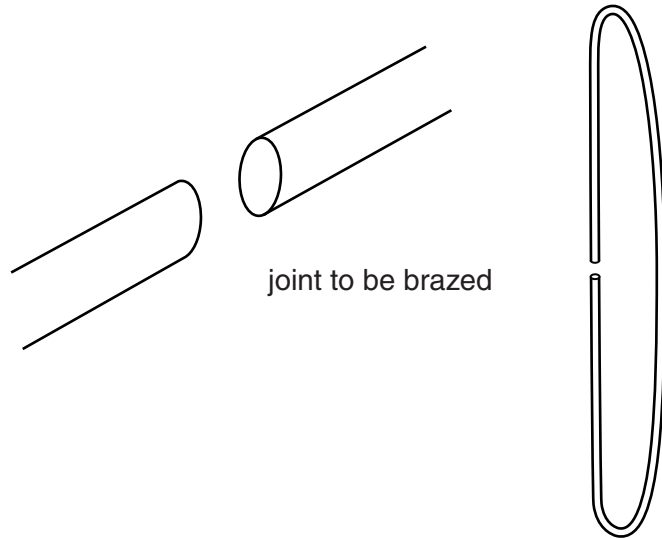


Fig. 12

Use sketches and notes to show how the ends of the mild steel rod could be brazed together. Include details of how the ends would be prepared before they are brazed.

- (d) Use sketches and notes to show how the veneered chipboard shelves could be fixed to the end frames made from mild steel rod. Additional materials, fittings and fixings may be used.

[6]

- (e) Give **one** reason why each of the materials used to make the wall-mounted shelf unit shown in Fig. 10 could be considered to be environmentally friendly.

Mild steel ..... [1]

Veneered chipboard ..... [1]

- (f) Fig. 13 shows a wall-mounted shelf unit with veneered chipboard sides rather than mild steel end frames.

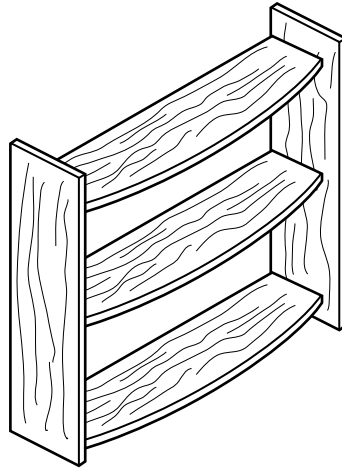


Fig. 13

Give **two** reasons why the designer has decided to use veneered chipboard sides rather than mild steel end frames.

1 .....

2 ..... [2]

13 Fig. 14 shows views of an incomplete design for a towel holder made mainly from oak.

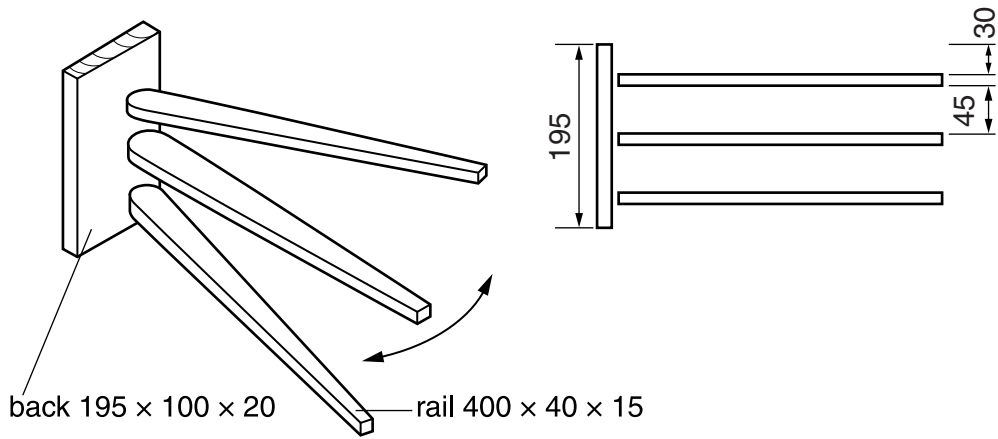


Fig. 14

(a) Give **two** properties of oak that make it suitable for the towel holder.

- 1 .....
- 2 ..... [2]

(b) Fig. 15 shows details of one rail marked out, ready to be shaped.

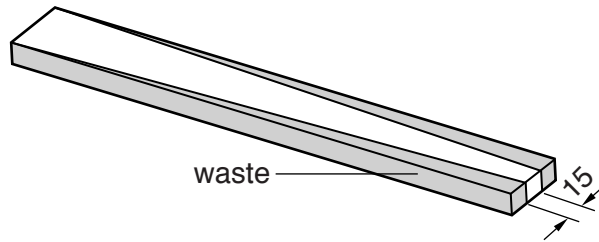


Fig. 15

Use sketches and notes to show how the waste wood could be removed and the surfaces made flat and smooth. Include details of how the rail would be supported while it is shaped.

[5]



- (c) Use sketches and notes to show how **all** the rails could be:
- connected to the back of the towel holder;
  - allowed to swing as shown in Fig. 14;
  - spaced apart.
- Include details of materials, constructions and fittings used.

[8]

- (d) Use sketches and notes to show how the towel holder could be fitted to a wall. Holes must not be drilled in the front of the towel holder. Include details of materials, constructions and fittings used.

[5]

(e) (i) Give **two** reasons why a clear polyurethane varnish would be a suitable finish for the towel holder.

1 .....

2 ..... [2]

(ii) Describe **three** stages to prepare the parts of the towel holder to take a clear polyurethane varnish finish.

1 .....

2 .....

3 ..... [3]



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