



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

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**DESIGN AND TECHNOLOGY**

**0445/32**

Paper 3 Resistant Materials

**May/June 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 dark 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.

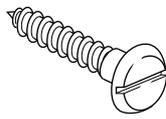
The total of the marks for this paper is 50.

This document consists of **17** printed pages and **3** blank pages.

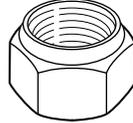
**Section A**

Answer **all** questions in this section.

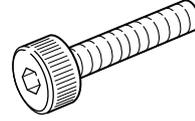
- 1 Name **three** different tools that would be used to tighten each of the fastenings **A**, **B** and **C** shown below.



**A**



**B**



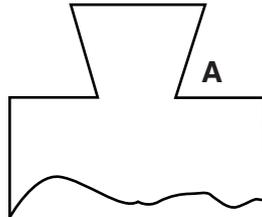
**C**

**A** .....[1]

**B** .....[1]

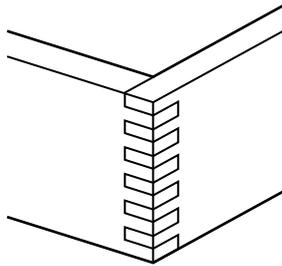
**C** .....[1]

- 2 Add to the drawing below to show how a bevel edge chisel would be used to cut out corner **A**.

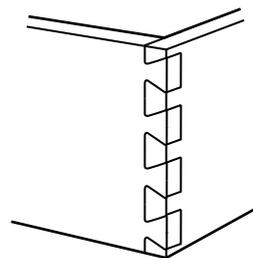


[2]

- 3 Fig. 1 shows two wood joints.



**A**



**B**

**Fig. 1**

- (a) Name the joints **A** and **B** shown in Fig. 1.

**A** .....

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

- (b) Give **one** reason why joint **B** is stronger than joint **A**.

.....[1]

4 Name the **two** standard metal sections shown below.



..... [2]

5 Fig. 2 shows a metal handle with a textured finish on its edge.

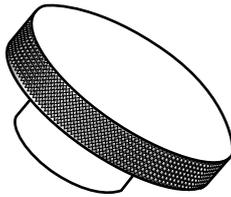


Fig. 2

(a) Give the correct name for the textured finish.

.....[1]

(b) State the purpose of the textured finish.

.....[1]

(c) Name the machine used to produce the textured finish.

.....[1]

6 Fig. 3 shows a lap joint marked out. Lines **A** and **B** have been marked out using two different gauges.

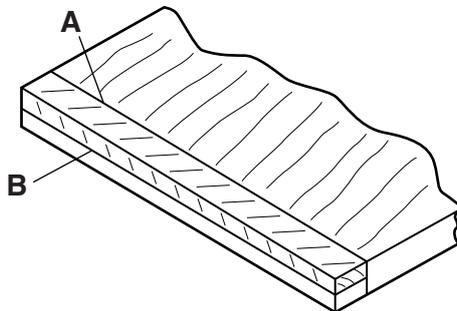


Fig. 3

Name the gauge used to mark out each line.

**A** .....

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

7 Fig. 4 shows a car shell made from carbon fibre reinforced plastic (CFRP).

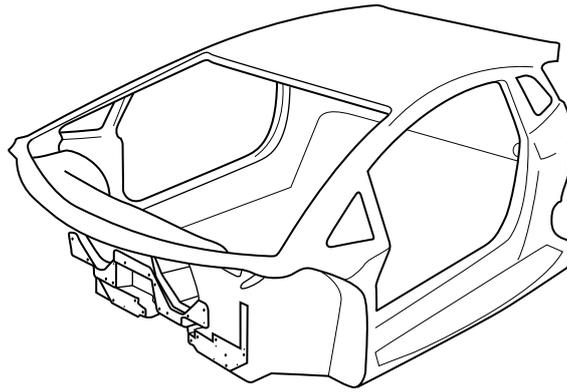


Fig. 4

Give **two** advantages of using carbon fibre reinforced plastic (CFRP) rather than steel for the car shell.

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

8 Fig. 5 shows a child’s sit-on toy made from wood.

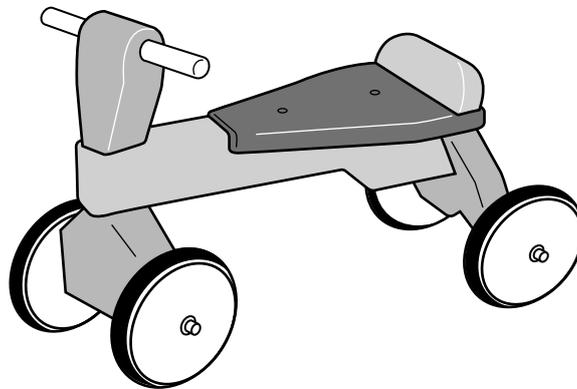
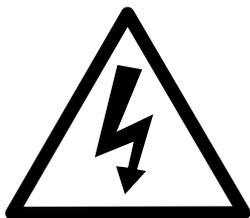


Fig. 5

Describe **three** ways in which the designer has made the sit-on toy suitable for children.

- 1 .....
- 2 .....
- 3 .....[3]

9 State what is meant by each safety symbol shown below.



.....[1]



.....[1]

10 Complete the table below by naming a different metal that matches each of the properties given.

Name of metal	Property
	malleable
	corrosion resistant
	electrical conductivity

[3]

## Section B

Answer **one** question in this section.

- 11 Fig. 6 shows an incomplete design for a book stand made from hardwood. The book stand has two main parts: the frame and the ledge.

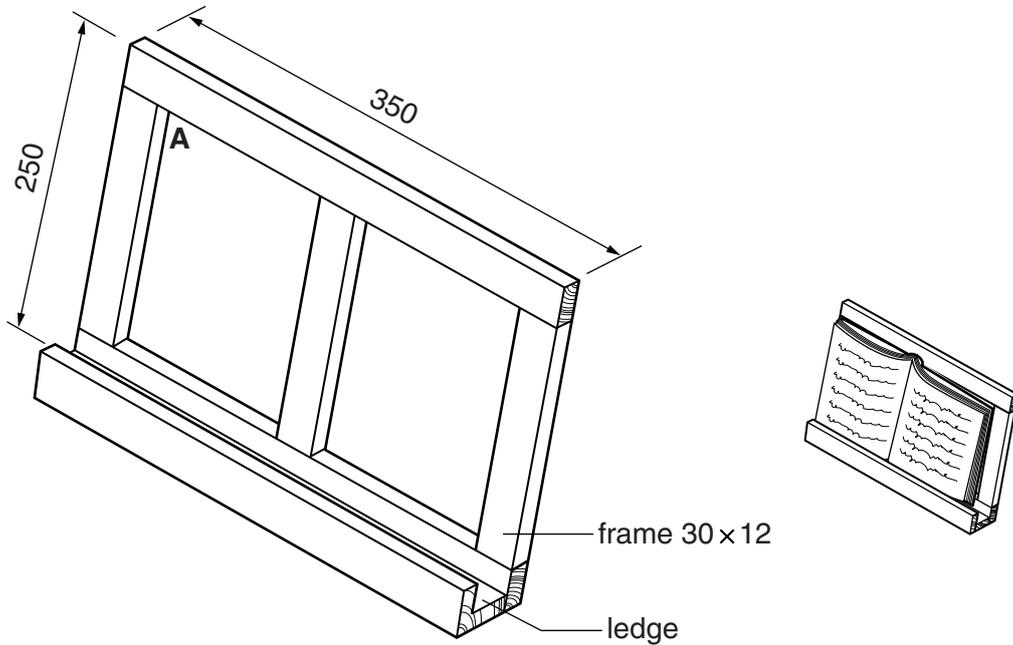


Fig. 6

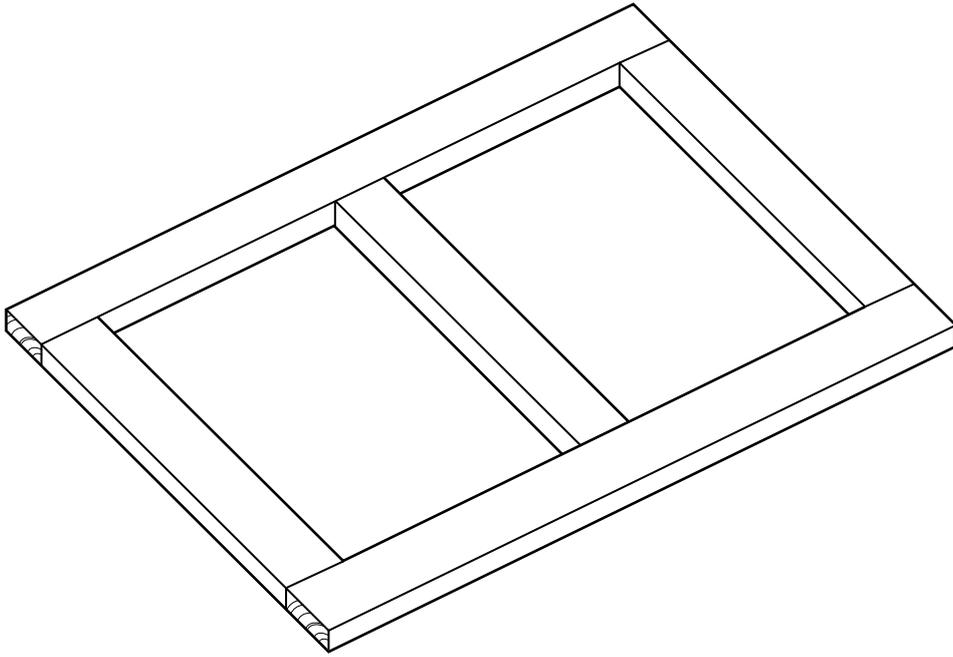
- (a) Give **two** advantages of using a frame made from separate pieces of hardwood for the book stand rather than one solid piece of wood.

1 .....

2 .....[2]

- (b) Sketch and name a suitable joint at **A** in Fig. 6.

(c) Fig. 7 shows the frame ready to be clamped and glued together.



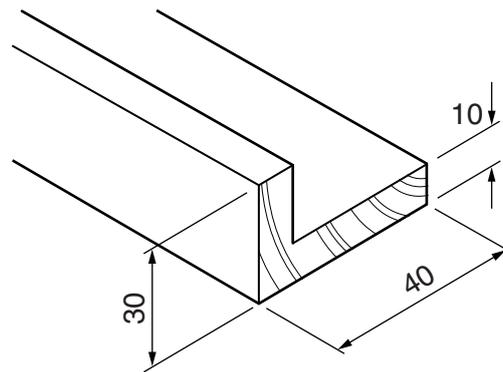
**Fig. 7**

- (i) Add sketches and notes to Fig. 7 to show how the frame would be clamped while the glue sets. Name the type of cramps used. [3]
- (ii) Use sketches and notes to show how the outside edges would be planed and the surfaces prepared to take a clear varnish finish.

[4]

8

(d) Fig. 8 shows details of the ledge.



**Fig. 8**

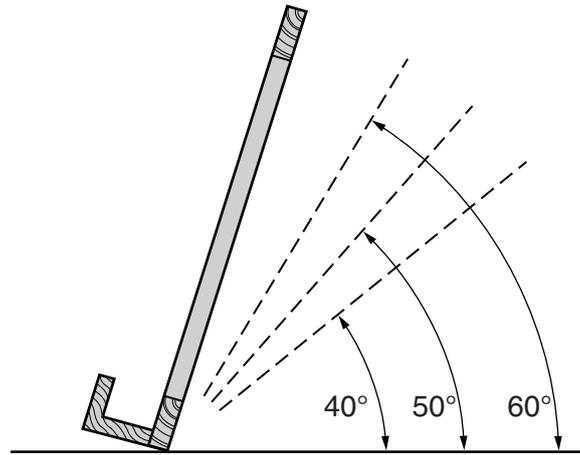
Use sketches and notes to show how the ledge could be attached to the frame as shown in Fig. 6.

[2]

(e) When a book is placed on the book stand the book does not always stay open at the required page.  
Use sketches and notes to show a modification to the design so that the book stays open.  
Include details of materials and/or fittings used.

[4]

(f) Fig. 9 shows a side view of the book stand.



**Fig. 9**

Use sketches and notes to show how the book stand could be adjusted to **three** different positions as shown above.  
Include details of materials, constructions and fittings used.

[6]

12 Fig. 10 shows a child's shape sorting toy. The box and shapes are made from beech. The top is made from acrylic.

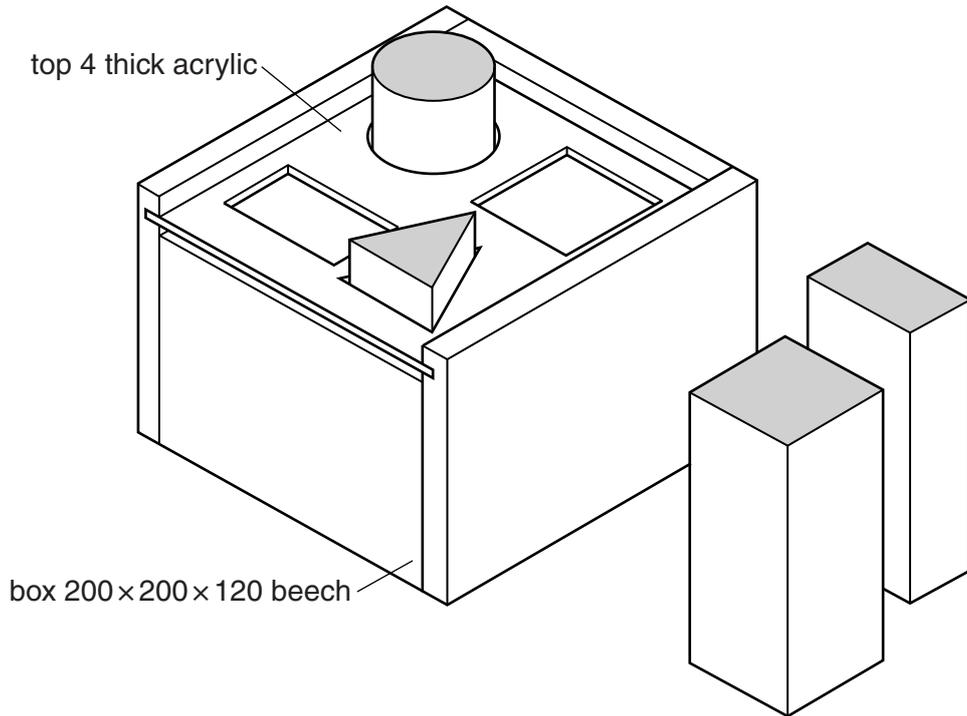


Fig. 10

(a) Give **two** reasons why beech is often used to make children's toys.

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

(b) Fig. 11 shows the acrylic top with the shapes marked out.

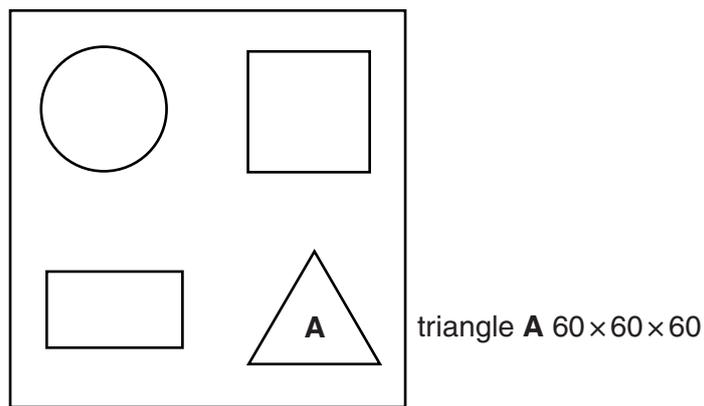


Fig. 11

(i) Name a tool that would be used to mark the shapes on the surface of the acrylic.

- ..... [1]

- (ii) Use sketches and notes to show how triangle shape **A** could be cut out from the acrylic top and the edges made flat and smooth.

[4]

- (iii) When working with acrylic there is a possibility that it could crack. Describe **two** processes where this could occur and how the problem can be solved.

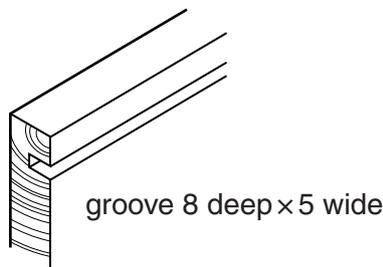
Process .....

Solution .....

Process .....

Solution .....[4]

- (c) Fig. 12 shows part of the groove that allows the acrylic top to be removed.

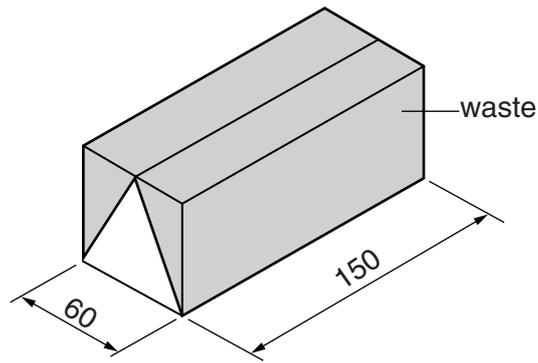


**Fig. 12**

Use sketches and notes to show how the groove could be produced.

[3]

(d) Fig. 13 shows the triangular shape **A** marked out on a length of beech.

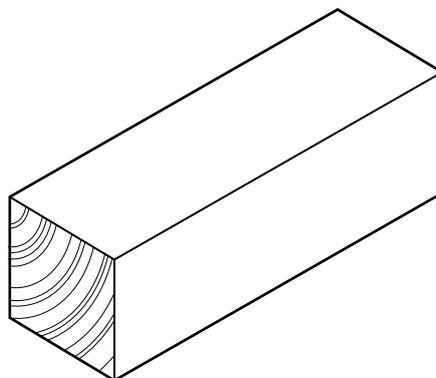


**Fig. 13**

Use sketches and notes to show how the triangular shape could be produced.  
Name all the tools and equipment used.

[4]

(e) Fig. 14 shows a length of beech that will be used to make the round shape.  
The round shape will be produced by turning between-centres on a wood turning lathe.



**Fig. 14**

Add sketches and notes to Fig. 14 to show how the beech would be prepared **before** it is set up on a wood turning lathe. [3]

(f) Fig. 15 shows hollow section plastic shapes that could also be used in the shape sorting toy.

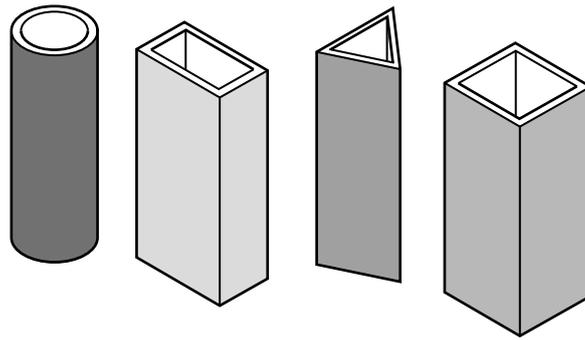


Fig. 15

(i) Give **three** advantages of using plastic rather than beech for the shapes.

- 1 .....
- 2 .....
- 3 .....[3]

(ii) Name a process that could be used to produce the hollow plastic shapes in quantity.

.....[1]

- 13 Fig. 16 shows a wall-mounted key rack. The front of the key rack and the key fob are made from 1.5 thick aluminium sheet. The back is made from 12 thick MDF.

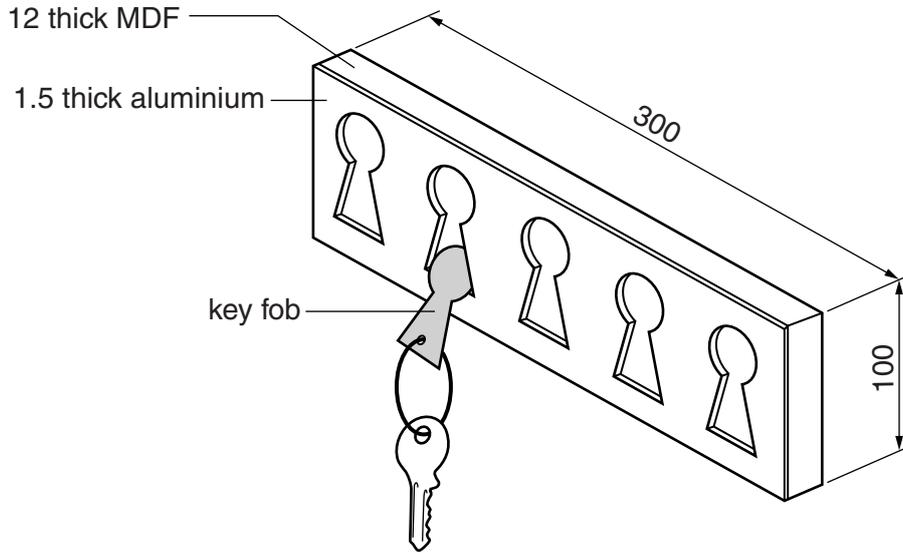


Fig. 16

- (a) (i) Fig. 17 shows the keyhole shapes marked out on aluminium sheet.

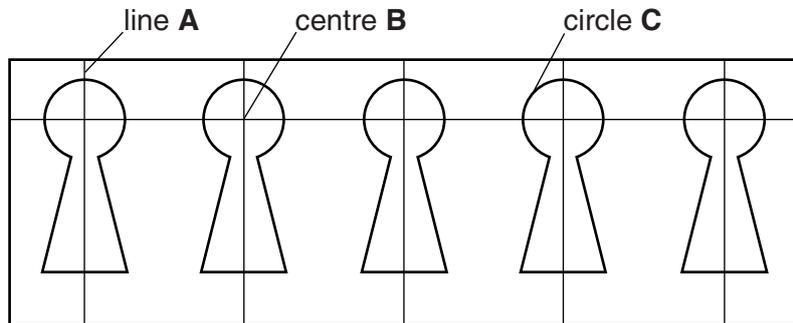


Fig. 17

Name a marking out tool that would be used to mark out:

line **A** .....

centre **B** .....

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

- (ii) Name a product that can be painted onto the surface of metal to make the marking out stand out more clearly.

.....[1]

(b) Fig. 18 shows details of one of the keyhole shapes.

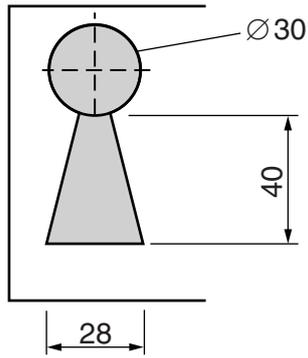


Fig. 18

Use sketches and notes to show how **one** of the keyhole shapes could be cut out and the edges made smooth. Name all the tools and equipment used.

[4]

(c) (i) Describe the process of self-finishing the aluminium to produce a polished surface.

.....

.....

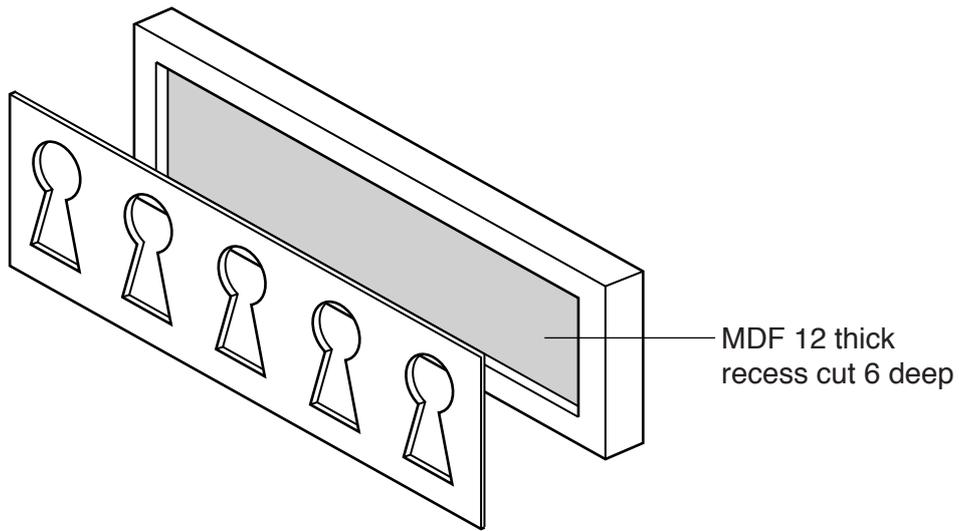
.....

.....[3]

(ii) Aluminium can be anodised.  
Give **one** reason for anodising the surface of aluminium.

.....[1]

(d) Fig. 19 shows an exploded view of the key rack.



**Fig. 19**

(i) Name **two** tools or items of equipment that could be used to cut out the recess shown in Fig. 19.

1 .....

2 .....[2]

(ii) Use sketches and notes to show how the front and back could be joined using an adhesive.  
Name a suitable adhesive and show how the parts are held together while the adhesive sets.

[3]

(e) Give **two** benefits of using CAM (Computer Aided Manufacture) to make the key rack.

1 .....

2 ..... [2]

(f) Use sketches and notes to show how the key rack could be fitted to a wall.  
Screw holes must not be visible in the front of the key rack.  
Include details of materials, constructions and fittings used.

[4]

(g) Describe **one** environmental impact of using aluminium in products.

.....

..... [2]





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