

CANDIDATE
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DESIGN AND TECHNOLOGY

0445/32

Paper 3 Resistant Materials

October/November 2018

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 **19** printed pages and **1** blank page.

Section A

Answer **all** questions in this section.

1 Fig. 1 shows a length of wood marked to the required width.

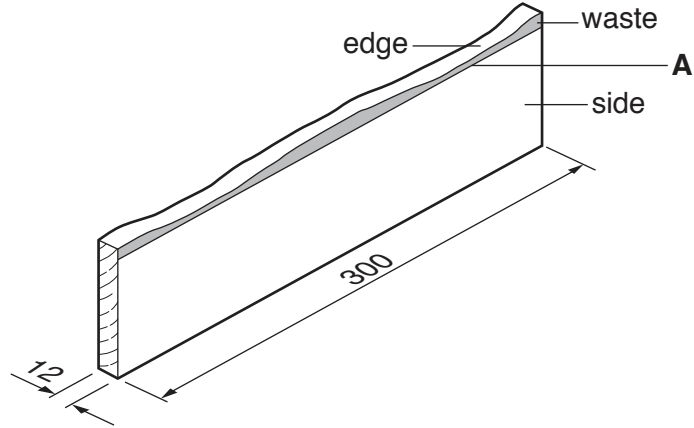


Fig. 1

(a) Name a tool, other than a pencil and steel rule, that could be used to mark the line **A**.

..... [1]

(b) Name a plane that could be used to remove the waste.

..... [1]

2 Fig. 2 shows a variety of different plastic tubes.

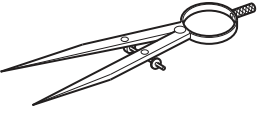
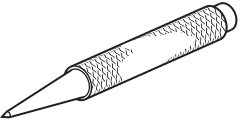


Fig. 2

Name the process used to make the plastic tubes.

..... [1]

3 Complete the table below by naming each tool and describing a specific use for each.

Tool	Name	Use
		
		

[4]

4 Fig. 3 shows two pieces of wood that will be joined together using a biscuit joint.

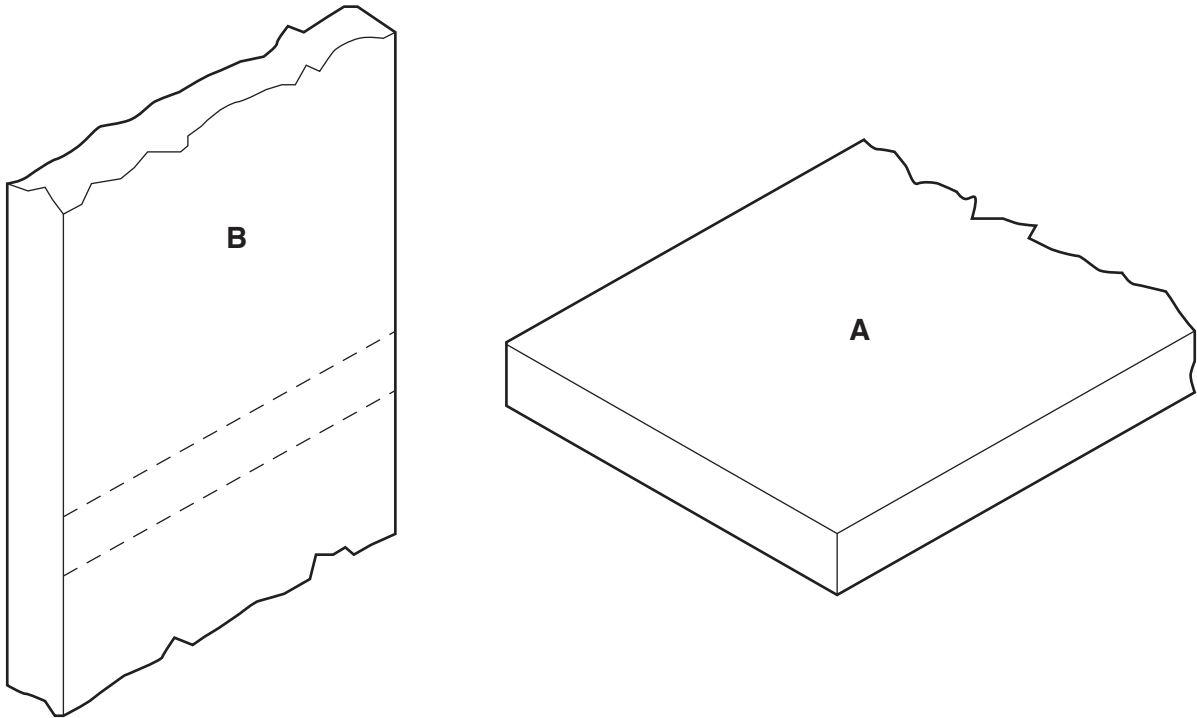


Fig. 3

Draw on Fig. 3 to show how **two** biscuits could be used to join **A** to **B**.

[3]

5 Fig. 4 shows three products made from different thermosetting plastics.

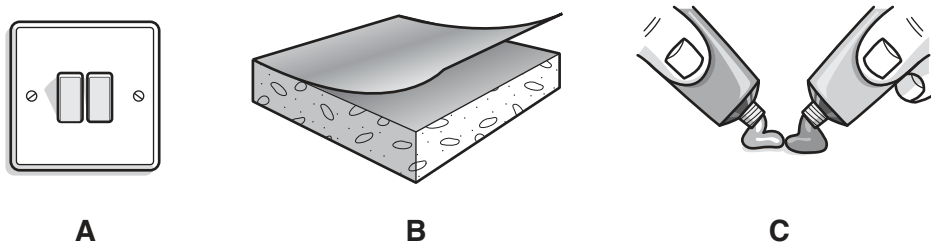


Fig. 4

Name a different thermosetting plastic that could be used to make **each** of the products.

- A Electrical fitting
- B Plastic laminate
- C Two-part adhesive [3]

6 Fig. 5 shows a three jaw and a four jaw chuck that are used with a centre lathe.



Fig. 5

(a) Describe a specific use for a three jaw chuck.

.....
 [1]

(b) Describe a specific use for a four jaw chuck.

.....
 [1]

7 Fig. 6 shows a pair of shin pads used by hockey players. The shin pads are made from a composite material.

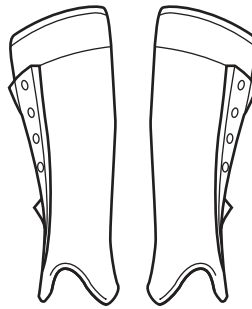


Fig. 6

(a) Name **one** composite material that could be used to make the shin pads.

..... [1]

(b) Describe **two** properties of a composite material that makes it suitable for the shin pads.

1.....

2..... [2]

8 Name the type of soldering that could be used when joining:

(a) electronic components to a circuit board;

..... [1]

(b) nickel silver jewellery.

..... [1]

9 Fig. 7 shows part of a leg and rail of a table and a knock-down (KD) fitting.

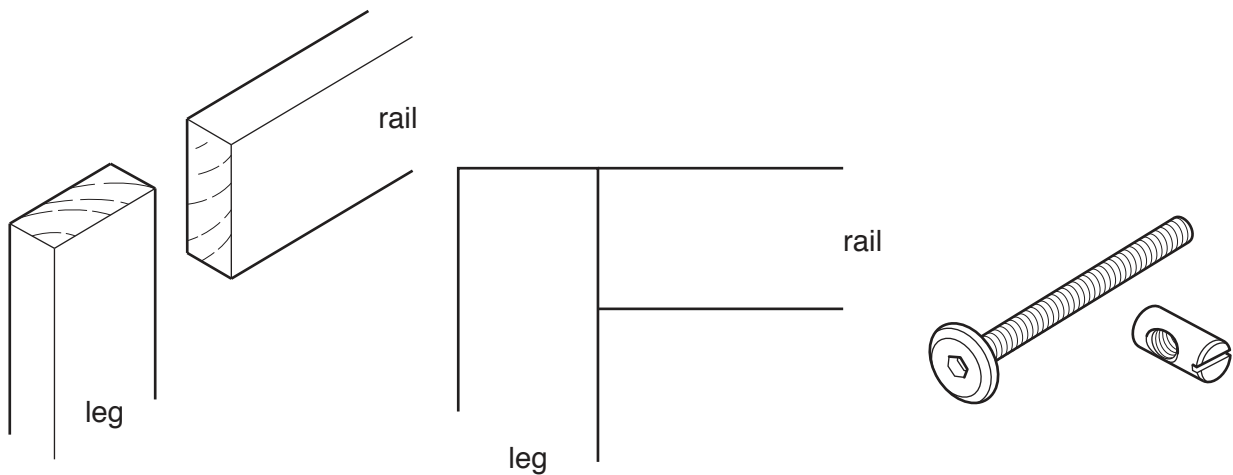


Fig. 7

Draw on Fig. 7 to show how the knock-down (KD) fitting could be fitted to the leg and rail to make a strong joint. [3]

10 Fig. 8 shows a process used to make a plastic bowl.

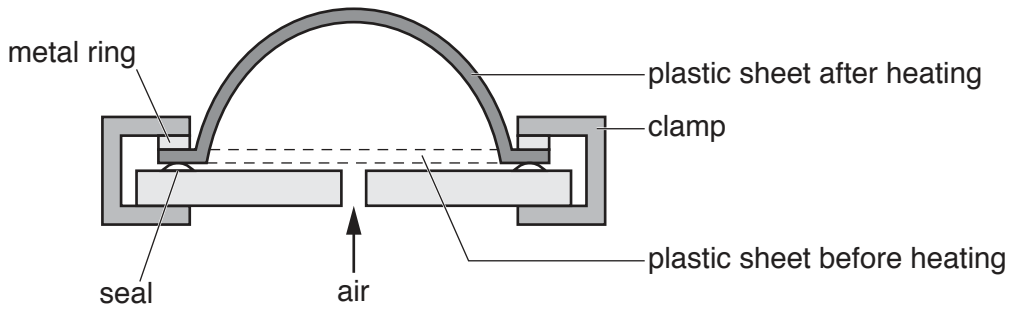


Fig. 8

(a) Name the process shown in Fig. 8.

..... [1]

(b) Add to Fig. 8 to show how the bowl could be produced with a flat bottom. [1]

Section B

Answer **one** question in this section.

- 11 Fig. 9 shows views of a toothbrush holder made from 4 mm thick acrylic.

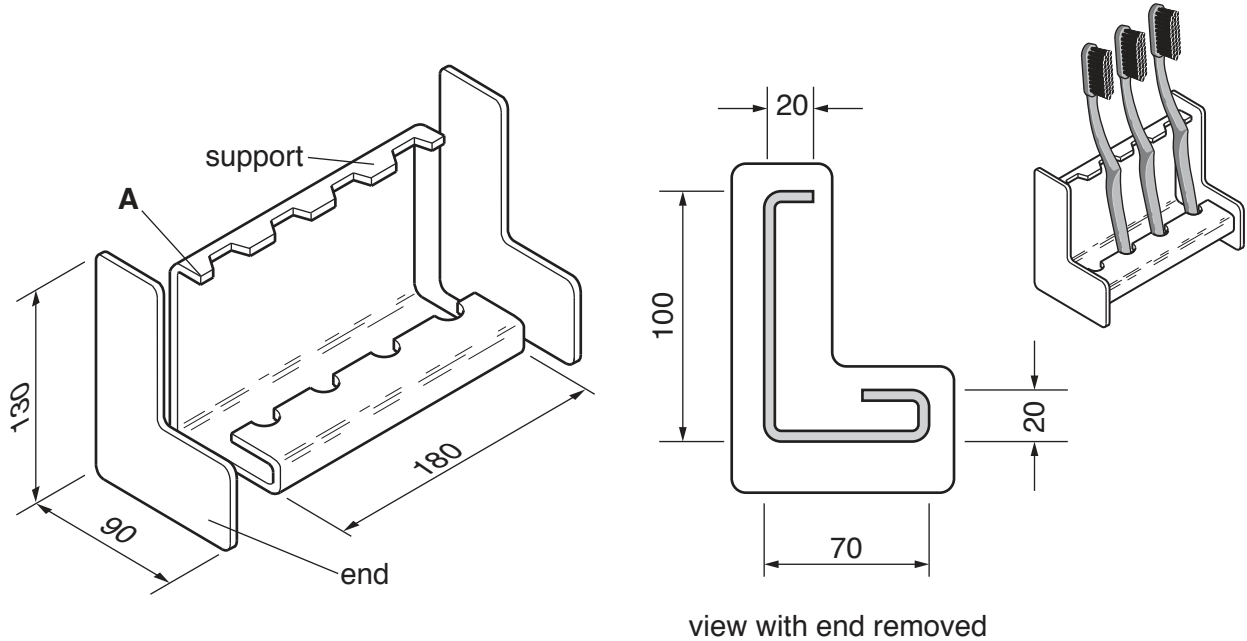


Fig. 9

- (a) Fig. 10 shows a sheet of acrylic on which the development (net) of the support will be marked out. Corner **A** is shown in Figs. 9 and 10.

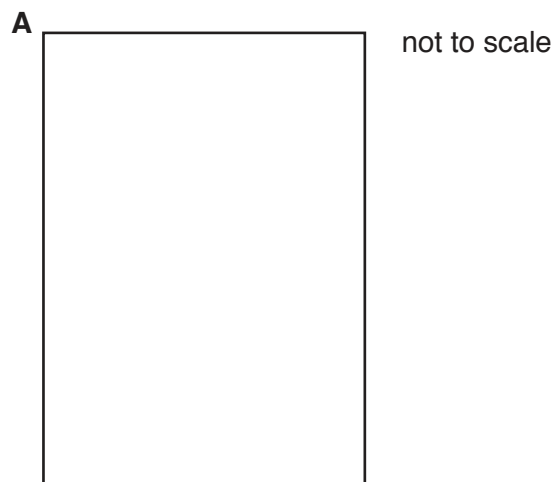


Fig. 10

- (i) Draw on Fig. 10 to show **all** the bend lines. [4]
- (ii) From the list below circle **one** item of equipment used to mark the bend lines on the surface of the acrylic.

lead pencil biro scriber felt marker marking knife [1]

(b) Use sketches and notes to show how the development (net) could be bent to shape. Include the following details:

- the method of softening the acrylic
- the method of producing an accurate shape

[5]

(c) Fig. 11 shows one end marked out, ready to be cut to shape.

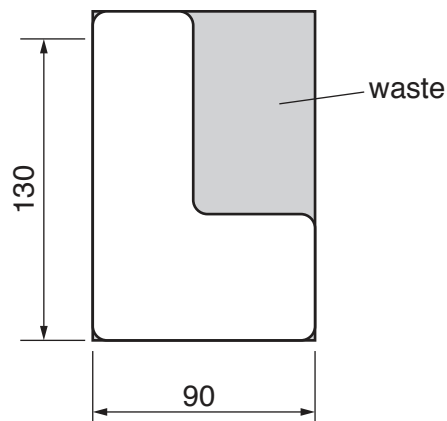


Fig. 11

Use sketches and notes to show how the waste could be removed and the rounded corners produced. Name **all** the tools and equipment used.

[4]

(d) The edges of the ends and support will be self-finished to a high quality before the parts are joined together.

(i) Name the method of filing used to make the edges smooth.

..... [1]

(ii) Explain why two different grades of wet and dry (silicon carbide) paper would be used when self-finishing the edges.

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

(e) The support will be joined to the ends by using acrylic cement.

(i) Describe how the acrylic cement would be applied and how the parts would be held together while the acrylic cement sets.

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

(ii) State why it is important to work in a well-ventilated area when using acrylic cement.

..... [1]

(f) Use sketches and notes to show how the toothbrush holder could be modified so that a tube of toothpaste could be stored.
Describe how the modification could be made in a school workshop.
Name all tools and equipment used.

[5]

12 Fig. 12 shows an incomplete design of a desk. The desk top is made from manufactured board and the legs and rails from hardwood.

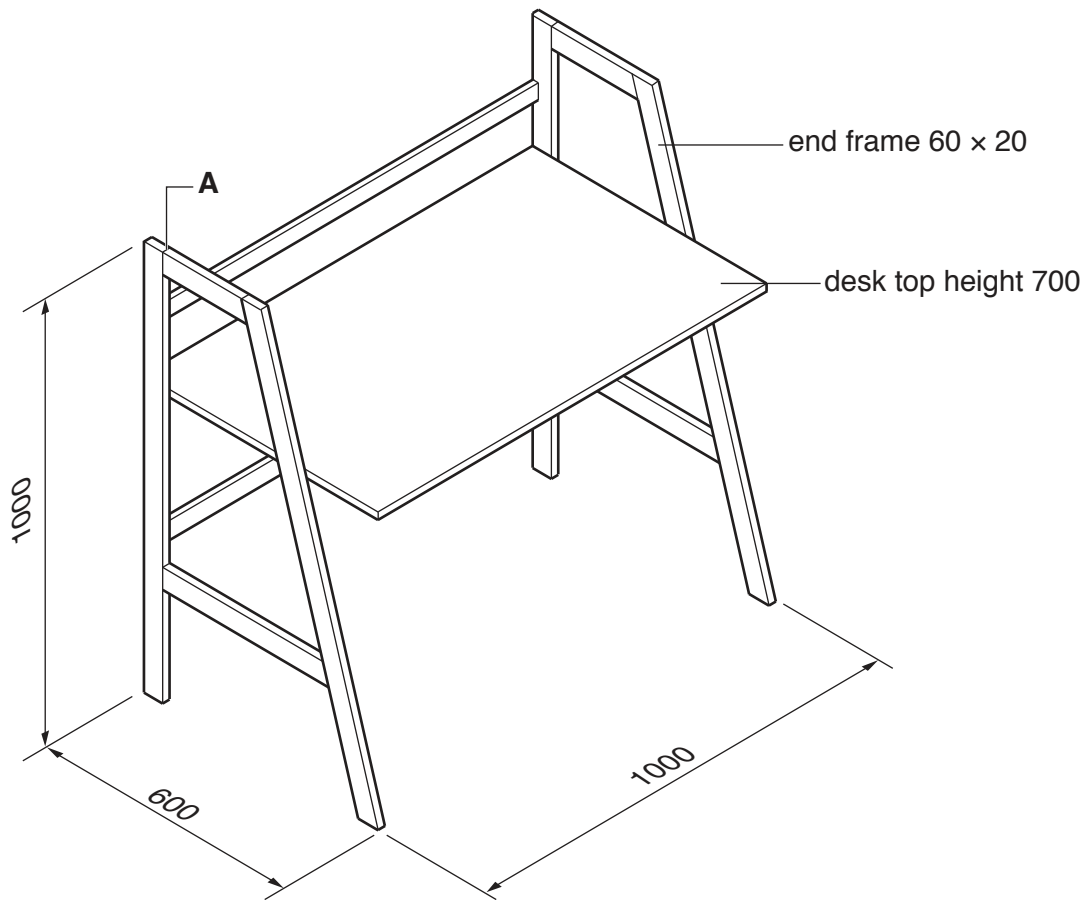
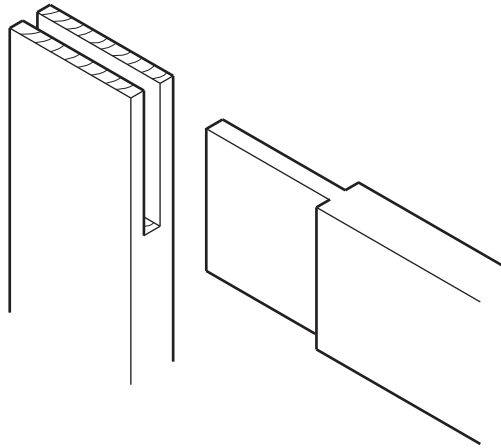


Fig. 12

- (a) (i) Name a suitable manufactured board for the desk top.
 [1]
- (ii) Suggest an appropriate thickness of manufactured board for the desk top.
 [1]
- (iii) Name a suitable hardwood for the legs and rails.
 [1]
- (iv) Complete the statement below by adding the correct term from the list.
mechanisms seasoning anthropometrics sustainability
 The designer decided to make the desk 700 mm high after studying
 [1]

- (b) The corner bridle joint shown below could be used to join the leg and rail at corner **A** in Fig. 12.



- (i) Name **two** marking out tools, other than a pencil, that could be used to mark out the corner bridle joint.

1

2 [2]

- (ii) Name **two** tools that could be used to cut out the corner bridle joint.

1

2 [2]

- (c) Use sketches and notes to show how the desk top could be fixed to the end frames. Include details of constructions and fittings used.

[5]

(d) Fig. 13 shows the legs and rails of one frame ready to be glued and clamped.

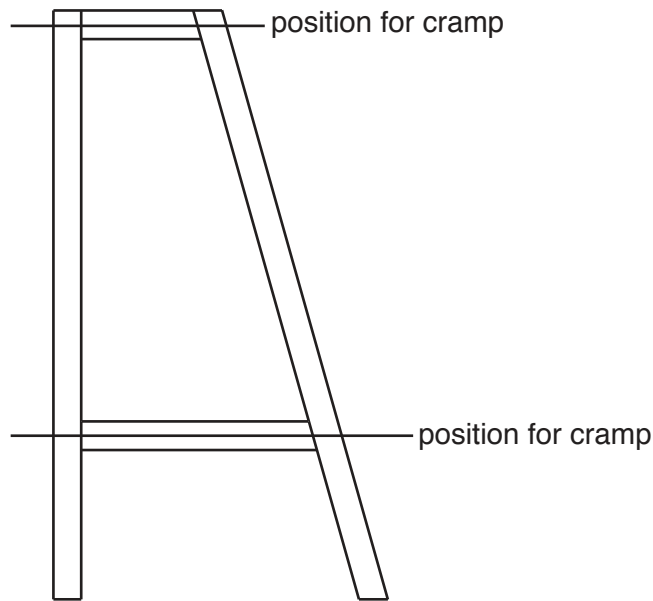


Fig. 13

(i) Name the cramps that would be used to secure the joints.

..... [1]

(ii) Name a suitable adhesive that could be used to glue the joint together.

..... [1]

(iii) Describe **two** checks that would need to be carried out when the legs and rails are glued and clamped together.

1

2 [2]

- (e) Fig. 14 shows the shape of one end frame marked out on a sheet of manufactured board. The end frame will be cut out of the sheet of manufactured board rather than using separate legs and rails.

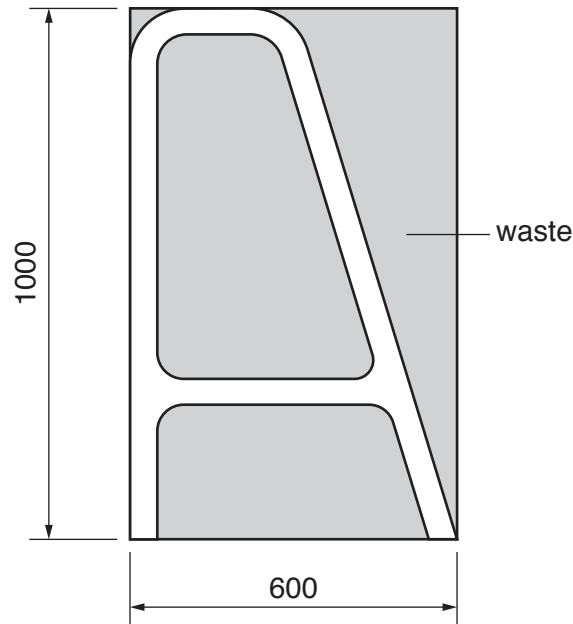


Fig. 14

- (i) Give **one** advantage and **one** disadvantage of making the end frame from one piece of manufactured board rather than separate legs and rails.

Advantage

.....

Disadvantage

..... [2]

- (ii) Name a portable power tool that could be used to cut out the shape of the end frame.

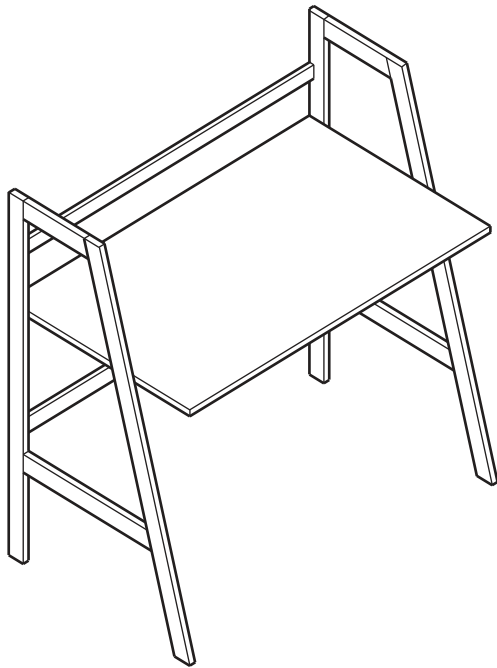
..... [1]

- (iii) Describe **two** safety precautions, other than personal protection equipment, that must be taken when using portable power tools.

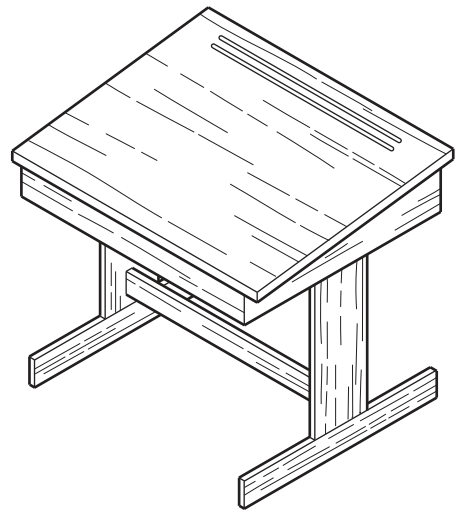
1

2 [2]

(f) Fig. 15 shows two desks. Desk **A** is a modern desk and desk **B** is a traditional design.



A



B

Fig. 15

Explain why the design of the desk has changed.

.....

.....

.....

..... [3]

13 Fig. 16 shows a wall-mounted adjustable shelving system.

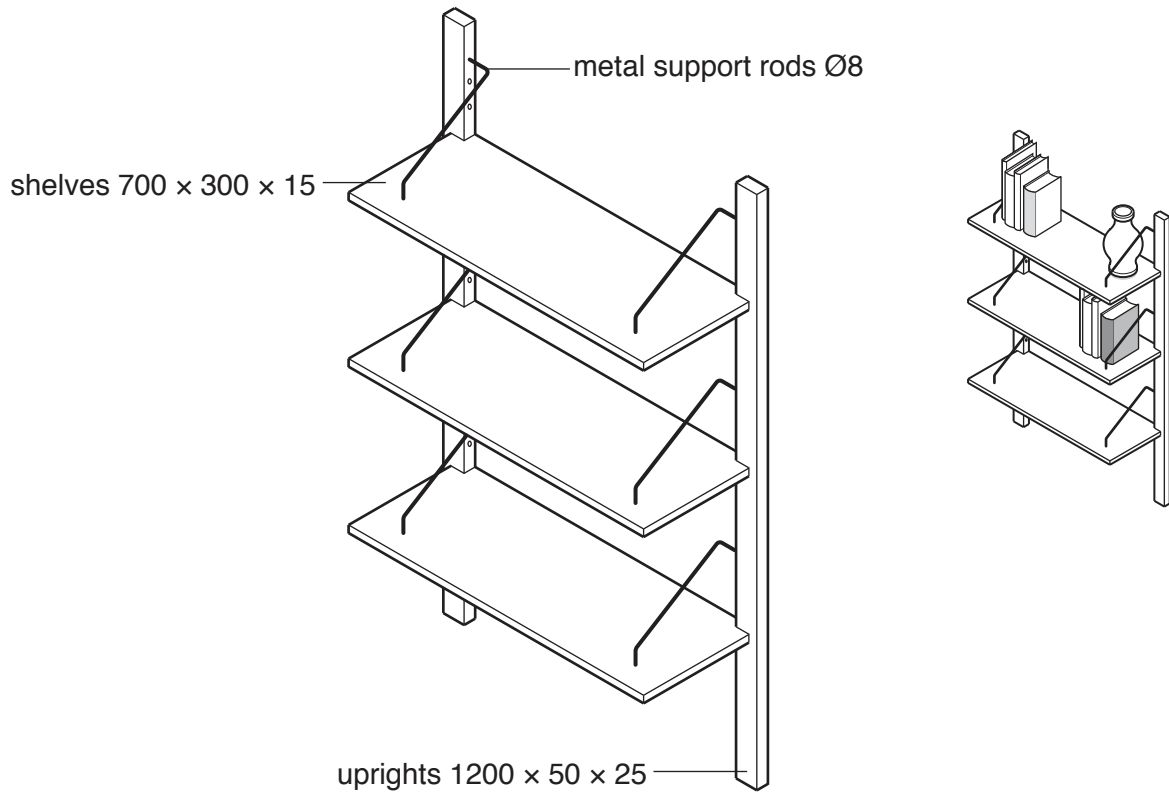


Fig. 16

(a) Name suitable specific materials for the parts of the shelving system:

- hardwood uprights
- metal support rods
- manufactured board shelves [3]

(b) The manufactured board used for the shelves is veneered.

(i) Give **one** benefit of covering the manufactured board with veneer.

..... [1]

(ii) Give **one** drawback of covering the manufactured board with veneer.

..... [1]

(c) Fig. 17 shows part of one upright with the centres for $\text{Ø}8$ holes marked out.

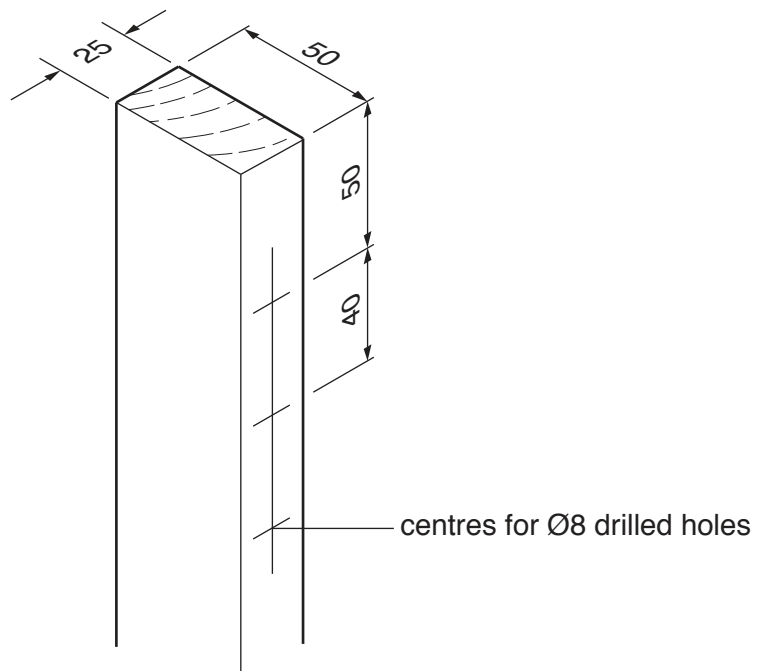


Fig. 17

Use sketches and notes to show a design for a jig to allow **three** holes to be drilled accurately. Include details of materials used.

[5]

(d) Fig. 18 shows details of one metal support rod.

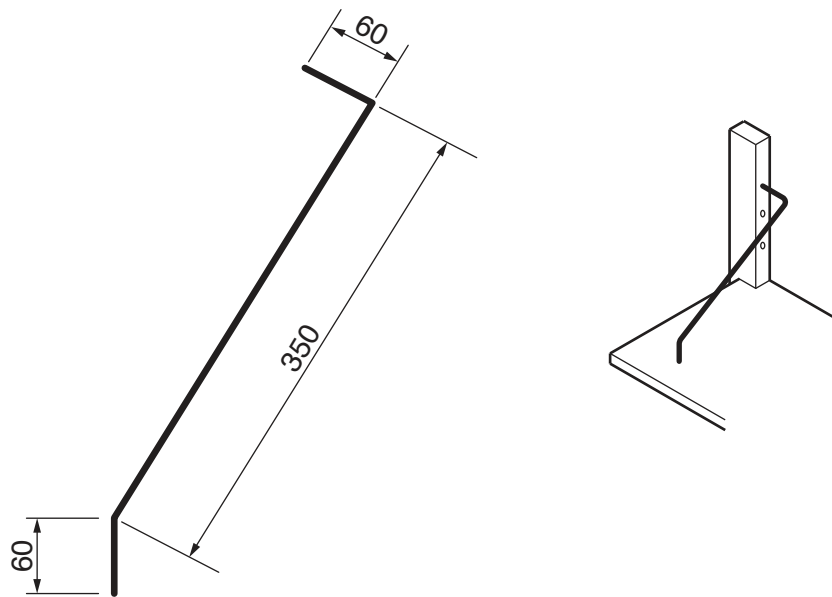


Fig. 18

Use sketches and notes to show how the **two** bends in the support could be produced.

[4]

(e) The metal support rods will have a clear lacquer finish.
Describe how the metal could be prepared **before** applying clear lacquer.

.....

.....

.....

..... [3]

(f) Fig. 19 shows one corner of a shelf marked out ready to be cut out to take the upright.

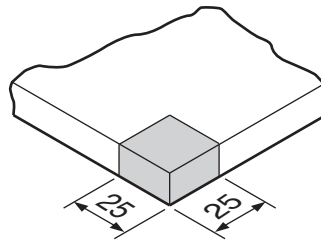


Fig. 19

(i) Name **one** marking out tool, other than a pencil and a steel rule, that could be used to mark out the shape.

..... [1]

(ii) Name a back saw that could be used to cut out the shape.

..... [1]

(g) Fig. 20 shows one metal support rod that fits into a $\text{Ø}8$ hole in a shelf.
Use sketches and notes to show how the metal support rod could be fixed to the shelf to support the weight when in use.

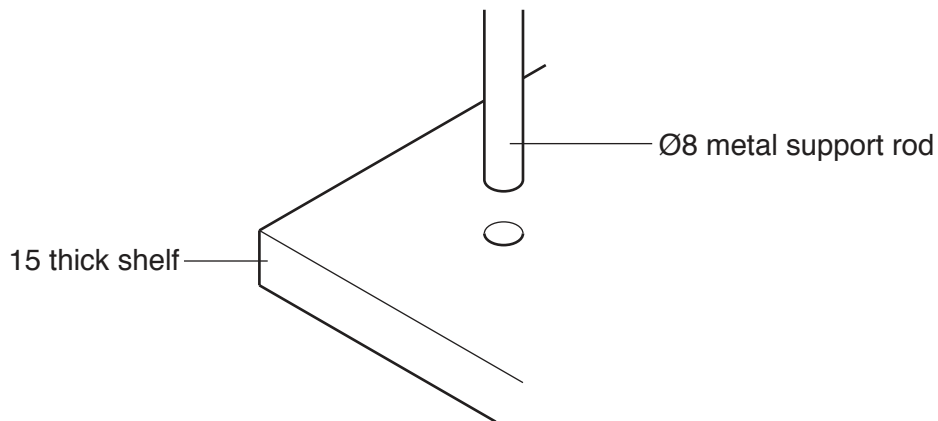


Fig. 20

[4]

(h) Describe **two** good design features of the shelving system.

1.....

2..... [2]

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