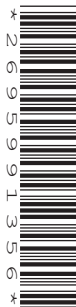


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## 0445/31

May/June 2018

**1 hour**

No Additional Materials are required.

## READ THESE INSTRUCTIONS FIRST

DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions in this section.

Answer **one** question in this section.

You may use a calculator.

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 a tool box made from plastic and a symbol found on the tool box.

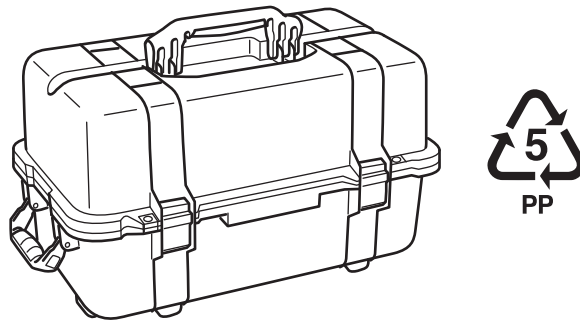


Fig. 1

- (a) Name the plastic.

.....[1]

- (b) Give **one** benefit of using this plastic for the tool box.

.....[1]

- 2 Fig. 2 shows a try square being used to test an edge for squareness.

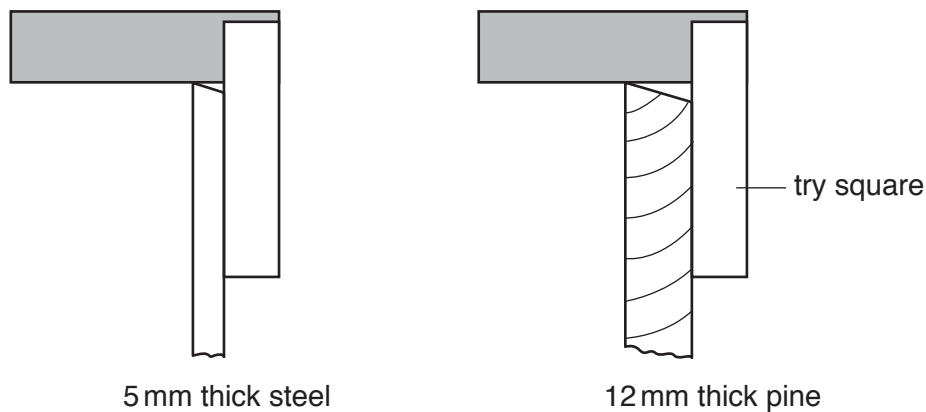


Fig. 2

Give the correct name of a specific hand tool that could be used to make the edge square when made from:

- (a) 5 mm thick steel .....[1]

- (b) 12 mm thick pine .....[1]

3

3 Fig. 3 shows a block joint.

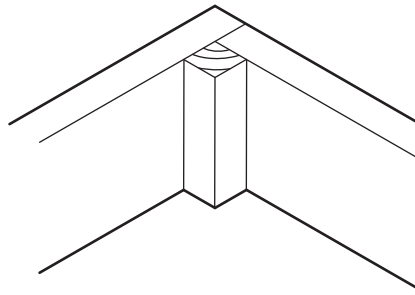


Fig. 3

Add to Fig. 3 to show how the block joint could be strengthened.

[2]

4 Fig. 4 shows views of a smart phone desk stand.

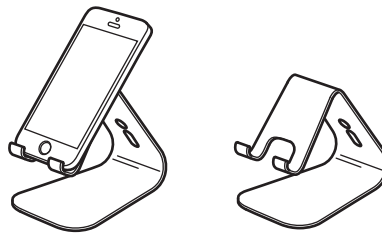


Fig. 4

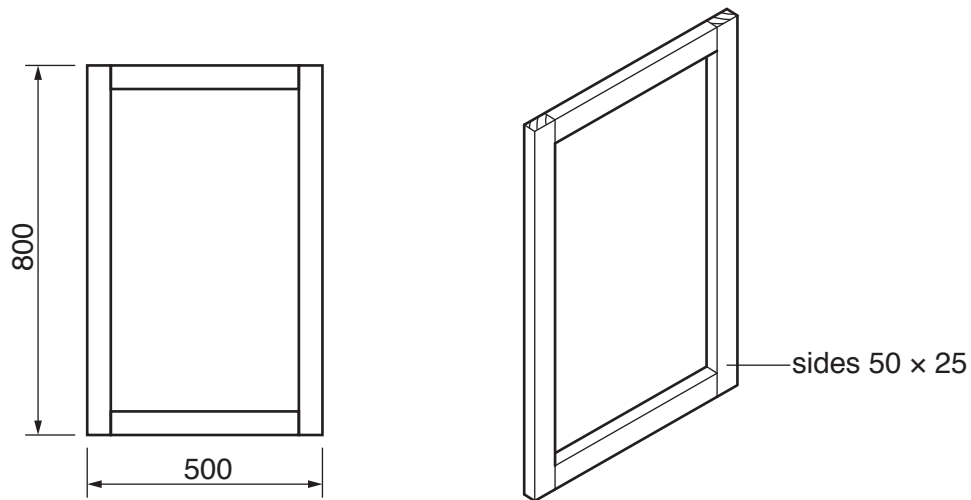
(a) Name a suitable non-ferrous metal that could be used to make the stand.

.....[1]

(b) Give **one** reason for your choice of non-ferrous metal.

.....[1]

- 5 Fig. 5 shows views of a basic frame construction in wood.



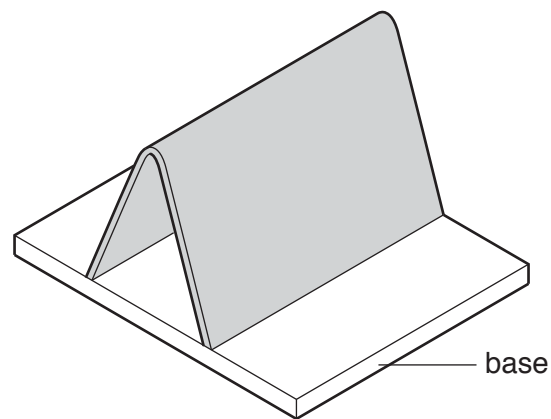
**Fig. 5**

Add sketches and notes to Fig. 5 to show **two** ways of strengthening the frame construction. [4]

- 6 Complete the table by selecting the correct material from the list below to match each description. [3]

| ash      | plywood | blockboard                                                                        | MDF | oak |
|----------|---------|-----------------------------------------------------------------------------------|-----|-----|
| Material |         | Description of material                                                           |     |     |
|          |         | tough, wide-grained hardwood used for tool handles, cricket stumps, hockey sticks |     |     |
|          |         | manufactured board made by sandwiching strips of softwood between two plies       |     |     |
|          |         | manufactured board made by compressing and gluing wooden fibres together          |     |     |

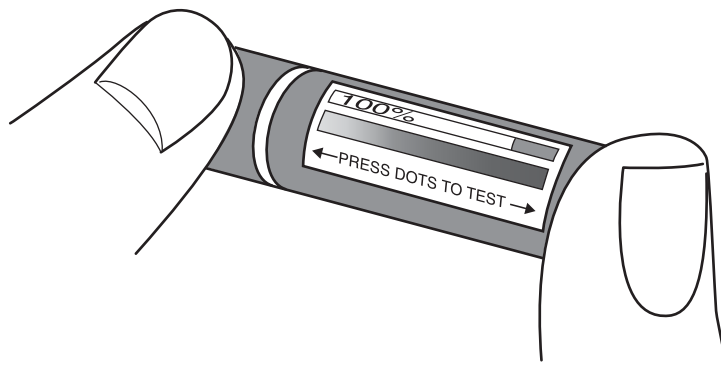
- 7 Fig. 6 shows acrylic sheet bent to shape.



**Fig. 6**

Add sketches and notes to Fig. 6 to show how the bent shape of the acrylic could be held in position while it cooled. [2]

- 8 Fig. 7 shows a battery with a test strip. When the contacts at each end are pressed, a current flows through the strip which then indicates how much charge is left in the battery.



**Fig. 7**

Complete the statement below by adding the correct term from the list.

**conductive**

**fabricating**

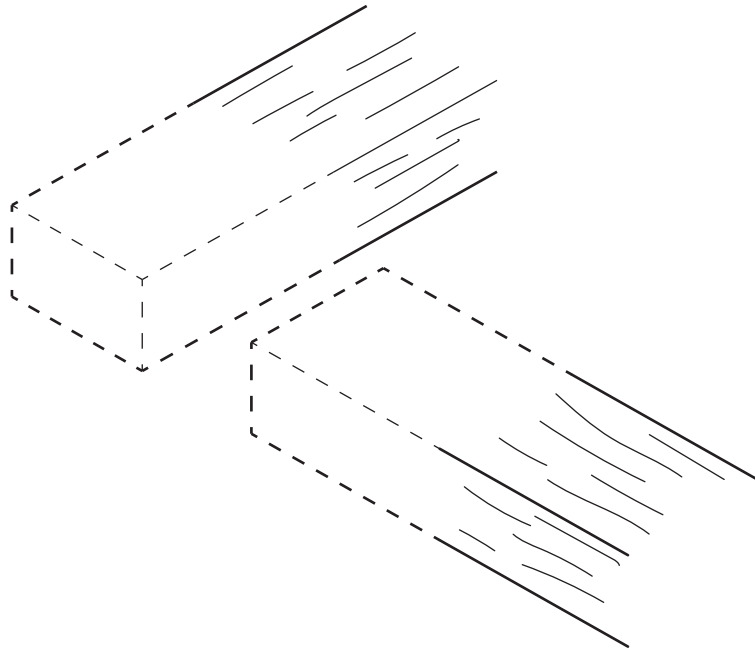
**thermochromic**

**laser**

The battery tester is an example of ..... technology.

[1]

- 9 Complete the drawing below to show an exploded view of a corner bridle joint.



[3]

- 10 Fig. 8 shows plastic cutlery used in fast food restaurants. The cutlery is produced by the injection moulding process.



**Fig. 8**

- (a) Explain why the injection moulding process is only suitable for mass production.

.....

.....

.....[2]

- (b) Explain why the use of plastic cutlery in fast food restaurants could be harmful to the environment.

.....

.....

.....[2]

## Section B

Answer **one** question from this section.

- 11 Fig. 9 shows an incomplete design for a floor standing bathroom storage unit made mainly from softwood. The storage unit will be batch produced and the parts delivered to customers for self-assembly.

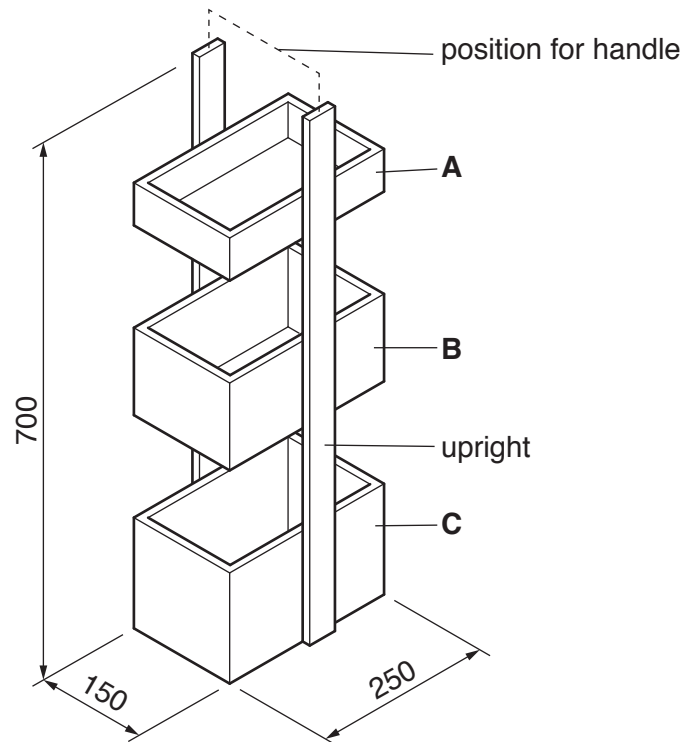


Fig. 9

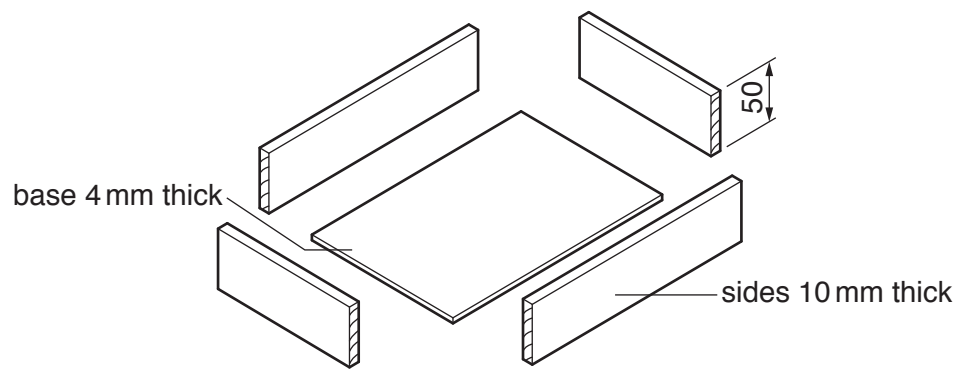
- (a) (i) Name a suitable softwood for the storage unit.

.....[1]

- (ii) Give **one** reason why the choice of materials is important when designing products for use in a bathroom.

.....[1]

(b) Fig. 10 shows an exploded view of box **A**.



**Fig. 10**

(i) Sketch and name a suitable construction that could be used at each corner of the box.

[4]

(ii) Use sketches and notes to show how the base could be fitted **inside** the box so that the edges of the base cannot be seen.

[3]



- (c) Use sketches and notes to show a design for a handle that could be fitted in the position shown in Fig. 9.

[3]

- (d) Use sketches and notes to design a jig or device that could be used to speed up batch production of **one** part of the storage unit.  
State clearly which part of the storage unit is to be batch produced.

Part to be batch produced .....

[5]

- (e) Each of the boxes will be fitted to the uprights by customers using only screws.  
Use sketches and notes to show customers how **one** box will be fitted to an upright.

[3]

- (f) Use sketches and notes to show **one** functional improvement to the design of the storage unit.

[3]

- (g) Give **two** reasons why self-assembly products are popular with customers.

1 .....

2 ..... [2]

- 12 Fig. 11 shows views of a wall-mounted coat rack. Coats are hung on the front pegs and coat hangers can be hooked over the pegs behind the front of the coat rack.

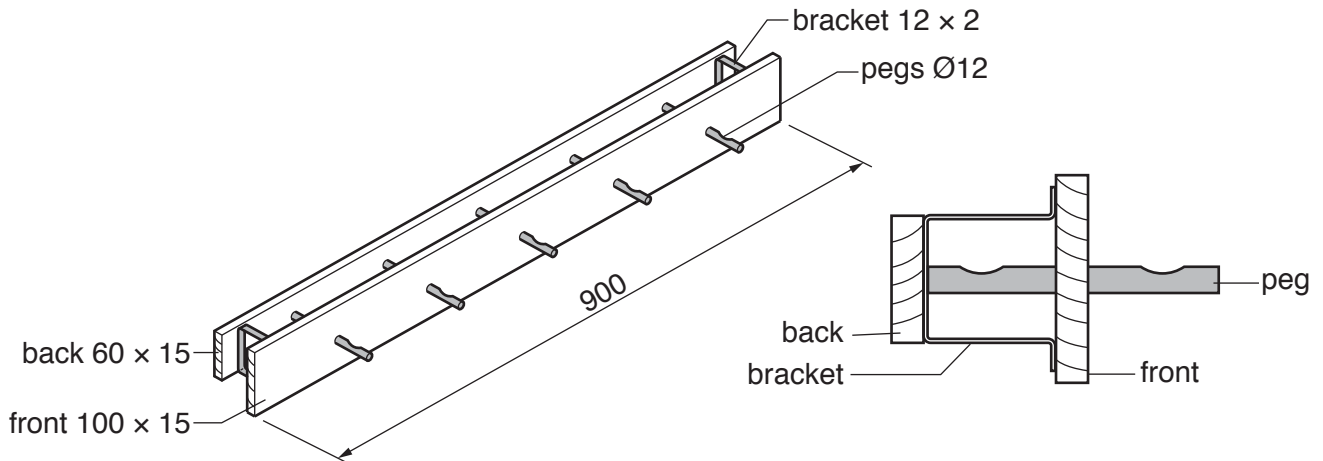


Fig. 11

- (a) Name a suitable hardwood for the front and back of the coat rack.

.....[1]

- (b) Stainless steel will be used to make the brackets and pegs.  
Give **two** reasons for using stainless steel.

1 .....

2 .....[2]

- (c) (i) Five holes Ø12 will be drilled in the front and back of the coat rack.  
Name **two** bits that could be used to drill the holes.

1 .....

2 .....[2]

- (ii) Explain how you could prevent the wood from splintering at the back of the hardwood when holes are drilled.

.....

.....

.....[2]

- (d) Fig. 12 shows a strip of stainless steel marked out ready to be bent to the shape of the bracket.

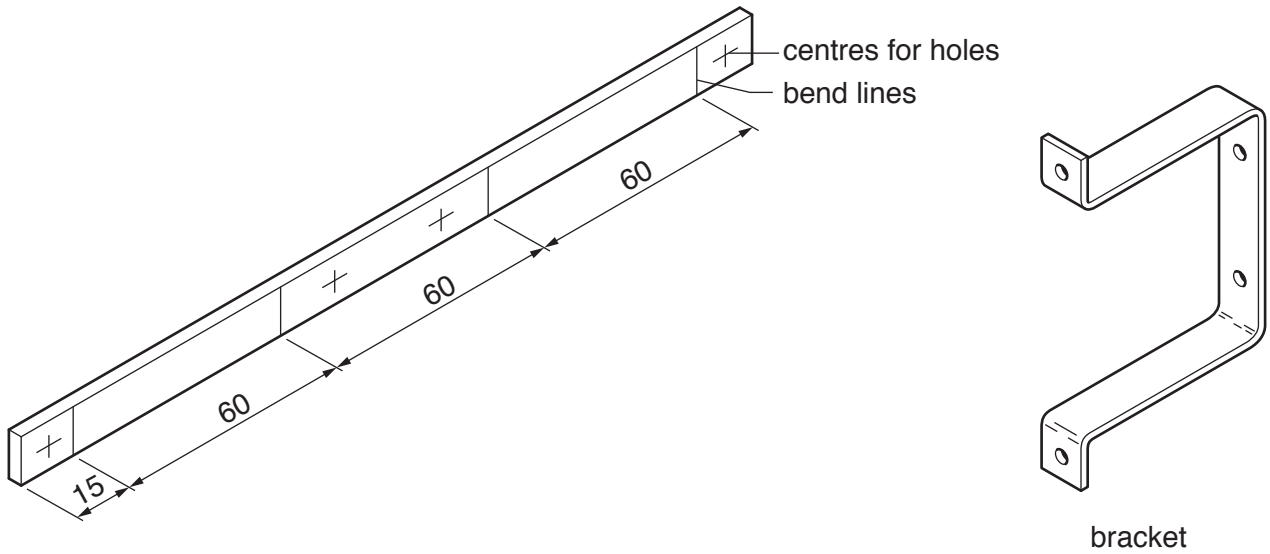


Fig. 12

- (i) Name **two** marking out tools that could be used to show the bend lines.

1.....

2.....[2]

- (ii) Explain the purpose of a centre punch when marking the centres of holes to be drilled.

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

- (iii) Use sketches and notes to show how the 2 mm thick stainless steel strip could be bent to the shape of the bracket.

- Describe the order in which the bends will be made.
- Name all the tools and equipment used.

[6]

- (e) Explain why it is sometimes necessary to anneal metals.

.....

.....

.....

.....[2]

- (f) The purpose of the bracket shown in Fig. 11 is to join the front to the back of the coat rack. Use sketches and notes to show a different method using wood-based materials rather than stainless steel.

Include the following details:

- specific material/s
- constructions used
- **two** important sizes.

[6]

- 13 Fig. 13 shows a toy racing car made from softwood. Ten identical cars will be made in a school workshop.

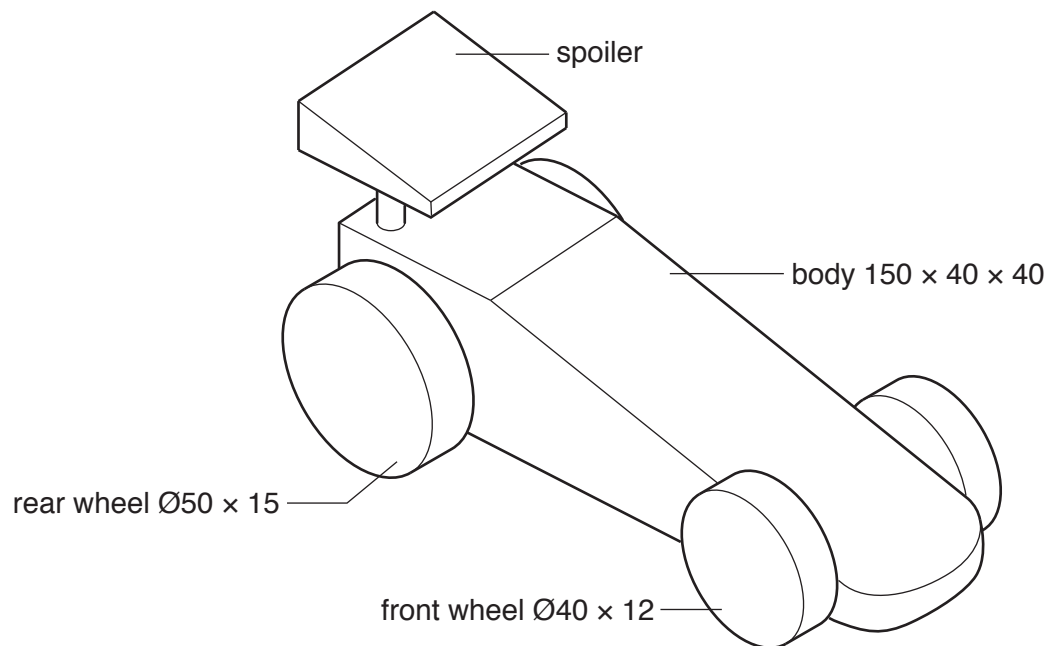


Fig. 13

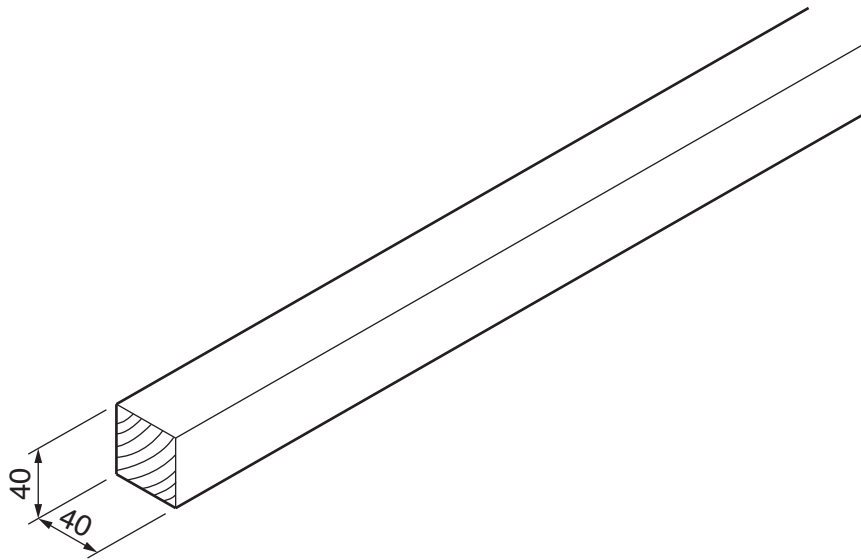
- (a) (i) Name a suitable softwood for the toy racing car.

.....[1]

- (ii) Give **one** reason, other than 'strength', for your choice of softwood.

.....[1]

(b) The 150 mm long car body will be cut from a length of softwood similar to that shown below.



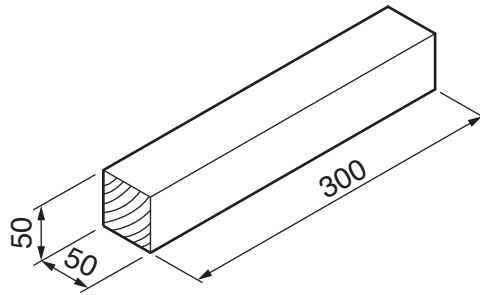
Use sketches and notes to show a design for a sawing jig that would enable **ten** identical car bodies to be cut to length.

The sawing jig must:

- position the softwood length securely while it is sawn
- produce an accurate 150 mm length.

[4]

- (c) The front wheels will be produced by turning between centres on a woodturning lathe. Fig. 14 shows a length of softwood before it is set up on a woodturning lathe.



**Fig. 14**

- (i) Describe **two** processes that would be carried out to the length of softwood **before** it is set up on the woodturning lathe.

1 .....

2 ..... [2]

- (ii) Name a tool that could be used to check the diameter of the wheels when they are turned on the lathe.

..... [1]

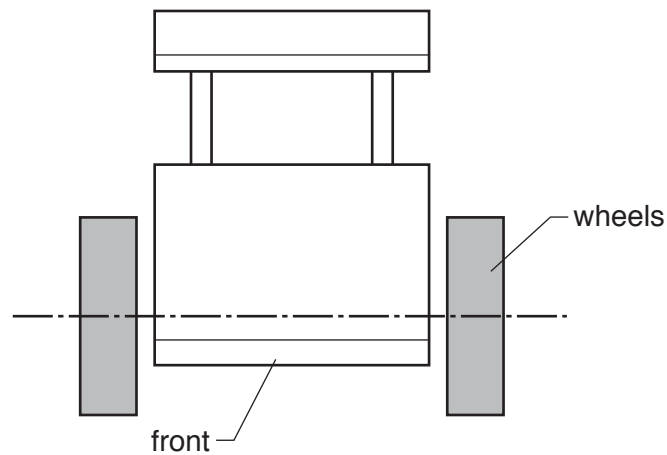
- (iii) Name **two** other tools or items of equipment that could be used when turning the wheels.

1 .....

2 ..... [2]



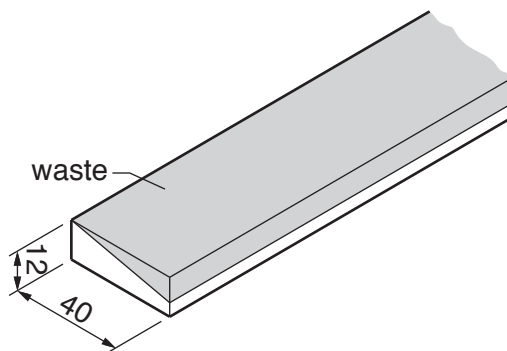
(d) Fig. 15 shows the front view of the toy racing car.



**Fig. 15**

Draw on Fig. 15 to show how the wheels could be attached to the body of the toy racing car while allowing them to move freely. [3]

(e) Fig. 16 shows part of a length of softwood from which the spoiler will be made.



**Fig. 16**

(i) Name a suitable plane that could be used to remove the waste wood.

.....[1]

(ii) Use sketches and notes to show how the length of softwood could be held against a bench stop when planing off the waste wood.

- (f) The body of the toy racing car could be used as a former to produce a vacuum formed plastic car body. Fig. 17 shows the car body made from softwood.

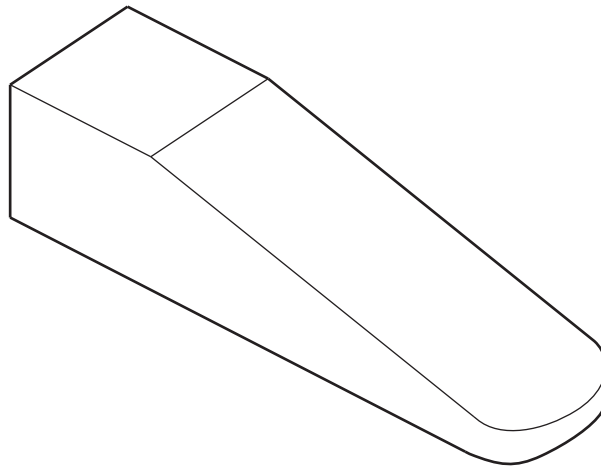


Fig. 17

- (i) Draw on Fig. 17 to show how it would need to be modified so that it could be used as a former to produce a vacuum formed plastic car body. [4]
- (ii) Name a suitable plastic that could be used to produce the car body.  
 .....[1]
- (iii) Describe **two** checks that would need to be made during the vacuum forming process to make sure it was successful.
- 1 .....[1]
- 2 .....[2]



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