Candidate 3 evidence

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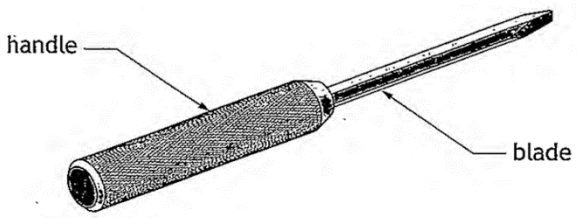
Total marks — 60

Attempt ALL questions

1. A handmade screwdriver, made of two separate parts, is shown below.



The blade is made from high carbon steel. High carbon steel is a ferrous metal.

(a) Explain what is meant by the term 'ferrous metal'. 1

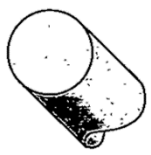
A Ferrous metal is a metal which consists of a high level of Iron

(b) State one property of high carbon steel that makes it suitable for the screwdriver blade. 1

Durability

When material is delivered to a metal workshop, it comes in a range of sections.

(c) Name each of the two common sections shown below.

(i) 

Round bar 1

(ii) 

Hexagonal Bar 1

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1. (continued)

(d) The screwdriver blade was hardened and then tempered.

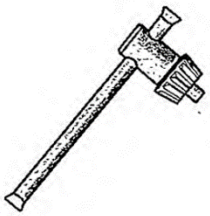
(i) Describe the process of **hardening** the screwdriver blade. 3

The screwdriver blade was heated up until real hot and then quenched in cold water

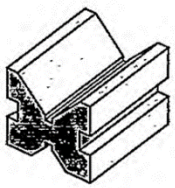
(ii) Explain the effect of **tempering** the screwdriver blade. 1

This leaves the blade completely solid

The tools shown below were used during the manufacture of the screwdriver handle.



Tool A



Tool B

(e) Name each of the tools shown.

(i) Tool A Chuck Key 1

(ii) Tool B V - block 1

[Turn over

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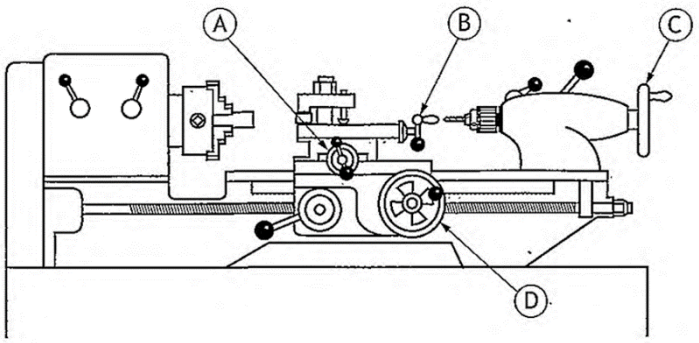
1. **(continued)**

The machine shown below was used in the manufacture of the screwdriver handle.



(f) Name this machine. 1

Metalwork Lathe

(g) Describe three safety checks that should be carried out on this machine **before** switching it on. 3

1 The chuck has been tightened securely.

2 The chuck key has been removed.

3 The safety guard is down

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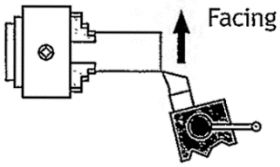
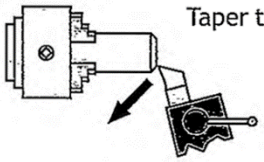
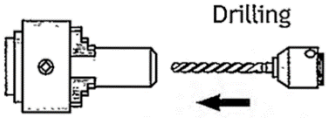
1. (continued)

Handles A, B, C and D, shown on the machine opposite, were used during the manufacture of the screwdriver.

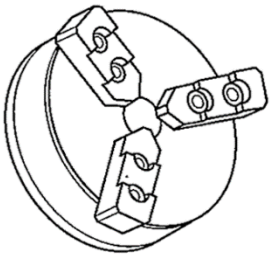
(h) Identify the correct handle to use when carrying out the processes shown below.

(i)  Facing off Handle A 1

(ii)  Taper turning Handle B 1

(iii)  Drilling Handle C 1

A 3-jaw chuck for holding the handle is shown below.



(i) State the feature of a 3-jaw chuck which makes it suitable for holding the screwdriver handle. 1

It holds round pieces of metal

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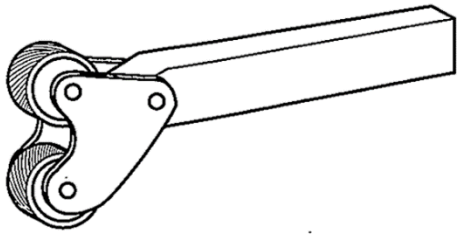
1. **(continued)**

The knurling tool, shown below, was used during the manufacture of the screwdriver handle.



(j) State two procedures that ensure a high quality finish is achieved when knurling. 2

1 _____

_____

2 _____

_____

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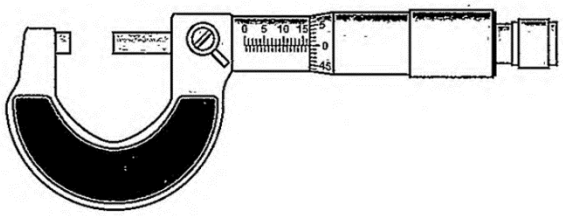
1. (continued)

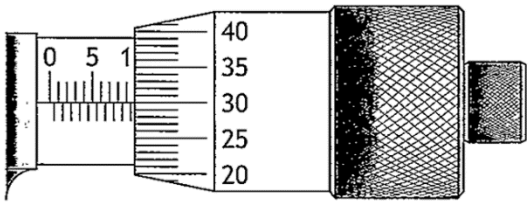
The micrometer, shown below, was used to check diameters during the manufacture of the screwdriver handle.



Two readings from the micrometer are shown below.

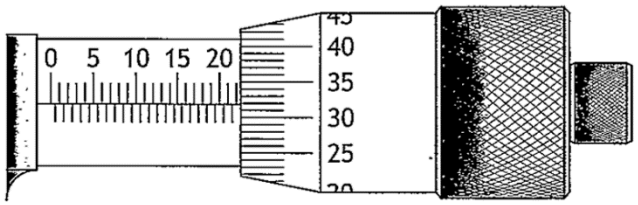
(k) State the correct readings.

A



(i) Reading A 10-30mm 1

B



(ii) Reading B 24.32mm 1

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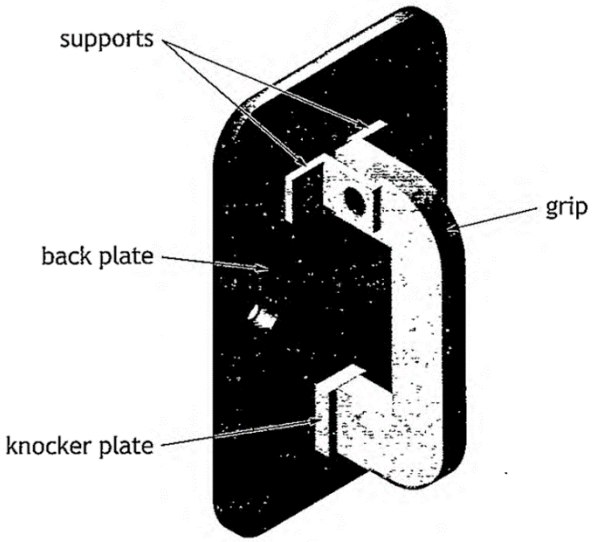
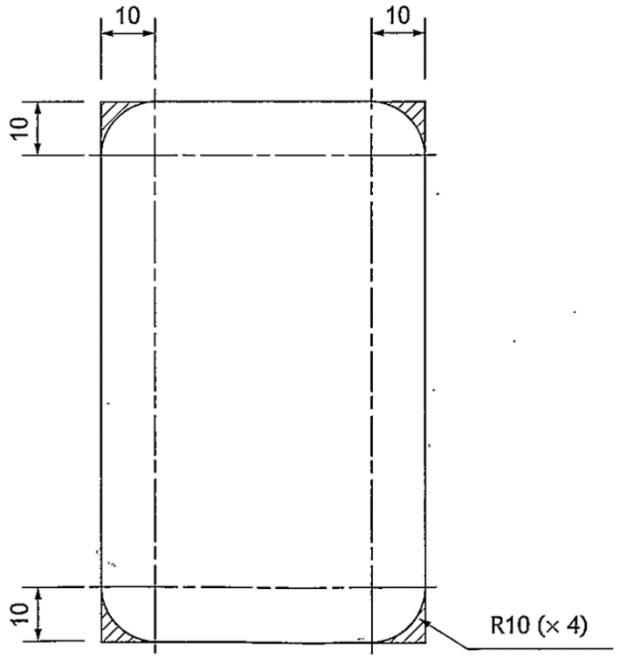
2. A handmade door knocker is shown below.



The back plate has to be marked out, as shown on the drawing below.



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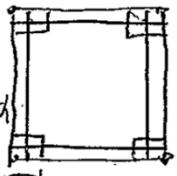
2. (continued)

(a) (i) Describe how to accurately mark the R10 on the corners of the back plate. 5

You must make reference to all tools, processes and relevant dimensions.

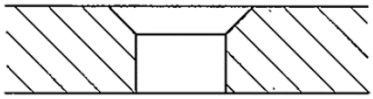
You may use sketches to support your answer.

Find the centre of each of the four corners by using a steel rule and a scriber. Measure in 5mm from each side of each corner and use an engineers square to connect all the lines. * Find the corners of the inner square and centre punch them using a centre punch and ball-pien hammer. Use and set a pair of calipers to 10mm and mark out the corners radiles.



* The marked metal should look like this

A cross section of the back plate showing the hole for a countersink screw is shown below.



(ii) Explain the purpose of using a countersink screw. 1

It leaves a smooth flat surface on the metal

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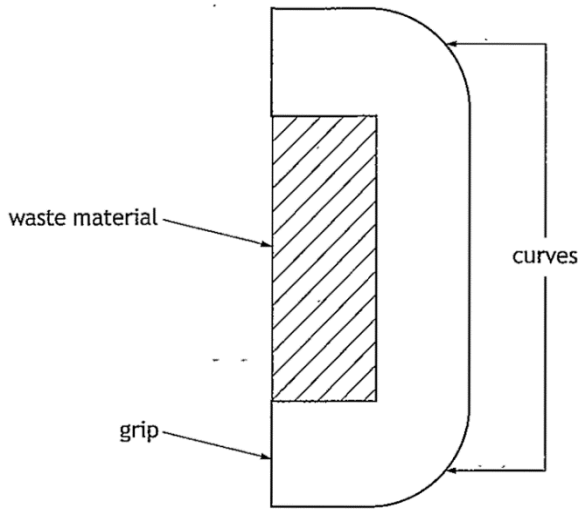
2. (continued)

This drawing shows how the grip was marked out, prior to removing the waste material.

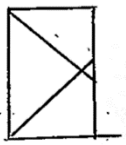


(b) (i) Describe how to remove the waste material. 3

You must make reference to all tools and processes.

You may use sketches to support your answer.

Collect a hacksaw and and begin cutting in *' from each side * of the waste material. cut in diagonally from both the waste material comes into a V - Shape.



From here a Junior hacksaw should be small enough to fit in and cut horizontally along to the side that has been cut away.

File the rest of the *' Straight down material using a flat file.

*2 down to the bottom corner

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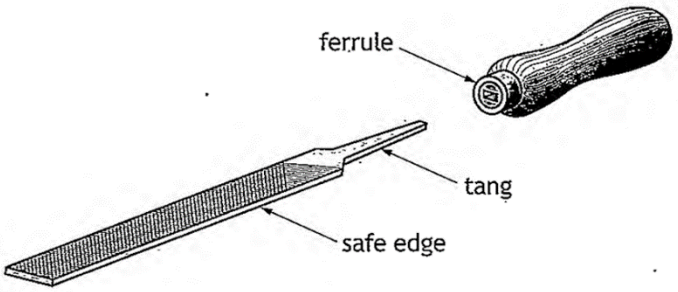
2. (b) (continued)

A flat file was used to shape the curves. Parts of a flat file are shown below.



(ii) State the purpose of the following parts of the flat file. 3

Ferrule Secures the file blade safely in the handle

Tang allows the blade to connect to the handle

Safe edge

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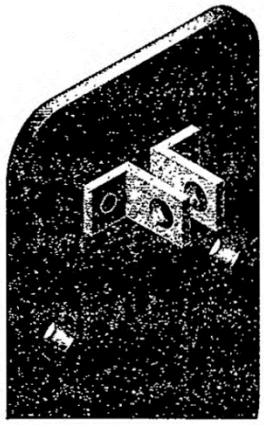
2. **(continued)**

The supports are joined to the back plate using rivets.



(c) Name the types of rivet shown below.

(i) 

Rivet type Pop 1

(ii) 

Rivet type Round head 1

(iii) 

Rivet type Countersink 1

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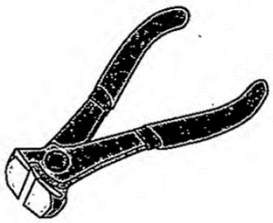
2. (continued)

The tools shown below are used during riveting.

Tool A



Tool B

(d) (i) Name Tool A. 1

rivet set

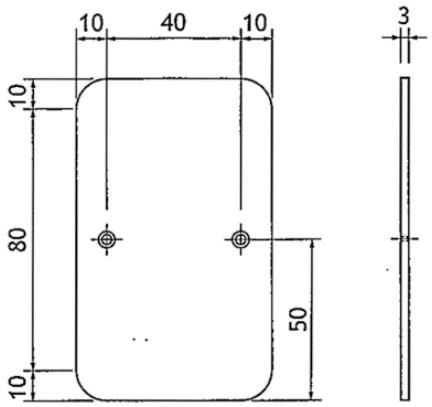
(ii) Explain what Tool B is used for. 1

This is used to cut the excess metal of the rivet away

2. (continued)

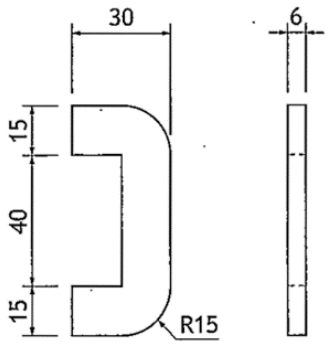
The working drawings for the door knocker are shown below.

Back plate



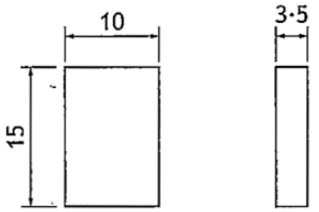
Elevation End Elevation

Grip



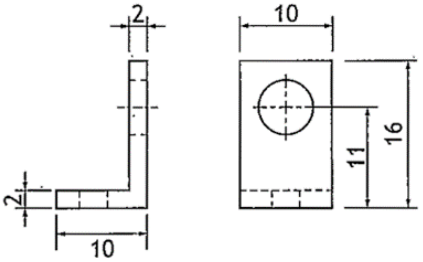
Elevation End Elevation

Knocker plate



Elevation End Elevation

Support



Elevation End Elevation

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2. (continued)

(e) Using the information from the drawings shown opposite, complete the cutting list shown below. 4

Part	Number	Material	Length	Breadth	Thickness
Back plate	1	Mild steel	100	40	3
Grip	1	Mild steel	70	30	6
Support	1	Mild steel	26	10	2
Knocker plate	1	Mild steel	15	10	3·5

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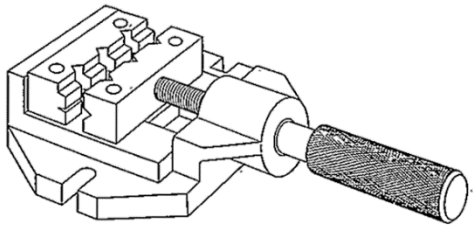
2. (continued)

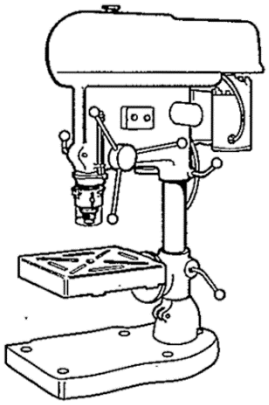
The tool, shown below, was used in the manufacture of the door knocker.



(f) Name this tool. 1

Machine Vice

The machine, shown below, was used in the manufacture of the door knocker.



(g) Name this machine. 1

Pillar drill

(h) Explain why work areas and floors around machinery should always be kept clean and dry. 1

to avoid any accidents and injuries

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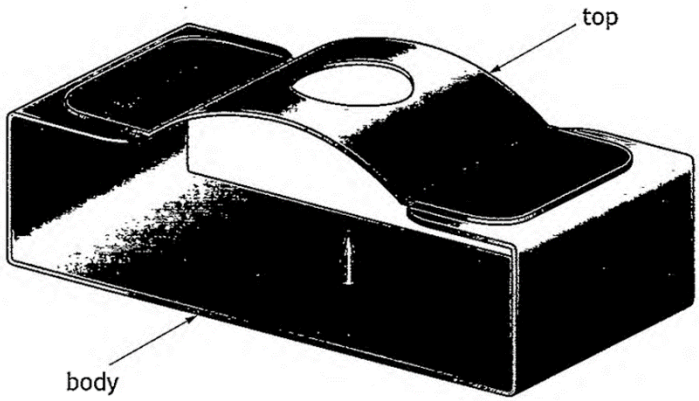
3. A candle holder is shown below.



The candle holder was made from recycled metal.

(a) (i) State why it is important to use recycled metal whenever possible. Give two reasons. **2**

Reason 1 It doesn't use anymore metal

Reason 2 it saves money

(ii) Describe a test that would distinguish between mild steel and aluminium as part of the recycling process. **1**

[Turn over

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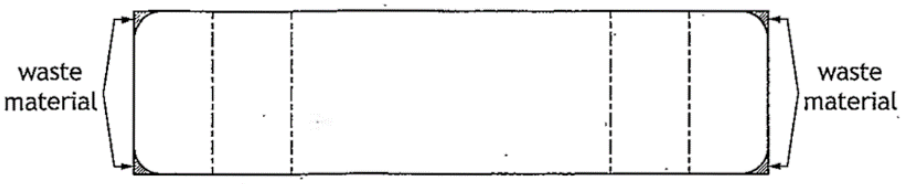
3. (continued)

The body, shown below, was made from 1mm mild steel sheet.



(b) Name a hand tool that can be used to remove the waste material before finishing with a file. 1

Hacksaw

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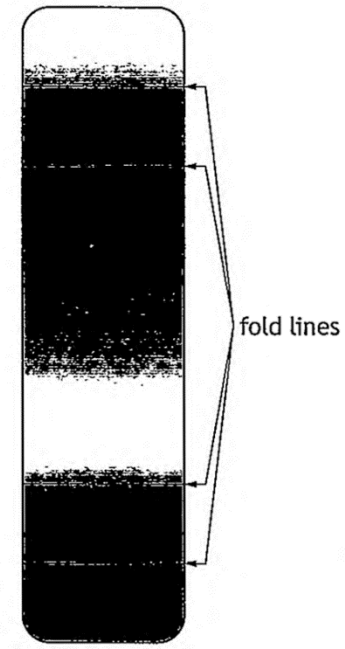
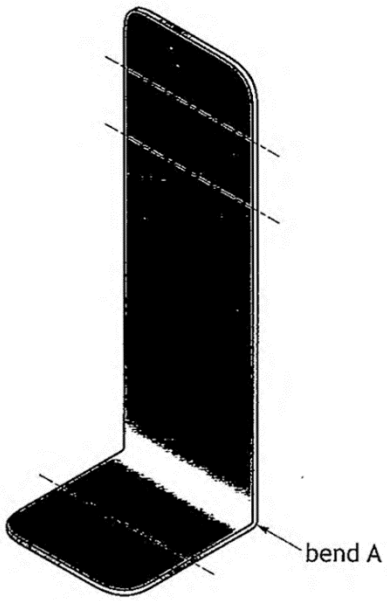
3. (continued)

The surface development and stage one of bending the body are shown below.



surface development



stage one of bending

(c) Describe, using correct terminology, how bend A is formed. 2
You may use sketches to support your answer.

Bend A was formed using a bench vice. The metal would be put in a ~~s~~ tightened at the desired fold and bent by hand.

MARKS | DO NOT WRITE IN THIS MARGIN

3. **(continued)**

The top of the candle holder is shown below.

(d) Explain why the hole is drilled in the top before bending it to shape. 1

It makes it easier by drilling the hole first

It was decided to make a pair of candle holders.

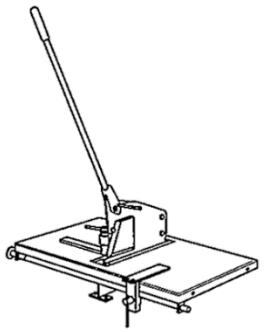
(e) State a method of ensuring that both tops are bent to the same shape. 1

(f) State one health and safety precaution that should be taken when working with sheet metal. 1

MARKS | DO NOT WRITE IN THIS MARGIN

3. (continued)

The tool shown below is used when working with sheet metal.



(g) Name this tool. 1

Guillotine

(h) Describe two stages of preparing sheet metal for a finish. 2

1 _____

_____

2 _____

_____

(i) State a suitable finish which could be applied to sheet metal. 1

Painting

(j) Explain why blunt tools can be just as hazardous as sharp tools. 1

they may not cut as well as sharp tools and leave rougher edges.

[END OF QUESTION PAPER]