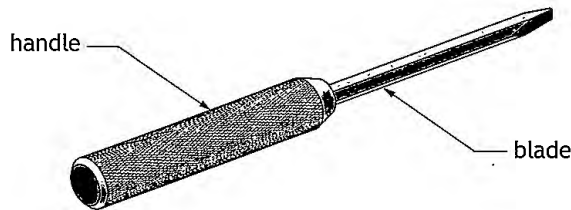


Candidate 1 evidence

MARKS
DO NOT
WRITE IN
THIS
MARGIN

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 contains iron,
for example Aluminium is a ferrous metal

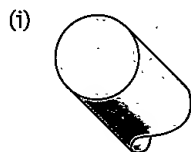
(b) State one property of high carbon steel that makes it suitable for the screwdriver blade.

1

can be hardened and used as a cutting blade

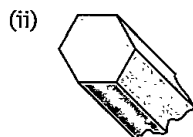
When material is delivered to a metal workshop, it comes in a range of sections.

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



Tubes

1



1

MARKS
DO NOT
WRITE IN
THIS
MARGIN

1. (continued)

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

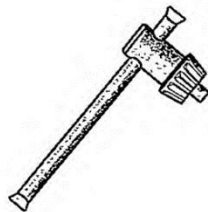
(i) Describe the process of **hardening** the screwdriver blade. 3

Metal is heated to a high temperature from a blow
torch, The metal is then beaten and bent into
shape and left to cool. This makes the metal
very brittle.

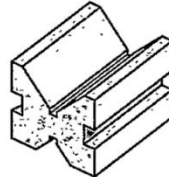
(ii) Explain the effect of **tempering** the screwdriver blade. 1

The screwdriver blade will become sharper.

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 used to loosen drill bits on a pillar drill 1

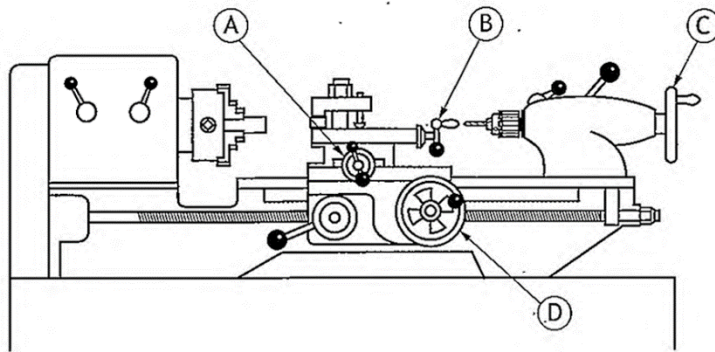
(ii) Tool B depth stock 1

[Turn over

MARKS
DO NOT
WRITE IN
THIS
MARGIN

1. (continued)

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



(f) Name this machine.

1

Metal work lathe

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

3

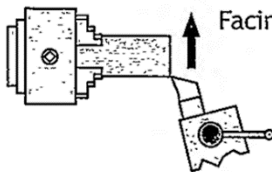
- 1 Make sure work piece is securely fixed in the machine and work area
- 2 Make sure guard is down on the machine before turning on.
- 3 Make sure area around machine is clean.

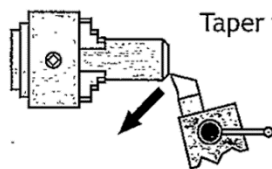
MARKS DO NOT WRITE IN THIS MARGIN

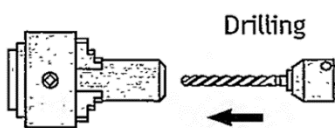
1. (continued)

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

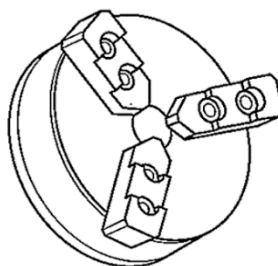
(h) Identify the correct handle to use when carrying out the processes shown below.

(i)  Facing off Handle _____ 1

(ii)  Taper turning Handle _____ 1

(iii)  Drilling Handle _____ 1

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



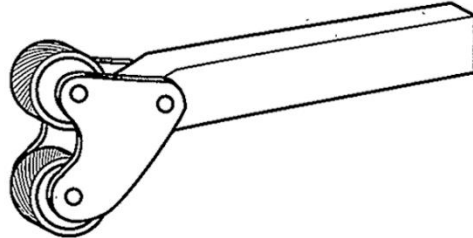
(i) State the feature of a 3-jaw chuck which makes it suitable for holding the screwdriver handle. 1

3 jaw chuck can be loosened or tightened to hold
work piece securely

MARKS	DO NOT WRITE IN THIS MARGIN
-------	--------------------------------------

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

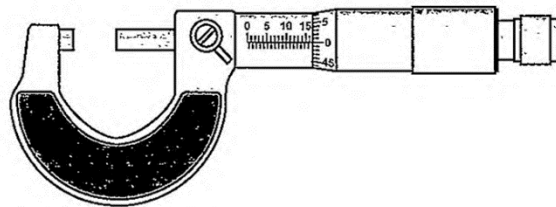
1. One procedure used to ensure knurling quality is to
move handle slowly.

2. _____

MARKS
DO NOT
WRITE IN
THIS
MARGIN

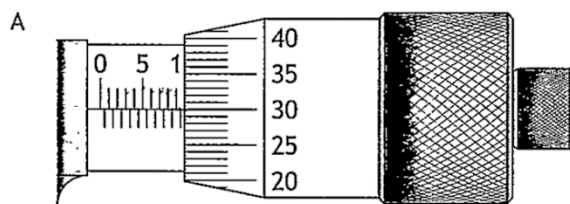
1. (continued)

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

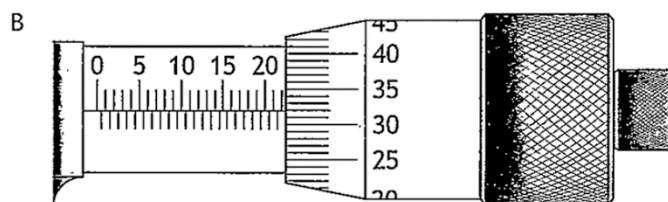


Two readings from the micrometer are shown below.

(k) State the correct readings.

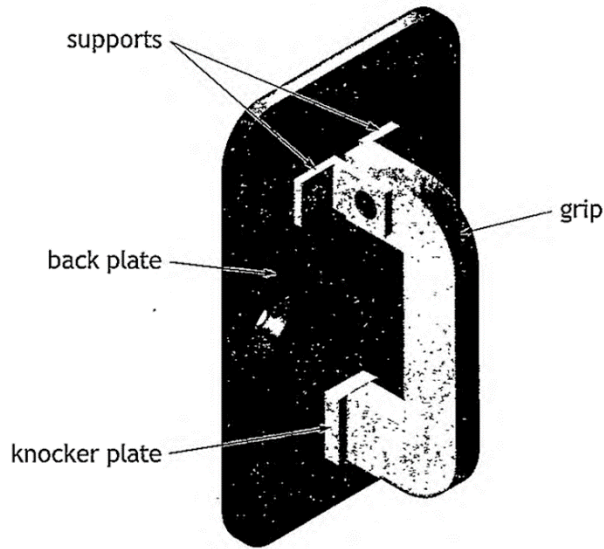


(i) Reading A 9.80 1

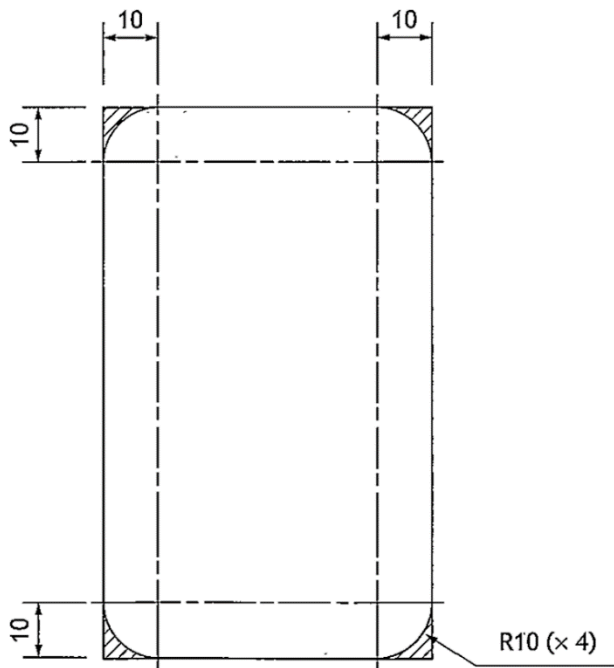


(ii) Reading B 22.32 1

2. A handmade door knocker is shown below.



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



DO NOT
WRITE IN
THIS
MARGIN

MARKS
DO NOT
WRITE IN
THIS
MARGIN

2. (continued)

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

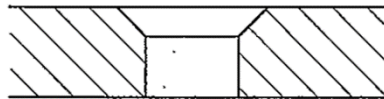
5

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

You may use sketches to support your answer.

1. Round edges using a file after marking out areas or waste material with a scriber and a steel rule.
2. Set odd leg calipers to 10cm with a steel rule and then draw a line down every side of the metal to give you a square on the middle.

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.

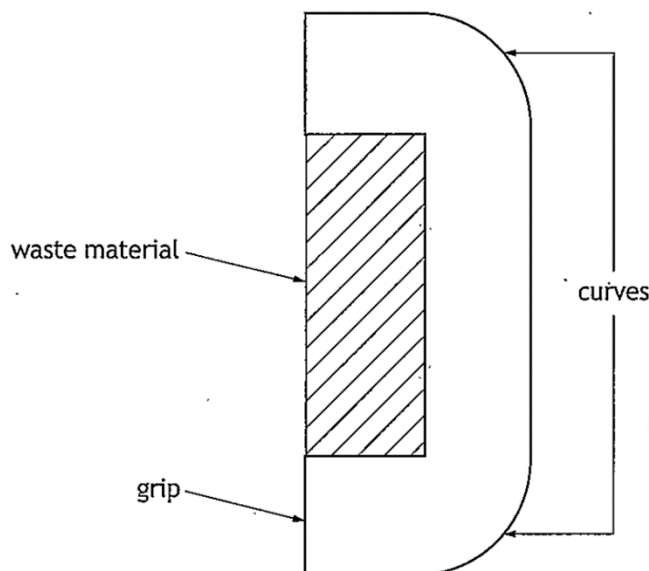
1

One purpose of using a countersink screw is that it
is in line with material drilling leaving a smooth surface

MARKS
DO NOT
WRITE IN
THIS
MARGIN

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.
You must make reference to all tools and processes.
You may use sketches to support your answer.

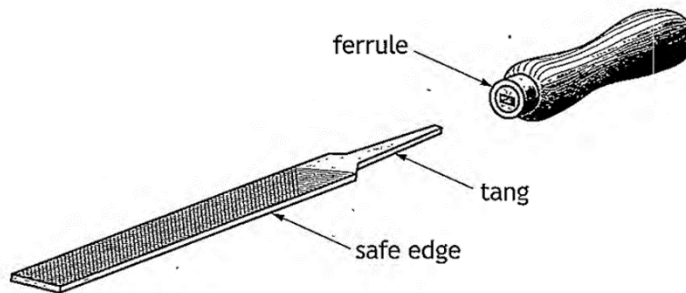
3

1. Secure the grip on a vice with the waste material visible
2. Using a hacksaw (junior or normal) saw down each side of the material marked and along to remove the waste material.
3. File once finished to leave a smooth surface

MARKS
DO NOT
WRITE IN
THIS
MARGIN

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 This is used to join the handle and file together.

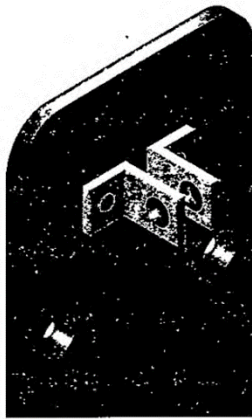
Tang This part fits onto the ferrule to securely join the product.

Safe edge When using a product this will ensure only one side is being filed

MARKS
DO NOT
WRITE IN
THIS
MARGIN

2. (continued)

The supports are joined to the back plate using rivets.



(c) Name the types of rivet shown below.



Rivet type Pop rivet 1



Rivet type Snap head rivet 1



Rivet type Snap countersunk rivet 1

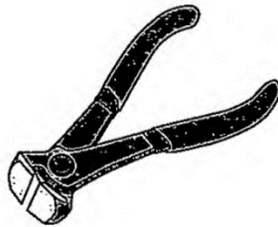
MARKS	DO NOT WRITE IN THIS MARGIN

2. (continued)

The tools shown below are used during riveting.



Tool A



Tool B

- (d) (i) Name Tool A.

1

Used to round a pop rivet to look aesthetically pleasing

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

1

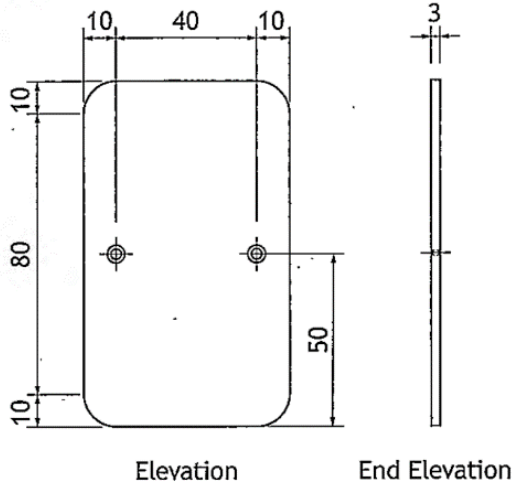
This tool is used for cutting metal like as striking out a product.

[Turn over

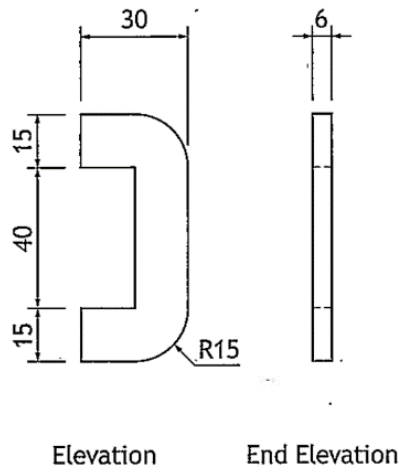
2. (continued)

The working drawings for the door knocker are shown below.

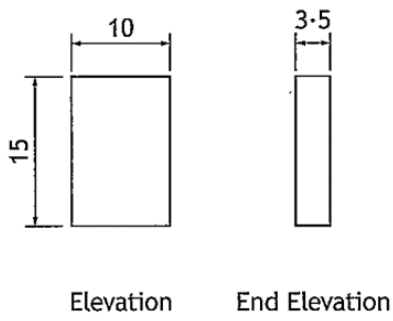
Back plate



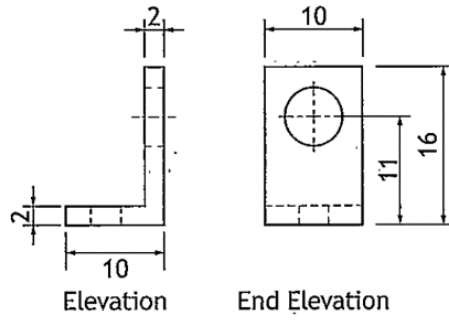
Grip



Knocker plate



Support



2. (continued)

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

Part	Number	Material	Length	Breadth	Thickness
Back plate	1	Mild steel	100	60	3
Grip	1	Mild steel	70	30	6
Support	2	Mild steel	26	10	2
Knocker plate	1	Mild steel	15	10	3.5

MARKS
DO NOT
WRITE IN
THIS
MARGIN

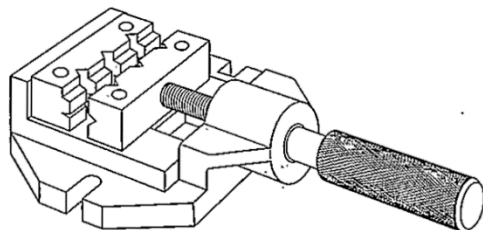
4

[Turn over

MARKS
DO NOT WRITE IN THIS MARGIN

2. (continued)

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

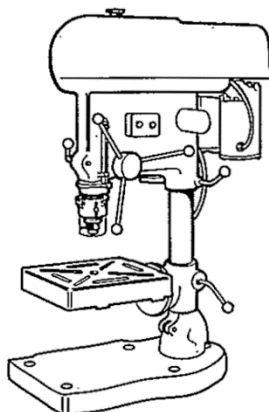


(f) Name this tool.

1

Hand vice

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



(g) Name this machine.

1

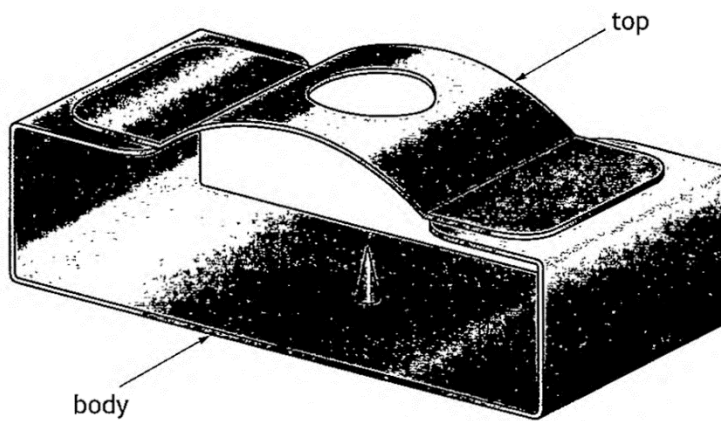
Pillar drill

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

1

as there is an emergency stop at the bottom of drill

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 Recycled metal is cheaper

Reason 2 This metal is also good for the environment

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

1

Iron test

MARKS
DO NOT
WRITE IN
THIS
MARGIN

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.

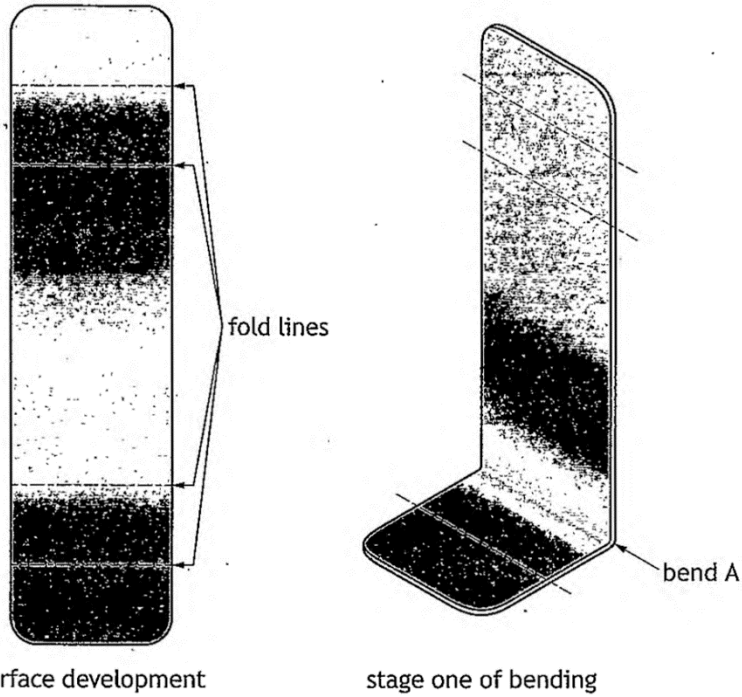
Hack saw

MARKS
DO NOT
WRITE IN
THIS
MARGIN

1

3. (continued)

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



MARKS
DO NOT
WRITE IN
THIS
MARGIN

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

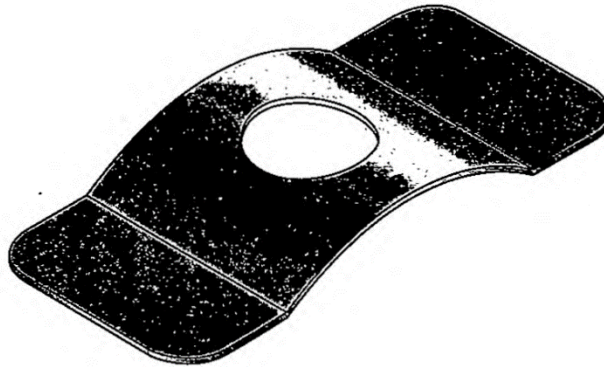
2

using bending bars secure metal on the vice at the fold line just above the bending bars. then using a ball peen hammer or mallet, hit the metal above the fold line until its bent at a 90° angle

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

The hole ^{is} drilled before being bent as it is much easier to secure it on the vice to be drilled.

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

Injection moulding

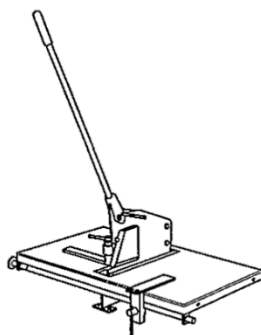
- (f) State one health and safety precaution that should be taken when working with sheet metal. 1

Wear a face mask as it contains ~ toxins.

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

knocker

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

2

1. File all sides of the metal until smooth

2. Use steel wool to clean the metal

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

1

Paint

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

1

When using blunt tools you are more likely to slip and cause yourself to injure yourself.

[END OF QUESTION PAPER]