FOR OFFICIAL USE

N5

National Qualifications 2025

Mark

X861/75/02 Practical Metalworking

TUESDAY, 20 MAY
9:00 AM – 10:00 AM

X8617502

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Number of seat

Date of birth
Day Month Year

Scottish candidate number

Total marks — 60

Attempt ALL questions.

You may use a calculator.

Write your answers clearly in the spaces provided in this booklet. Additional space for answers is provided at the end of this booklet. If you use this space you must clearly identify the question number you are attempting.

Use **blue** or **black** ink.

Before leaving the examination room you must give this booklet to the Invigilator; if you do not, you may lose all the marks for this paper.

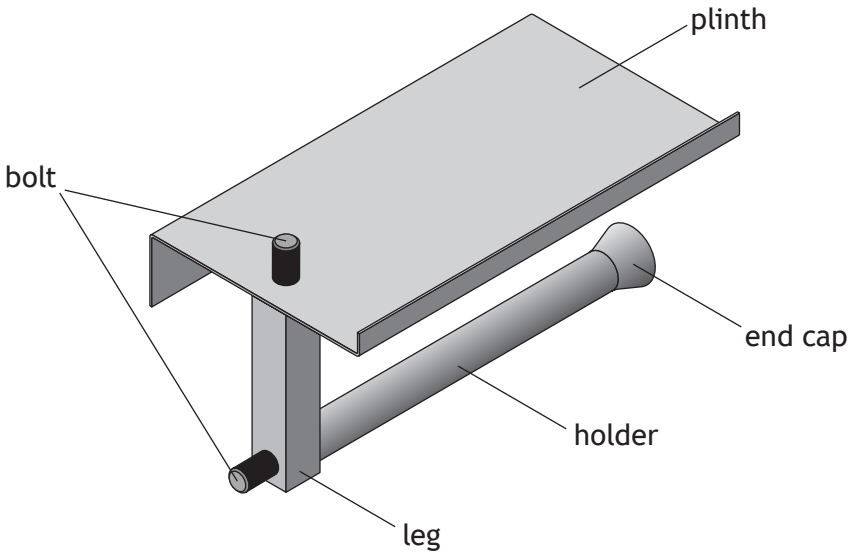
SQA ©

X8617502 01

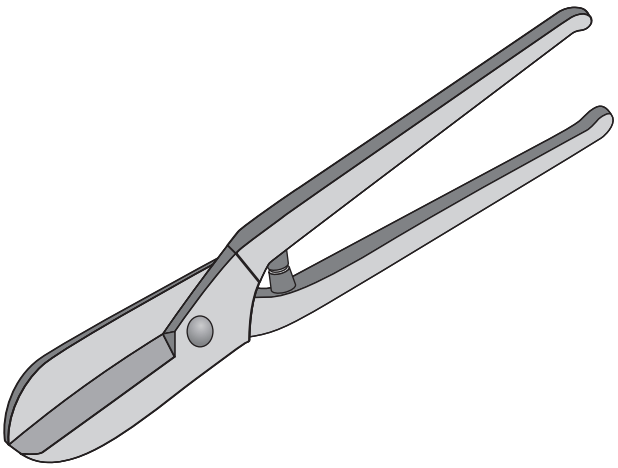
Total marks — 60

Attempt ALL questions

1. A toilet roll holder, made of five parts, is shown below.



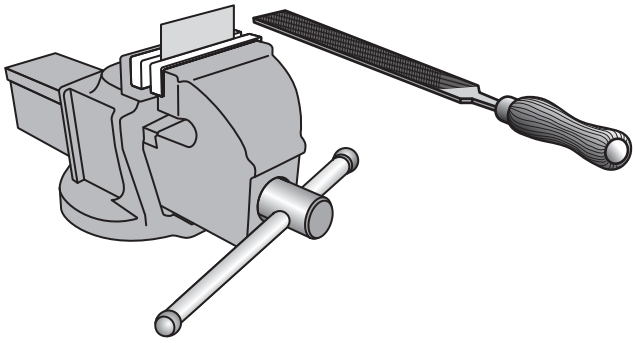
The tool shown below was used to cut the plinth to the correct size before folding.



(a) State the name of this tool. **1**

1. **(continued)**

Before folding the sheet metal plinth, the rough edges were removed with a file.

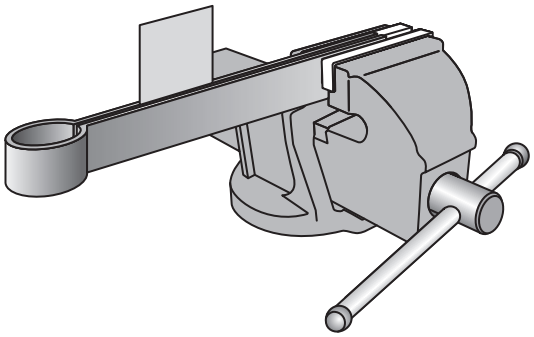


(b) Explain two reasons why the rough edges were removed before folding. **2**

1.

2.

A hide mallet was used to shape the folds on the plinth.

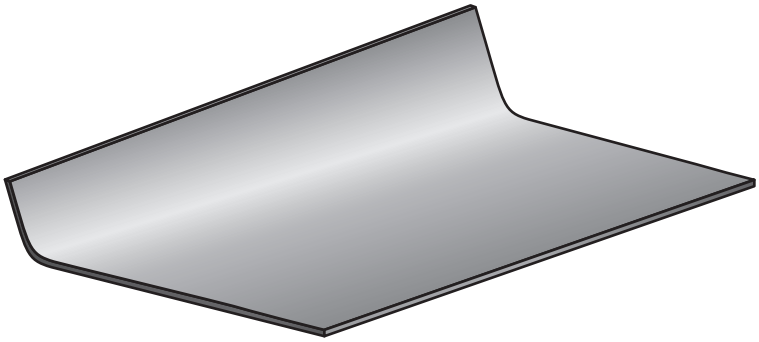


(c) State one reason for using a hide mallet rather than a ball pein hammer. **1**

[Turn over

1. (continued)

When the plinth was removed from the folding bars, the fold was at the wrong angle.



(d) Explain one reason why this happened. **1**

The toilet roll holder is made from aluminium.

(e) Explain two reasons why aluminium is a good choice of metal. **2**

1.

2.

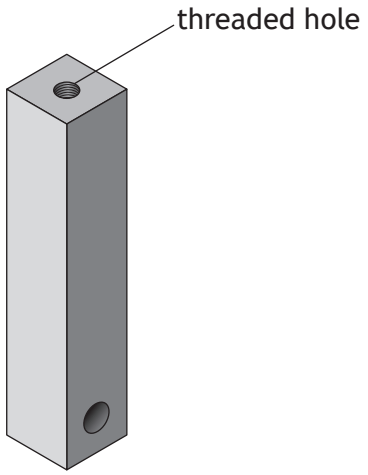
(f) Over a period of time aluminium can become dull.

Describe a method to prevent this from happening. **1**

MARKS

DO NOT WRITE IN THIS MARGIN

The leg has a threaded hole in the centre of the square bar.



(g) (i) Describe how to accurately mark the centre of the leg prior to drilling the threaded hole on a pillar/pedestal drill.

You must make reference to all tools and processes.

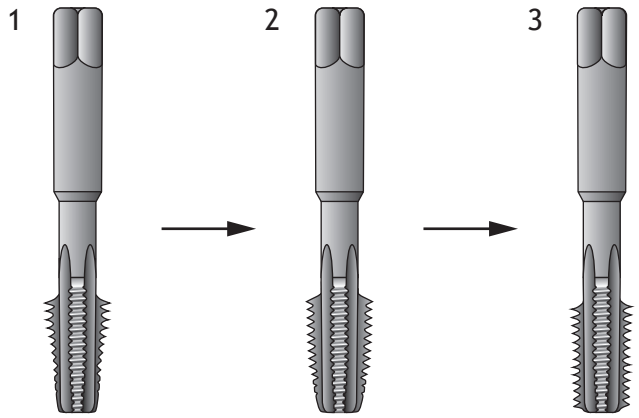
You may use sketches to support your answer. **3**

1. (g) **(continued)**

(ii) Identify the correct drill bit size for drilling a standard M6 internal thread by ticking (✓) a box below. **1**

- ☐ 3 mm drill bit
- ☐ 5 mm drill bit
- ☐ 6 mm drill bit
- ☐ 7 mm drill bit

The M6 hole was threaded by using three taps in the order shown below.

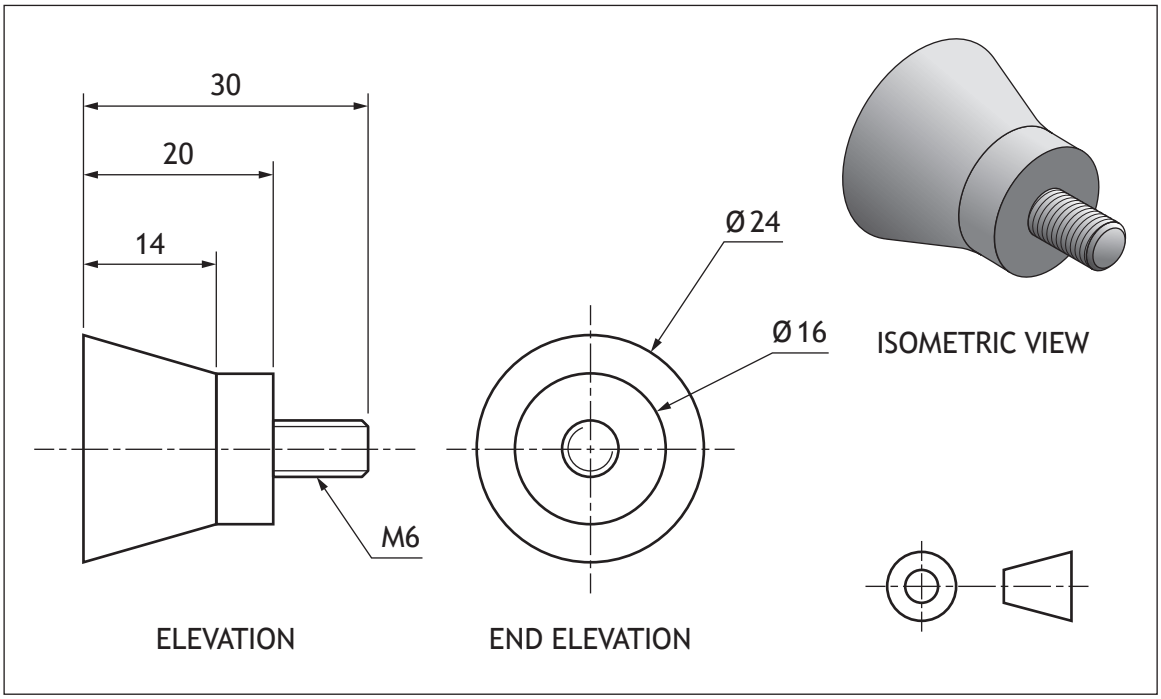


(iii) State the name of the final tap. **1**

(iv) Explain why it is important to occasionally remove cuttings from the hole when tapping. **1**

1. **(continued)**

The working drawing of the end cap is shown below.



(h) (i) State the length of the M6 thread. **1**

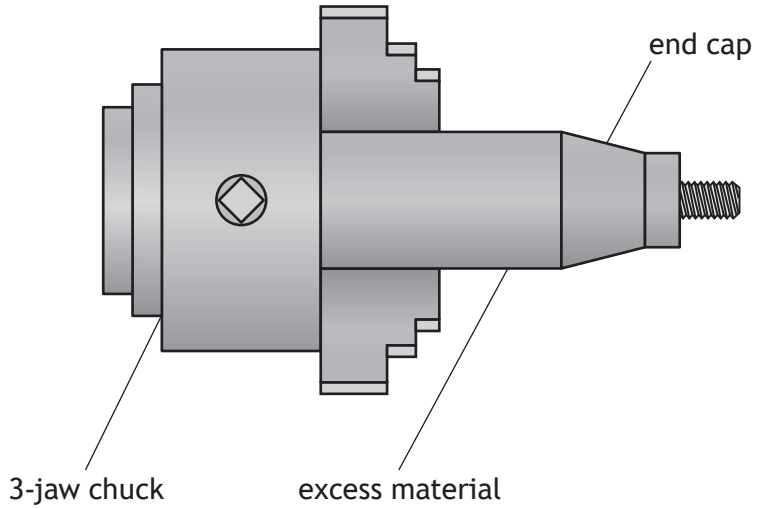
mm

(ii) Explain the purpose of showing the pictorial isometric view. **1**

[Turn over

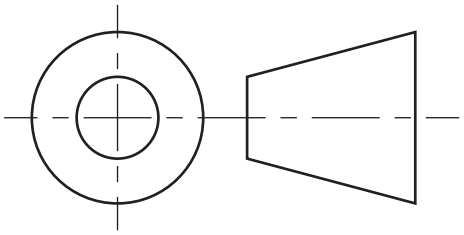
1. (h) **(continued)**

The end cap is manufactured on the centre lathe as shown below.



(iii) State the name of the machining process used to remove the end cap from the excess material. **1**

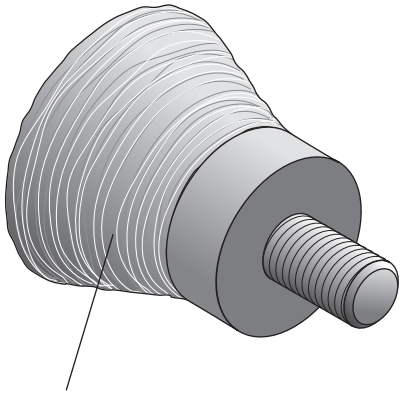
A symbol used in orthographic working drawings is shown below.



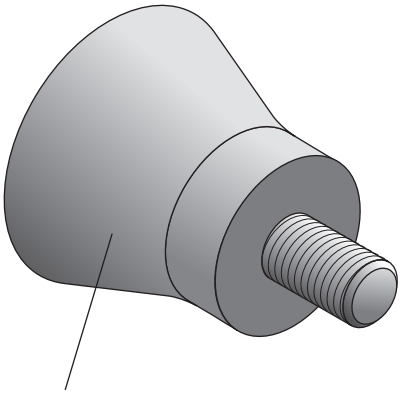
(i) Explain the purpose of this symbol. **1**

1. **(continued)**

The end cap had to be re-manufactured due to poor surface finish.



poor surface finish



good surface finish

(j) Explain two reasons why the surface finish was poor. **2**

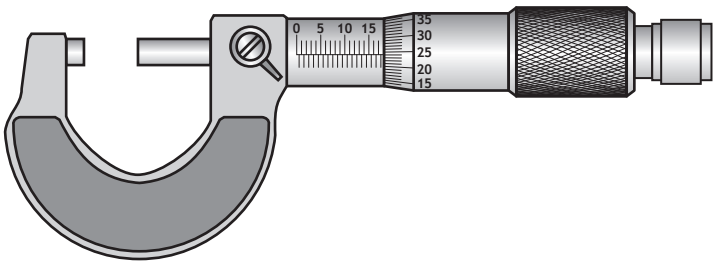
1. _____

2. _____

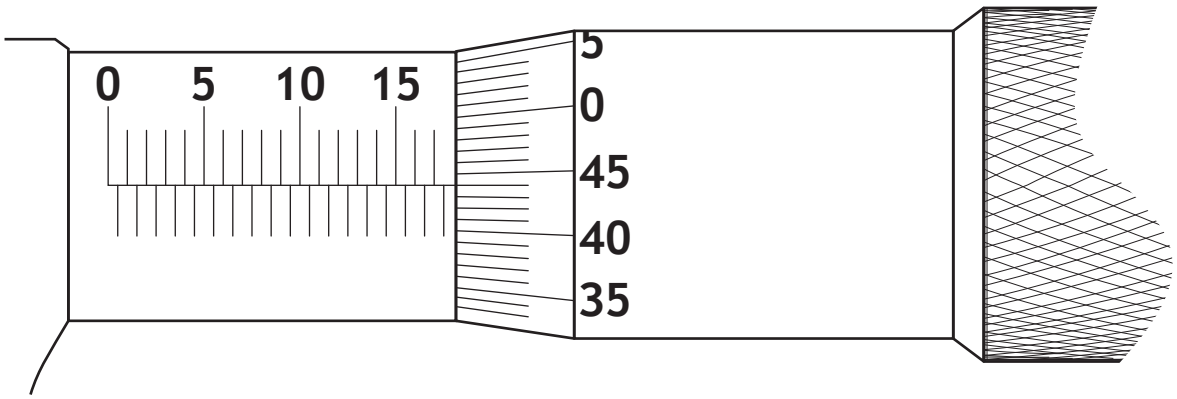
[Turn over

1. (continued)

The micrometer, shown below, was used to check diameters during the manufacture of the end cap.

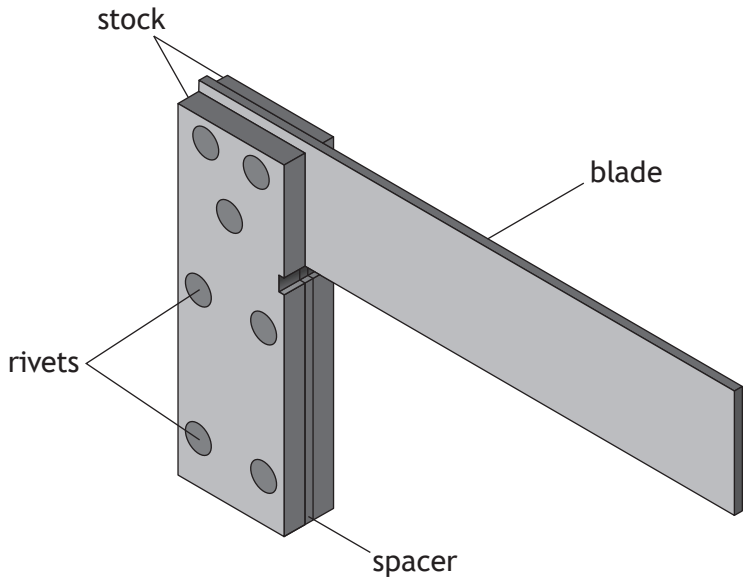


A reading from the micrometer is shown below.



(k) State the correct reading. **1**

2. An engineer's square made of three components joined by rivets is shown below.



(a) Describe two ways an engineer's square is used. **2**

1.

2.

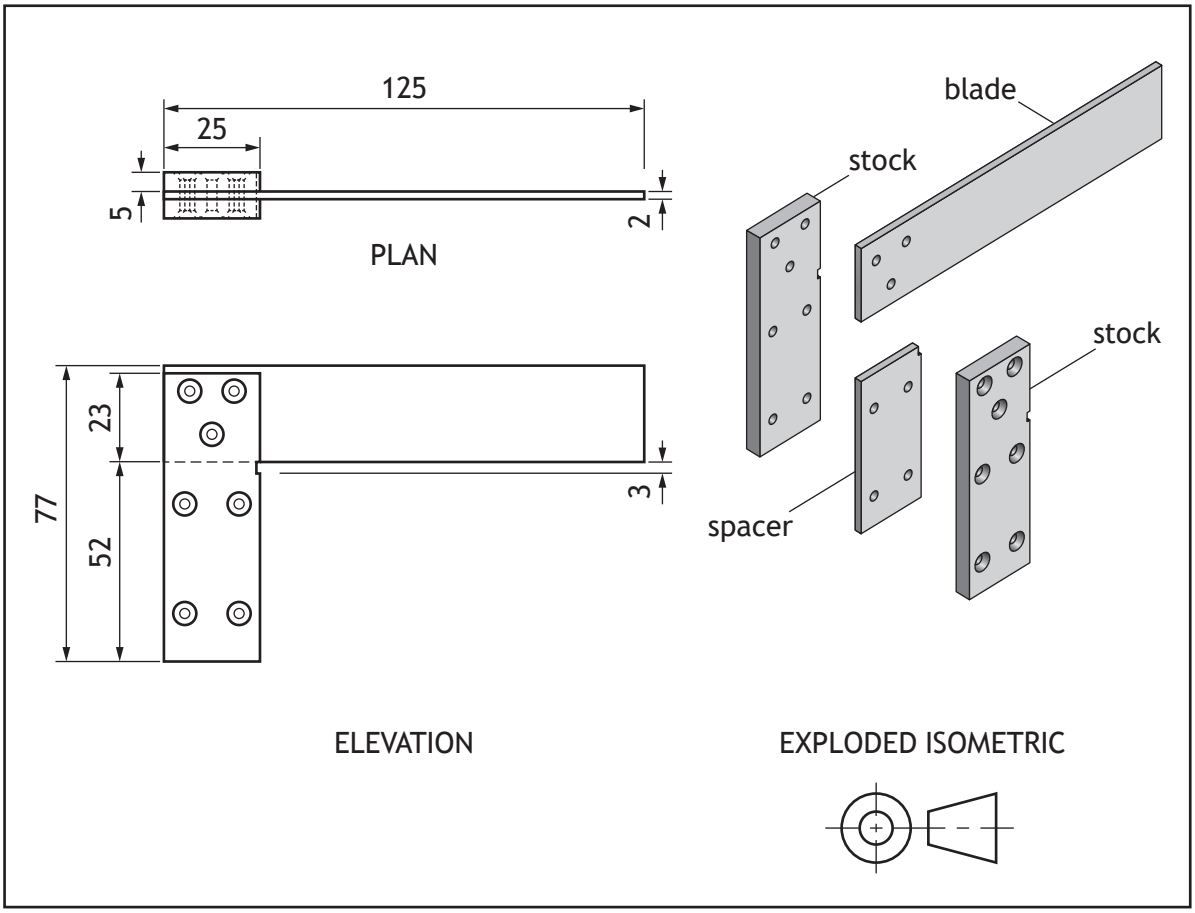
All components of the engineer's square are made from a ferrous metal.

(b) State the name of a ferrous metal. **1**

[Turn over

2. (continued)

An orthographic drawing and exploded isometric drawing of the engineer's square are shown below.

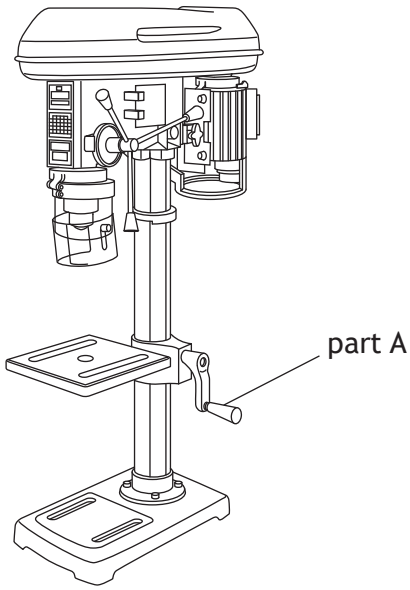


(c) Complete the parts list shown below, using information from the orthographic drawing. **3**

Part	Quantity	Length	Breadth	Thickness
Stock	2		25	5
Blade	1	125		2
Spacer	1	52	25	
Rivet	7	12	Ø3	Ø3

2. (continued)

The pillar/pedestal drill shown below is used to drill holes in the stock and spacer components of the engineer's square.



(d) (i) State the purpose of part A. **1**

(ii) Explain why the engineer's square components must be clamped before drilling the holes. **1**

Eye protection must be worn when using the pillar/pedestal drill.

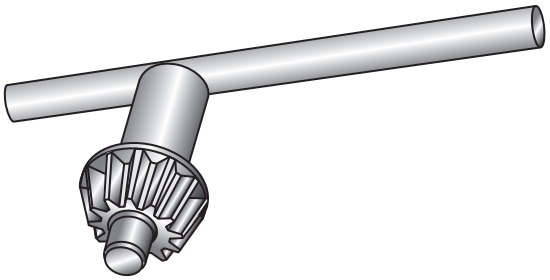
(iii) State two other personal health and safety precautions you should take while working on this machine. **2**

1.

2.

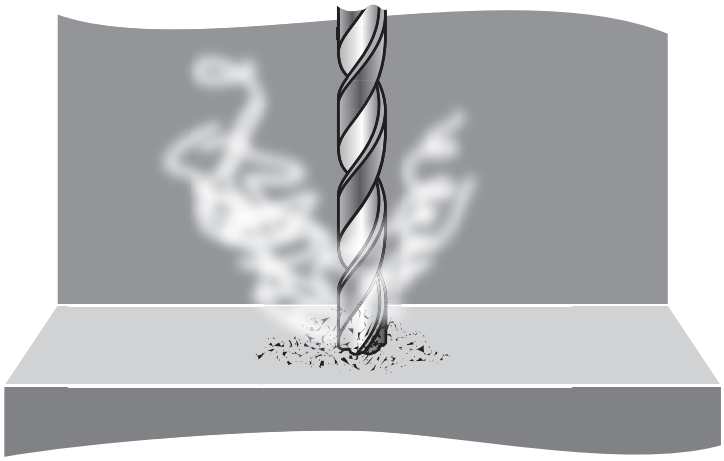
[Turn over

2. (continued)



(e) State the purpose of the tool shown above. **1**

Smoke started coming from the drill bit while drilling holes in the engineer's square components.



(f) Explain one reason why smoke was coming from the drill bit. **1**

2. (continued)

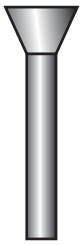
It is important that the holes in the components line up accurately, so the engineer's square can be correctly assembled.

(g) Describe two methods of ensuring that the holes in the components line up accurately. **2**

1.

2.

Countersink rivets were used to join the engineer's square components.



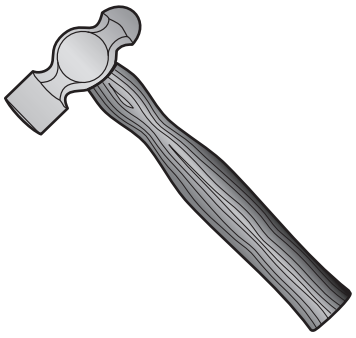
countersink rivet

(h) State one reason for using countersink rivets. **1**

[Turn over

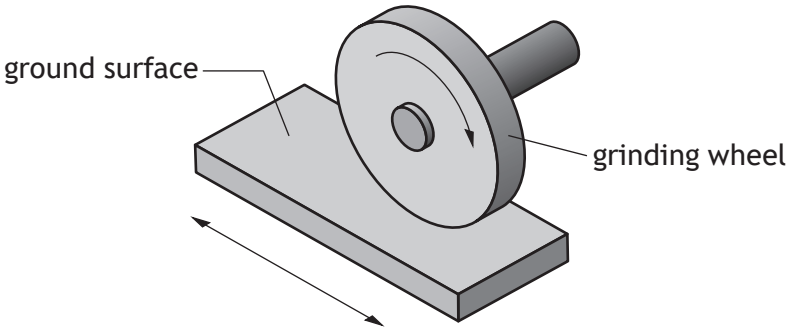
2. (continued)

The tool shown below is used in the riveting process.



(i) State the name of this tool. **1**

A surface grinder is used to finish the blade component. An image of this process taking place is shown below.

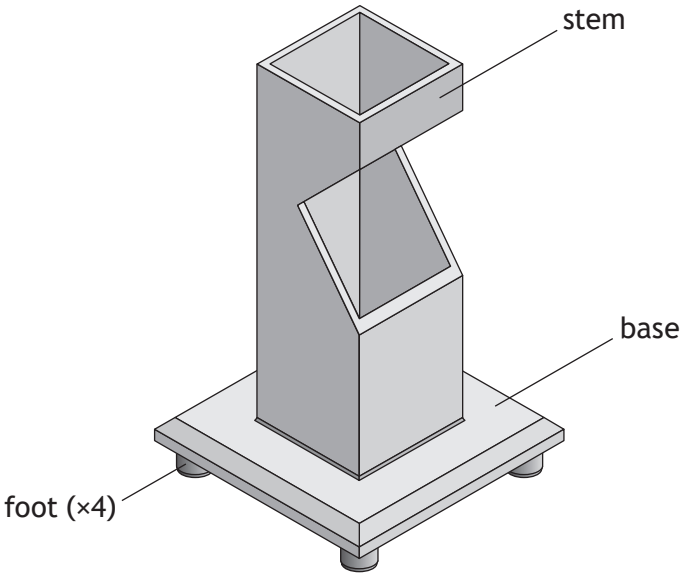


(j) State two reasons why the blade is finished by surface grinding. **2**

1.

2.

3. A metal lamp made of three components is shown below.



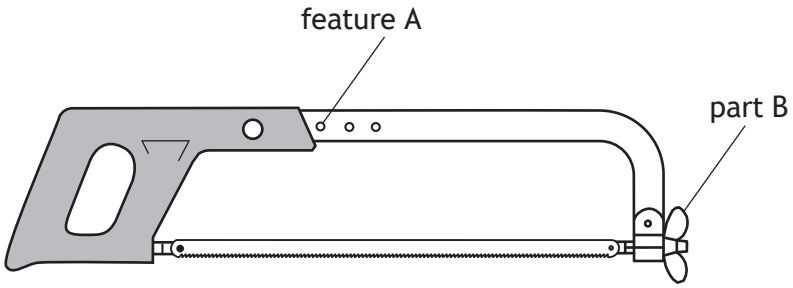
Metal is made by mining metal ores which are then processed to remove impurities.

(a) Describe one disadvantage of mining metal. **1**

[Turn over

3. (continued)

The tool shown below is used to cut the lamp material to the required lengths.



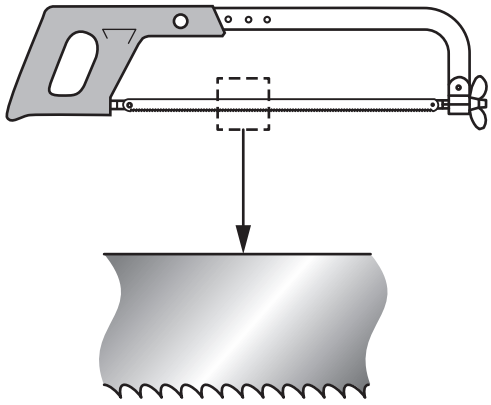
(b) (i) State the name of this tool. **1**

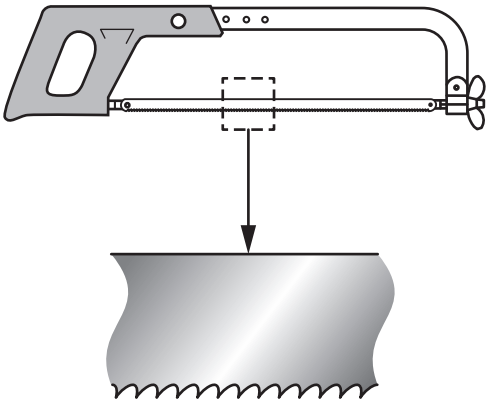
(ii) Describe the purpose of **feature A** and **part B**. **2**

Feature A

Part B

(iii) Identify the correct direction of the blade by ticking (✓) a box below. **1**





3. (continued)

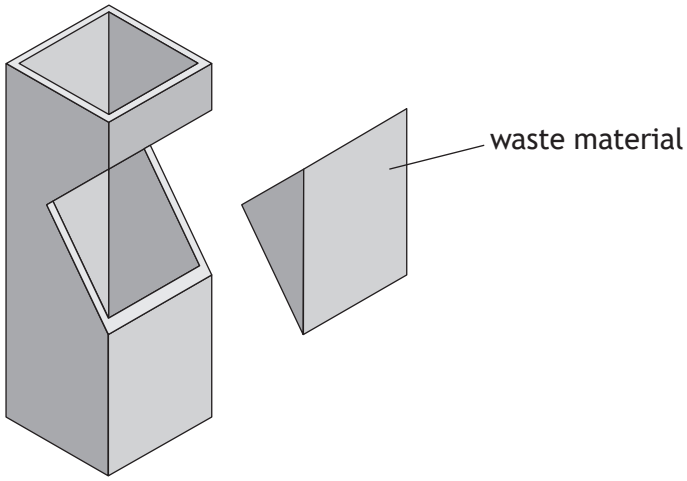
It is important to recycle waste material such as lamp offcuts.

(c) Describe two environmental benefits of recycling metal. **2**

1.

2.

A CNC milling machine is used to shape the stem component.



(d) Describe two advantages of using a CNC milling machine instead of a manual milling machine. **2**

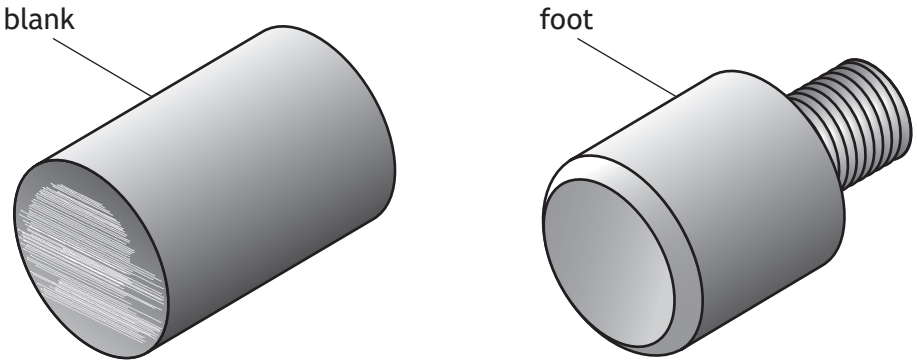
1.

2.

[Turn over

3. (continued)

The centre lathe was used to manufacture the foot from a blank.



(e) (i) Describe how the foot is manufactured from a blank on the centre lathe.
You must make reference to all processes.
You may use sketches to support your answer. **4**

3. (e) **(continued)**

(ii) State the name of the part of the centre lathe that is used to hold the cutting tool. **1**

The headstock is an important part of the centre lathe.

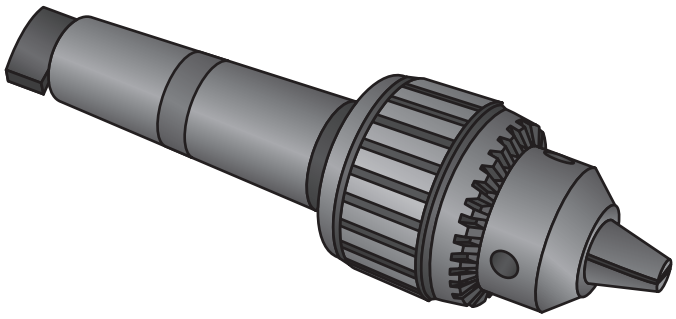
(iii) State one purpose of the headstock. **1**

(f) State two factors that will affect the selection of cutting feeds and speeds when using the centre lathe. **2**

1.

2.

The tool shown below was used in the manufacture of the lamp.



(g) State the name of two machines that this tool can be used on.

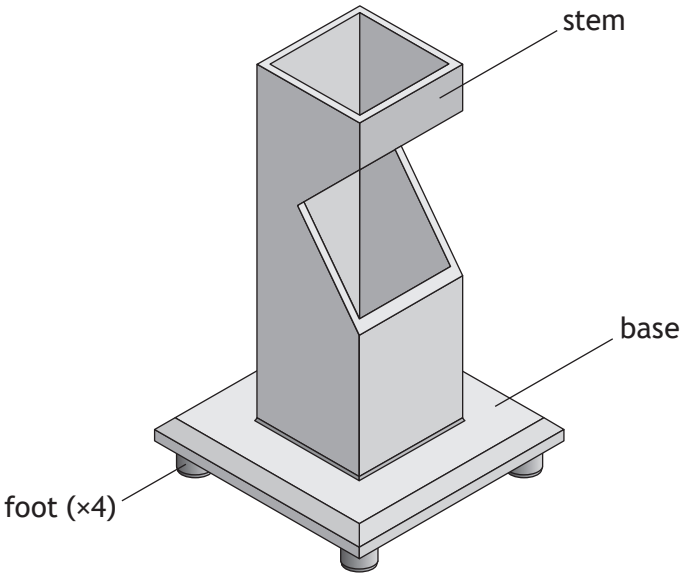
(i) **1**

(ii) **1**

[Turn over

3. (continued)

A thermal join is used to join the base to the stem. Brazing is one type of thermal join.



(h) (i) Describe how to prevent oxidation from occurring when brazing. **1**

(ii) State the name of one other type of thermal join. **1**

[END OF QUESTION PAPER]

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ADDITIONAL SPACE FOR ANSWERS

MARKS | DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS