



**Turnbull High School  
Technical Department**

# **National 5 Practical Metalwork Exam Revision Questions Booklet 2**

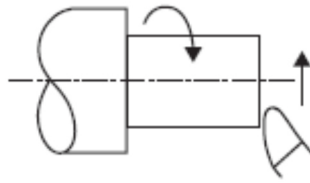
**Name:**

**Class:**

**Teacher:**

**Question 1**

Which turning process is shown below? *(Please tick)*

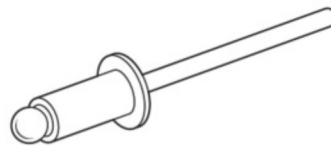


- Parallel turning
- Facing
- Taper turning
- Knurling

1

**Question 2**

A joining component is shown below.



What is the name of the component shown? *(Please tick)*

- Pop rivet
- Countersunk head screw
- Washer
- Knock down fitting

1

**Question 3**

Carbon steel is made from carbon and which other material? *(Please tick)*

- Copper
- Iron
- Brass
- Aluminium

1

**Question 4**

Which of the following is NOT a property of mild steel? *(Please tick)*

- Malleable
- Tough
- Magnetic
- Plasticity

1

**Question 5**

Which of the following best describes the process of **case hardening**? *(Please tick)*

- Removes the brittleness of the metal once hardened
- Increases the hardness of the metal
- Makes the surface shiny
- Makes the outside surface harder

1

**Question 6**

Which piece of safety equipment should be worn when using the pillar drill?

- Ear defenders
- High visibility jacket
- Heat protective gloves
- Safety glasses

1

**Question 7**

Which one of the following is a permanent method of joining metal?

- Welding
- Knock down fittings
- Screws
- Nuts and bolts

1

**Question 8**

A material that can be drawn into a long thin wire is said to have what property?

- Hardness
- Elasticity
- Ductility
- Toughness

1

**Question 9**

What is the name of the process used to control the brittleness caused as a result of hardening?

- Annealing
- Tempering
- Normalising
- Case hardening

1

**Question 10**

A screw thread M8 x 1.2 is to be cut in a metal block. What size hole must be drilled before the thread can be cut?

- 8.0mm
- 9.2mm
- 6.8mm
- 7.8mm

1

**Question 11**

A material that resists abrasive wear and indentation has which one of the following properties?

- Elasticity
- Hardness
- Plasticity
- Malleability

1

**Question 12**

Which one of the following processes involves the use of heat?

- Soldering
- Threading
- Pop riveting
- Knock down fittings

1

**Question 13**

Which one of the following materials is an alloy?

- Copper
- Zinc
- Brass
- Aluminium

1

**Question 14**

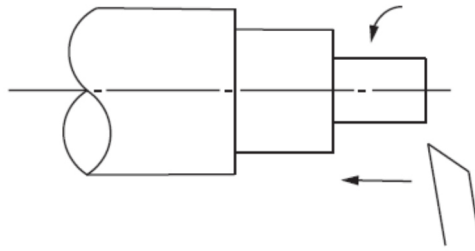
Which property is being described? *'The ability to withstand sudden force without fracturing?'*

- Ductility
- Toughness
- Hardness
- Malleability

1

**Question 15**

Which turning process is shown below?



- Knurling
- Parallel turning
- Parting off
- Taper turning

1

**Question 16**

Which type of drill bit is shown below?



- Twist
- Countersink
- Flat
- Masonry

1

**Question 17**

Which of the following metals should not be used outdoors without a protective coating of a different metal?

- Aluminium alloy
- Copper
- Low carbon steel
- Zinc

1

**Question 18**

Which one of the following will rust if left outside in the rain?

- Aluminium
- Mild steel
- Carbon Fibre
- Pine

1

**Question 19**

Which one of the following finishes is best applied to the mild steel hanging basket bracket shown below?

- Plastic dip coating
- Stain
- Wax polish
- Varnish



1

**Question 20**

A kitchen stool is shown below. When a person sits on this stool, what is the main force on the stool leg?

- Compression
- Shear
- Torsion
- Tension



1

**Question 21**




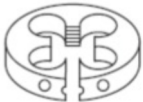



Shear strength is defined as:

- the ability of a material or joint to withstand being pulled apart
- the ability of a material to return to its original shape once a deformation force is removed
- the ability of a material to withstand being squashed
- the ability of a material to withstand abrasive wear and indentation

1

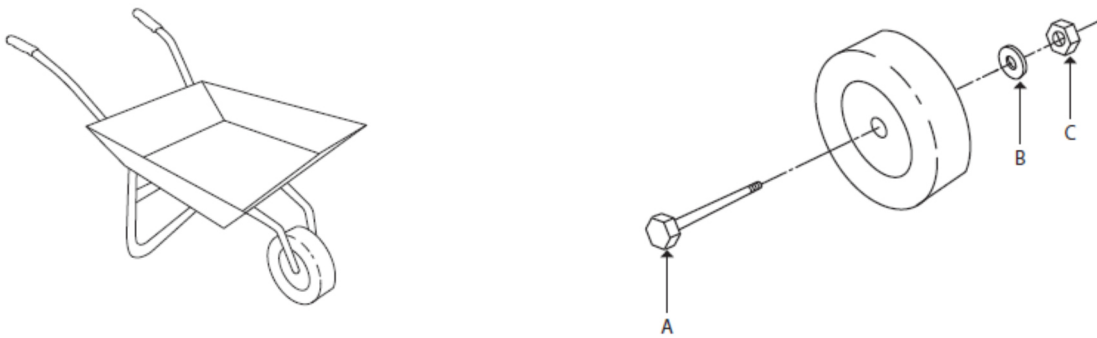
Question 22

Complete the table below.

Tool / Equipment	Name	Use
		
		
		
		
		
		
		

**Question 23**

The diagram below shows a wheelbarrow. The exploded view of the front axle for the wheelbarrow is also shown.

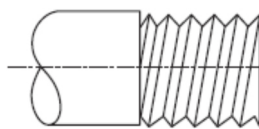


(a) (i) Name the parts labelled A, B and C

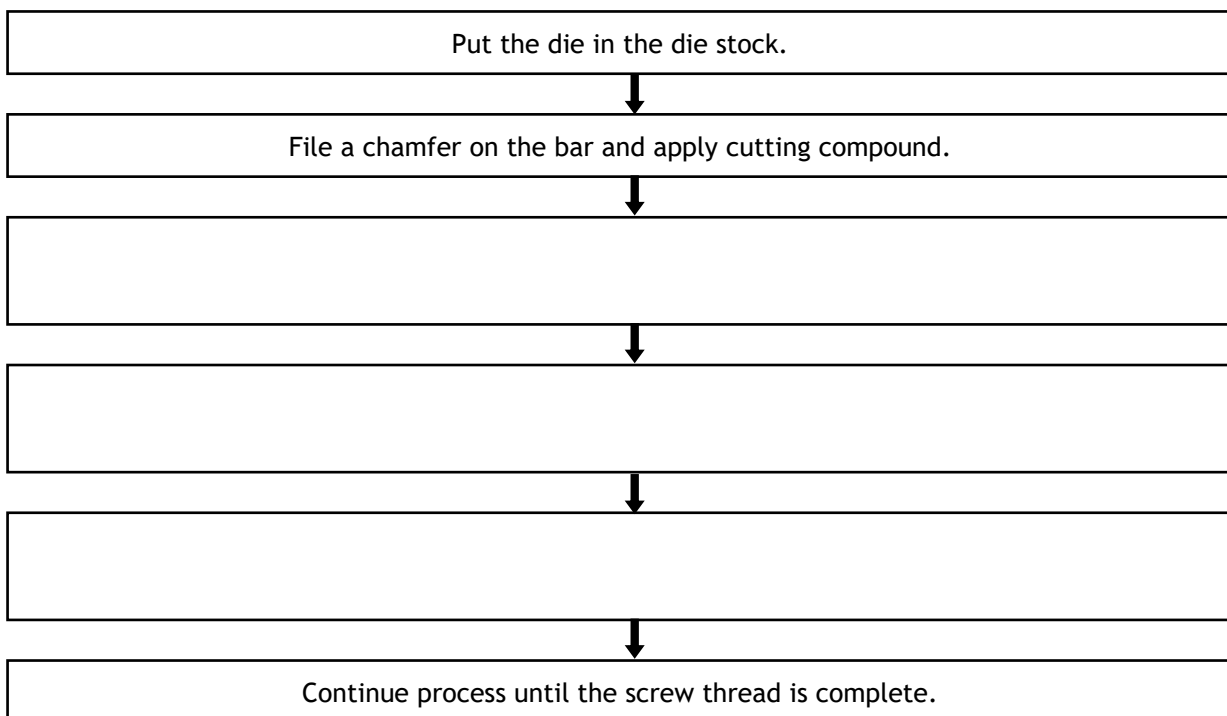
- A
- B
- C

(ii) State whether the joining method shown above is a temporary or permanent joining method.

(b) The external screw thread shown below can be made using hand tools in a school workshop.



Complete the flow chart to show the correct sequence for cutting a screw thread. Some stages have been completed for you.



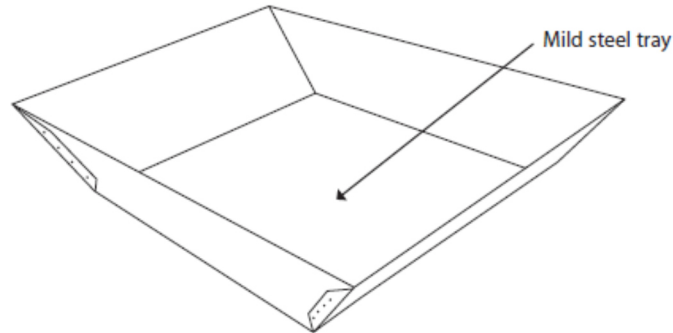


(c) Name two different metal joining processes which involve the use of heat.

- 1.
- 2.

2

(d) The wheelbarrow tray is made from mild steel.



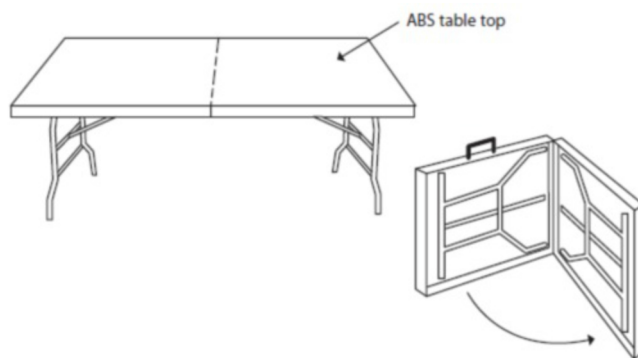
Explain **two** advantages of making the wheelbarrow tray from mild steel.

- 1.
- 2.

2

#### Question 24

The drawing below shows a garden table.



(a) The legs of the garden table are made from mild steel.

State **two** reasons for applying a finish to the mild steel table legs.

- 1.
- 2.

2

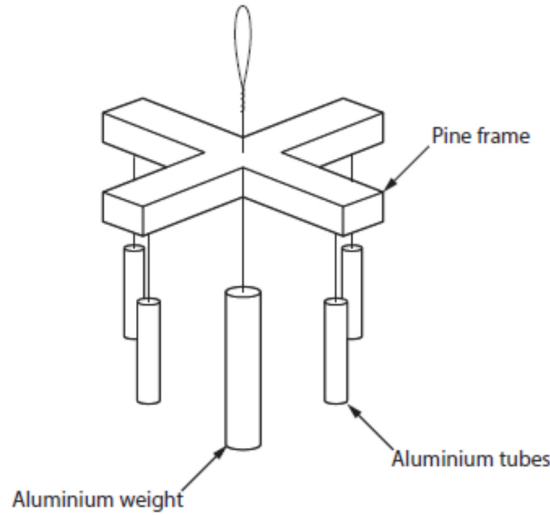
(b) Name two finishes that could be applied to the mild steel table legs.

- 1.
- 2.

2

**Question 25**

The drawing below shows a wind chime that is made from pine and aluminium.



(a) State two properties of aluminium that make it suitable for the wind chime.

- 1.
- 2.

2

(b) A chamfer has been added to the top and bottom edges of the aluminium tubes. State two reasons for adding the chamfer.

- 1.
- 2.

2

**Question 26**

Complete the table by naming the correct metal from the list below to match each description.

Mild Steel    Cast Iron    Copper    Stainless Steel    Brass    Aluminium

Metal	Description
	Hard, tough, used to make sink units.
	Hard, brittle, used to make metalwork vices.
	Lightweight, resists corrosion, used to make aircraft bodies.

3

**Question 27**

The image below shows the frame of a mass-produced chair made from mild steel.



(a) One reason mild steel was chosen was because it is easily welded.

(i) Name one other method of joining mild steel which involves the use of heat.

1

(ii) Explain two other reasons why mild steel is an appropriate choice of material for the frame of the chair.

1.

2

2.

(b) Describe two health and safety precautions that should be taken when welding.

1.

2

2.

(c) The metal parts are held in a jig when they are being welded.

Explain two reasons why a jig is used when the parts are being welded.

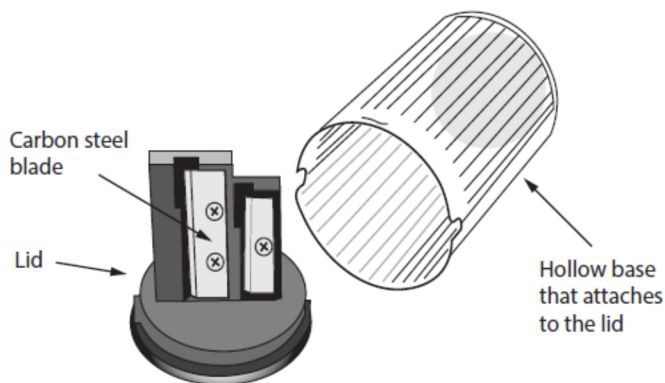
1.

2

2.

**Question 28**

The drawing below shows a pencil sharpener.



(a) (i) State **two** properties of carbon steel that make it suitable for the blade of the pencil sharpener.

- 1.
- 2.

2

(ii) Describe **one** reason why carbon steel is a better choice of metal for the blade than aluminium.

1

(b) The blade of the pencil sharpener has been heat treated.

Explain **one** reason for heat treating the blade of the pencil sharpener.

1

**Question 29**

Metal alloys are a mixture of two or more metals.

Correctly match the following alloys to the metals from which they are made.

*Stainless steel*

*Brass*

*Duralumin*

*Bronze*

**Metals**

**Alloy**

Copper (65%) + Zinc (35%)

=

Steel (72%) + Chrome and Nickel (18%)

=

Aluminium (95%) + Copper (4%) + Magnesium (1%)

=

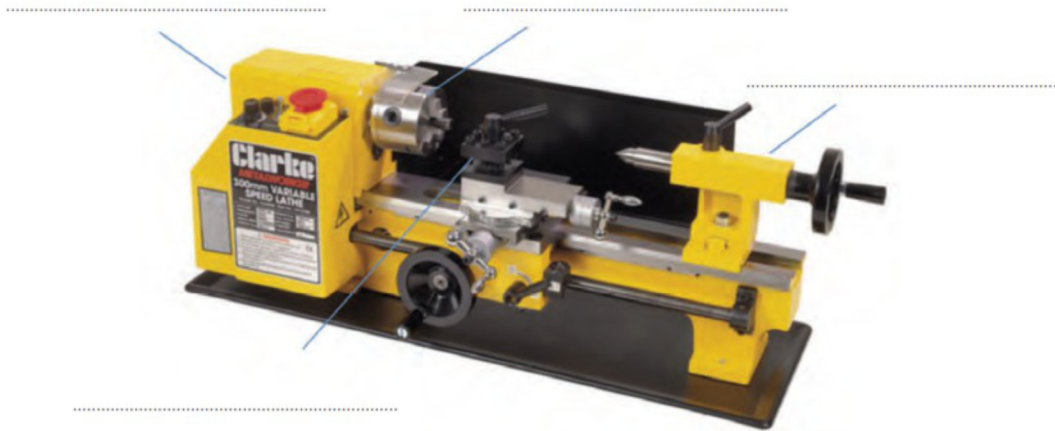
Copper (90%) + Tin (10%)

=

4

**Question 30**

(a) A metalworking machine is shown below. State the name of the machine shown.



*Name of machine:*

1

(b) Use the words below to label the machine above.

*Tailstock*

*Tool post*

*Chuck*

*Headstock*

4

(c) State two checks that should be made to the machine before switching it on.

1.

2.

2

(d) State three personal safety precautions that should be observed when using the machine shown.

1.

2.

3.

3

**Question 31**

The coat rack shown below has been designed for use in a primary school. The frame is made from mild steel and the top rail is made from laminated chipboard.



(a) The coat rack is designed to be sold in flat-pack form.  
Explain one advantage *to the manufacturer* of making the coat rack flat-pack.

1

(b) Designers must consider a wide range of material properties when designing and making products.  
Explain the following metal properties:

(i) Ductility

2

(ii) Toughness

(c) The coat hooks shown below are made from mild steel and have been dip coated.

(i) Describe the main steps in the dip coating process.



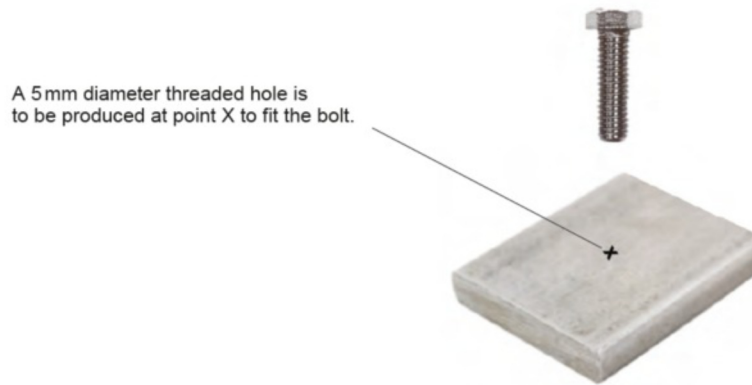
4

(ii) After dip coating, the coat hooks felt gritty. State a reason why this may have happened.

1

**Question 32**

A piece of mild steel and a 5mm diameter bolt are shown below.



(a) State the names of the **two tools** used to cut the thread in the hole in the metal.

2

(b) Explain in detail how you would produce the threaded hole in the piece of metal.

4

(c) (i) Explain what is meant by the term 'drunken thread'.

1

(ii) Describe two methods of ensuring a high quality thread is cut.

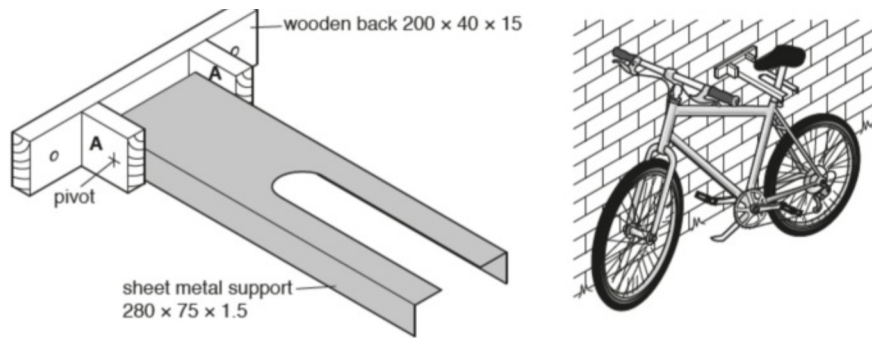
1.

2

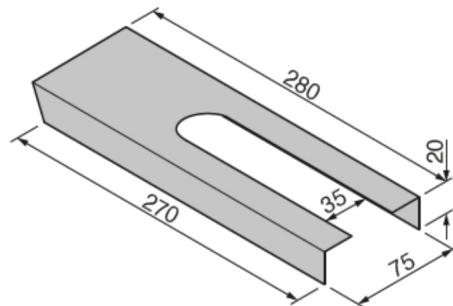
2.

**Question 33**

Shown below is a cycle rack that could be fixed to the wall of a garage or shed.



(a) Shown below is a more detailed view of the sheet metal support.



An outline of the sheet metal is shown below. **Sketch onto the image below** to show the **surface development** of the support. *Indicate waste material with hatching lines.*



(b) It was decided to make the support from a non-ferrous metal.

(i) State the name of a non-ferrous metal.

(ii) State one advantage of using a non-ferrous metal over a ferrous metal.

3

1

1



(c) To make the support, the slot will be cut out and the metal will be bent to shape.

(i) Describe how the slot would be cut out of the sheet metal and made safe for use. *You must reference all tools and equipment required. You may use sketches to illustrate your answer.*

3

(ii) Describe how the sheet metal would be bent into shape. *You must reference all tools and equipment required. You may use sketches to illustrate your answer.*

3

**Question 34**

The picture below shows a section of a steel frame that has been joined using the brazing process.



Using notes and sketches, describe how you would use the brazing process to successfully join the parts as shown.

**Question 35**

The copper used to make the bowl was annealed before being made into its final form.

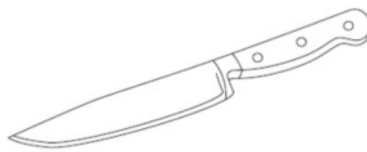
Explain why the copper was annealed.



1

**Question 36**

The blade of the kitchen knife shown below is made from stainless steel.



(a) State two properties of stainless steel that make it suitable for the blade of the knife and justify your answers.

Property 1

Reason

Property 2

Reason

4

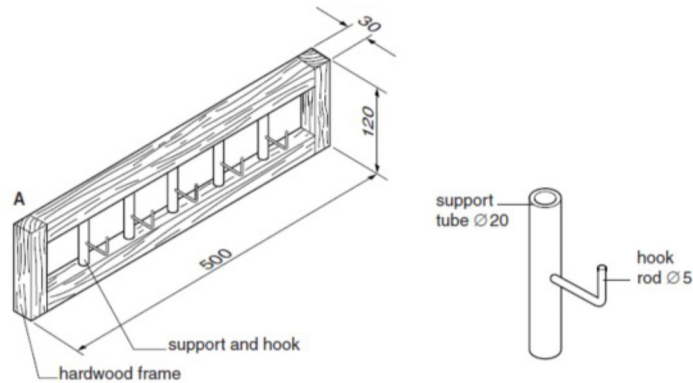
(b) Cheaper knife blades can be made from carbon steel which have been hardened.

Describe the process of hardening the knife blade.

2

**Question 37**

Shown below is a wall mounted coat rack and details of one support and hook. The coat rack has a hardwood frame. The brass supports are held in holes drilled into the hardwood frame. The five supports will all be cut from a single length of brass tube.



(a) Complete the table by naming one tool or item of equipment for each process.

Process	Tool / Equipment
Measure	
Mark out	
Cut to length	

(b) Give one reason why brass has been used to make the supports.

(c) (i) State one heat process that could be used to permanently join the brass hooks to the brass support tubes.

(ii) State one safety precaution that should be observed when carrying out a heat process in the workshop.

3

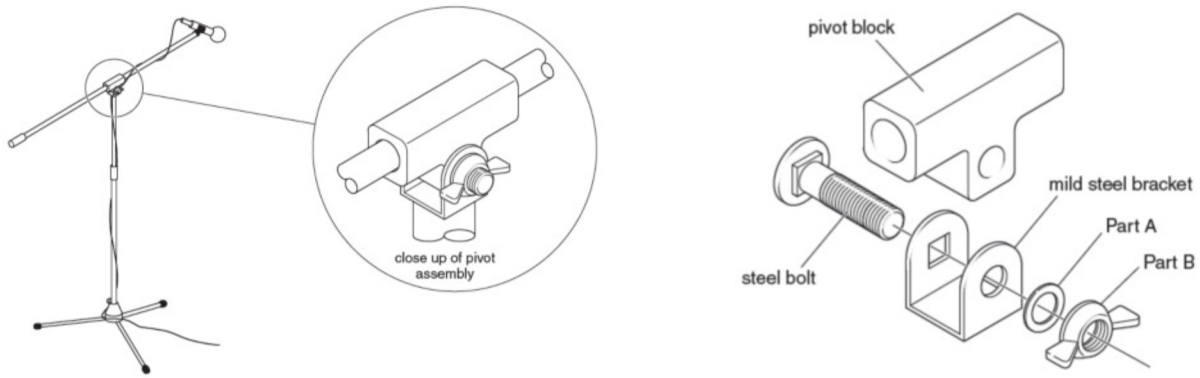
1

1

1

**Question 38**

A microphone stand is shown below. An exploded view of the pivot assembly is also shown.



(a) State the names of parts A and B.

A

B

(b) State one reason why Part B has been used rather than a simple hexagonal nut.

(c) The bracket has been made from one piece of 3mm mild steel as shown below. Complete the table below to show one tool or item of equipment for each process involved in the manufacture.



Process	Tool or equipment used
Cutting the outer shape	
Smoothing the edges	
Bending into shape	

(d) Describe how the square hole could be cut out using workshop tools.

**Question 39**

A metal bracelet is shown below.



(a) Name one suitable non-ferrous metal from which the bracelet could be made.

1

(b) Explain two reasons why your chosen metal is suitable for making the bracelet.

1.

2

2.

(c) The bracelet is made from a flat strip of metal.  
State an appropriate thickness for the strip of metal.

1

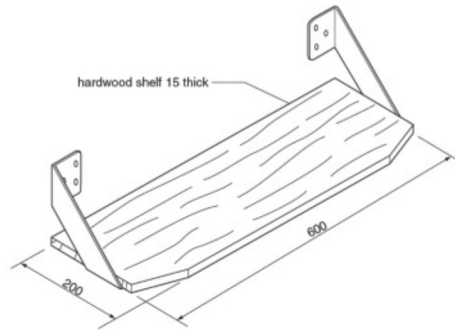
(d) The table below shows three of the processes used to make the bracelet by hand. Complete the table by naming the tools required to carry out each task.

Process	Tool(s) required
Cut metal sheet to length	
Form holes in sheet metal	
Smooth cut edges	

3

**Question 40**

The shelf shown below is made from hardwood and is supported by two aluminium brackets.



(a) (i) State two benefits of using a template to mark out the brackets.

1.

2.

(ii) Explain why a template would have to be made from wood or metal when marking out large quantities of the bracket.

(b) Aluminium is a material that can be self finished.  
Explain what is meant by the term self finished.

(c) Explain why round head screws rather than countersink head screws would be used to secure the brackets to the wall when the brackets are made from 1.5mm thick aluminium.

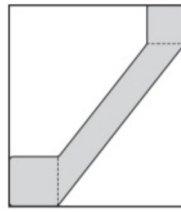
2

1

1

1

(d) The diagram below shows the bracket marked out on the aluminium.



Describe how one bracket could be cut out by hand and the edges made smooth. *You may use sketches to help illustrate your answer.*

2

### Question 41

Shown below are three waste bins used for different purposes, and their capacity in litres.



Ash bin  
90 litres



Rubbish bin  
90 litres



Wheelie bin  
140 litres

The ash bin is made from corrugated, zinc plated mild steel.

(a) Explain the term corrugated.

1

(b) Explain why the mild steel has been zinc plated.

1

(c) Explain one advantage of using mild steel for the ash bin, rather than plastic.

1