



Answer ALL the questions. Write your answers in the spaces provided.

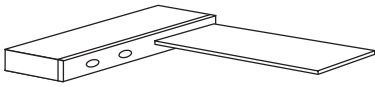
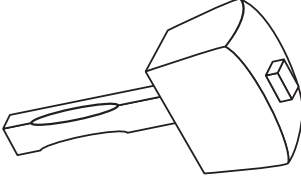
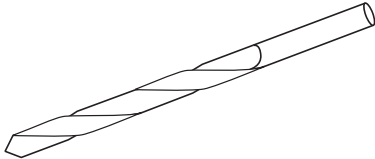
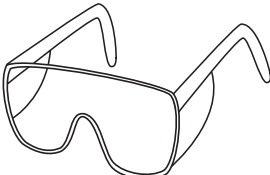
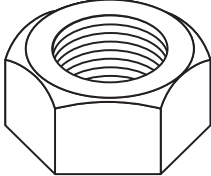
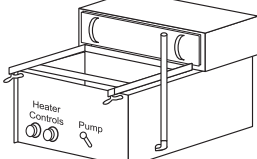
1. The table below shows some tools, components and equipment.

(a) Complete the table by:

(i) naming each tool, component or piece of equipment

(ii) describing its use

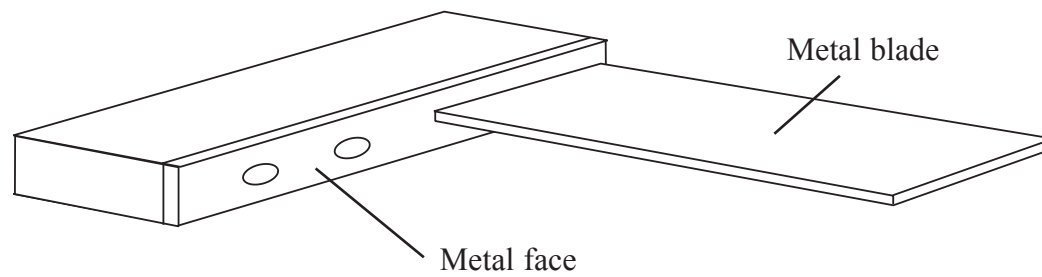
The first one has been done for you.

Tool/Component/ Equipment	Name	Use
	Try square	Marking out right angles on wood
		
		
		
		
		

(10)



(b) The drawing below shows a try square.



(i) The surface of the metal blade has been plated.

Give **one** reason why the metal blade is plated.

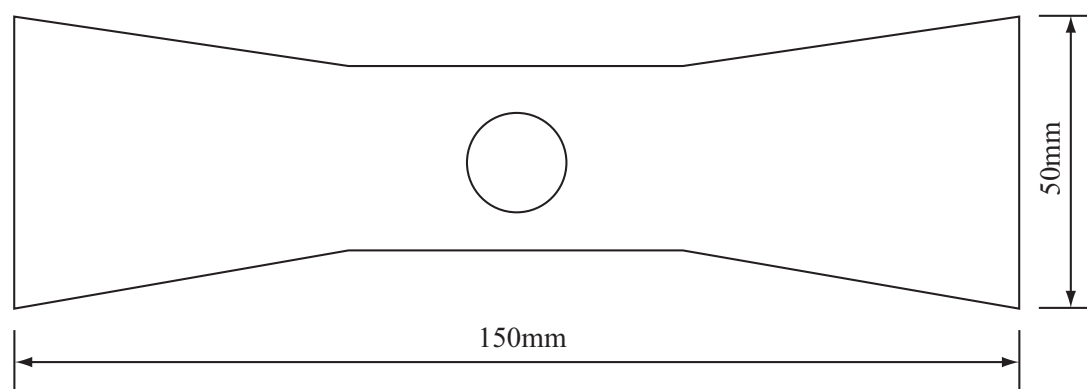
..... (1)

(ii) The metal face is made from brass, an alloy.

Mark with a cross (☒) **one** other alloy from the list below.

iron ☒    copper ☒    aluminium ☒    mild steel ☒ (1)

(c) A student needs to mark out 10 identical copies of the shape below.



The shape is marked out onto an acrylic sheet using a template and a marking-out tool.

(i) Name **one** marking-out tool which can be used to mark around the template.

..... (1)

(ii) Give **two** reasons for using a template.

1 .....

2 .....

(2)



Leave blank

(d) The original template was designed and manufactured on a CAD/CAM system.

Choose terms from the following list to complete the statements below about the design and manufacture of the template.

Each term may be used **once** or **not at all**.

- |                |                |                    |              |
|----------------|----------------|--------------------|--------------|
| <b>EPOS</b>    | <b>email</b>   | <b>high volume</b> |              |
| <b>CAD/CAM</b> | <b>virtual</b> | <b>CNC</b>         | <b>batch</b> |

Statements about the design and manufacture of the template.

1. During the design stage of the template, CAD was used to create a ..... product on screen.
2. Once the design was complete, ..... was used to send the drawings and information to the manufacturer.
3. The technical term for making 100 identical templates is ..... production.

(3)

(e) A manufacturer has been asked to make 10,000 of the shapes, in acrylic, using CNC machinery.

(i) Give **two** advantages for the manufacturer of using CNC machinery to produce the shapes in acrylic.

1 .....

2 .....

(2)

(ii) Explain **one** reason why CNC machinery is not normally used for one-off production.

.....

.....

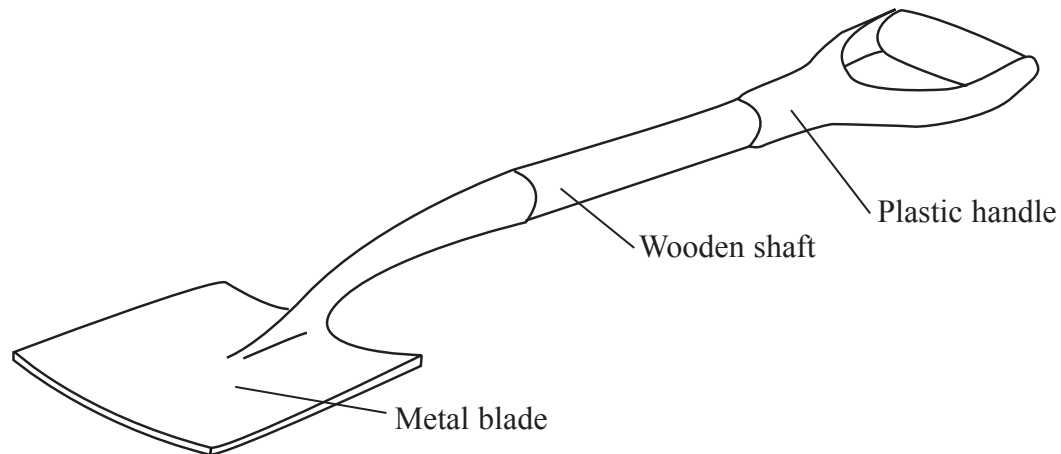
(2)

Q1

(Total 22 marks)



2. The drawing below shows a garden spade used for digging in a garden.



(a) The wooden shaft has been made from a hardwood.

Mark with a cross **one** hardwood from the list below which is suitable for the wooden shaft.

- ash     hardboard     MDF     pine

(1)

(b) One property of the metal used for the blade is hardness.

(i) Name **two** other properties the metal for the blade must have.

1 .....

2 .....

(2)

(ii) Give **three** reasons why the metal for the blade must have the property of hardness.

1 .....

2 .....

3 .....

(3)



(c) ABS has been used for the plastic handle. ABS has the property of plasticity.

(i) Give **three** other properties of the ABS plastic.

1 .....

2 .....

3 .....

(3)

(ii) The ABS plastic handle is formed using an injection moulding process.

Explain **one** reason why ABS plastic needs the property of plasticity.

.....

.....

(2)

(d) The garden spade has passed a British Standards test.

Give **three** advantages for the user of the garden spade having passed the British Standards test.

1 .....

.....

2 .....

.....

3 .....

.....

(3)



Leave  
blank

(e) A lot of wood is wasted in the production of the shaft for the garden spade.

Describe **two** effects on the environment of wasting wood.

1 .....

.....

2 .....

.....

(4)

(f) The wooden shaft of the garden spade is manufactured using CAD/CAM.

Explain **two** effects on a company's workforce of using CAD/CAM to manufacture the wooden shaft.

1 .....

.....

2 .....

.....

(4)

Q2

(Total 22 marks)

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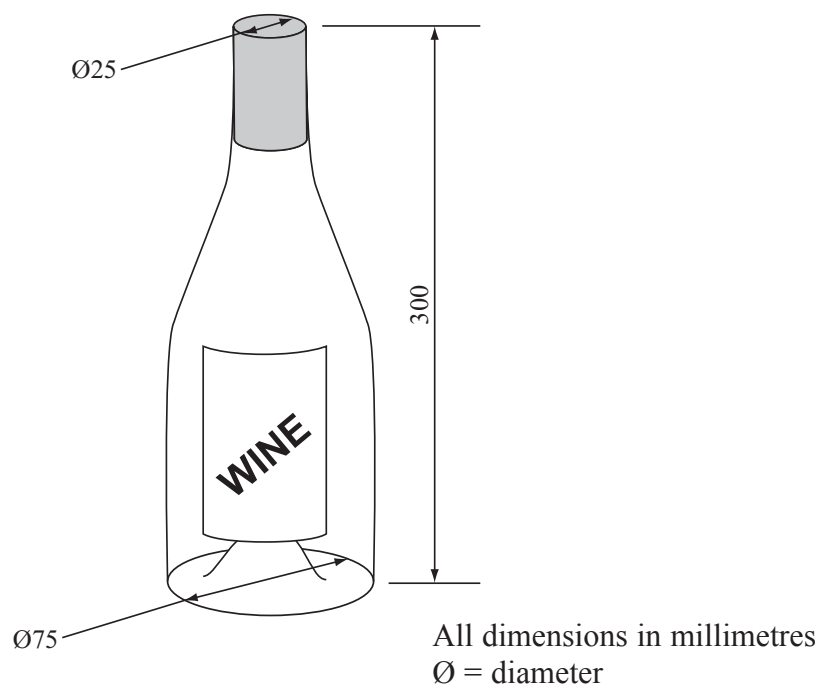


3. A wine bottle storage system is needed for use in the home.

The specification for the wine bottle storage system is that it must:

- not fall over and hold up to five bottles
- be flat pack for assembly without any tools
- allow each bottle to be easily removed
- be made using materials and processes suitable for one-off production

**ADDITIONAL INFORMATION**



(a) In the spaces opposite, use sketches and, where necessary, brief notes to show **two different** design ideas for the wine bottle storage system that meet this specification.

Do **not** evaluate your designs in part (a).

Candidates are reminded that if pencil is used for diagrams/sketches, it must be dark (HB or B). Coloured pens, pencils and highlighter pens must **not** be used.

Please do not write in the space below. Please write your answers in the space provided opposite.





**Design Idea 1**

Leave  
blank

**(8)**

**Design Idea 2**

**(8)**



Leave  
blank

(b) Three of the original specification points are repeated below.

Evaluate how **one** of your design ideas succeeds or fails to meet each of the specification points.

Write the number of your chosen design idea (1 or 2) here .....

(i) The wine bottle storage system must not fall over and hold up to five bottles.

.....  
.....  
.....  
.....

(2)

(ii) The wine bottle storage system must be flat pack for assembly without any tools.

.....  
.....  
.....  
.....

(2)

(iii) The wine bottle storage system must allow each bottle to be easily removed.

.....  
.....  
.....  
.....

(2)

(Total 22 marks)

Q3

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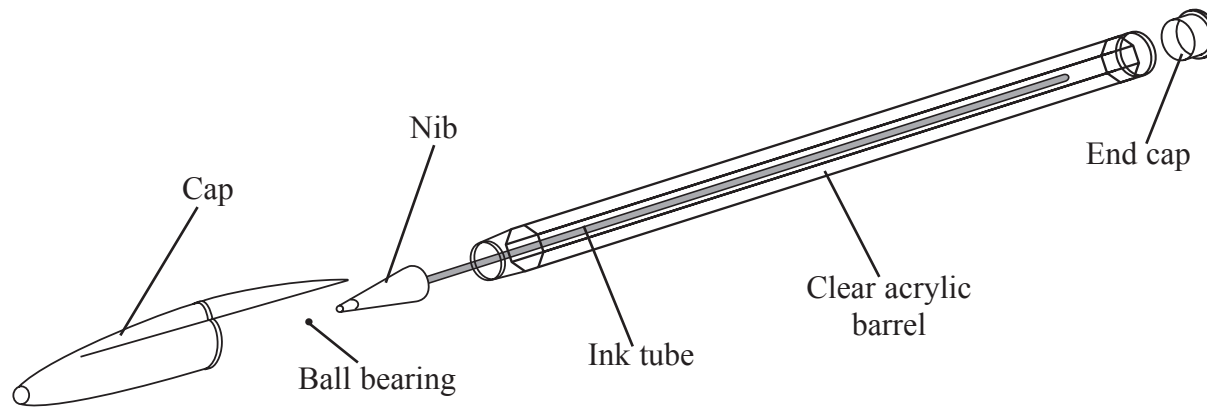


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4. The drawing below shows a ballpoint pen.



(a) Two specification points for the ballpoint pen are that it must:

- clip onto a shirt pocket when not in use
- provide a steady flow of ink when being used

Under each of the following headings, give **one** more point that should be included in the specification for this ballpoint pen.

For each point, give **one** reason why it should be included.

**Quality**

Point .....

Reason .....

.....

.....

**Environment**

Point .....

Reason .....

.....

.....

**Market**

Point .....

Reason .....

.....

.....

(6)



(b) The ball bearing is made from silver steel.  
One reason why the ball bearing is made from silver steel is that it will not rust.

Give **two** other reasons why silver steel is a suitable material from which to make the ball bearing.

1 .....

2 .....

(2)

(c) The cap is manufactured by injection moulding.

Give **two** reasons why injection moulding is a suitable process to manufacture the cap.

1 .....

2 .....

(2)

(d) The barrel is made from acrylic.

Give **two** properties of acrylic that make it suitable for the barrel.  
For each property give **one** reason why it makes acrylic suitable for the barrel.

Property 1 .....

Reason .....

.....

Property 2 .....

Reason .....

.....

(4)

(e) The end cap is made from a blue material.

Explain **one** reason why the end cap is made from a blue material.

.....

.....

(2)



Leave blank

- (f) The ink tube is manufactured by extrusion.  
Extrusion is a self-finishing process.

Explain why a self-finishing process is used to manufacture the ink tube.

.....  
.....

(2)

- (g) Two purposes of the ballpoint pen are to:

- clip onto a shirt pocket when not in use
- provide a steady flow of ink

Explain, under the following headings, how the ballpoint pen achieves these purposes.

- (i) clip onto a shirt pocket when not in use

.....  
.....  
.....  
.....

(2)

- (ii) to provide a steady flow of ink

.....  
.....  
.....  
.....

(2)

(Total 22 marks)

Q4

**TOTAL FOR PAPER: 88 MARKS**

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