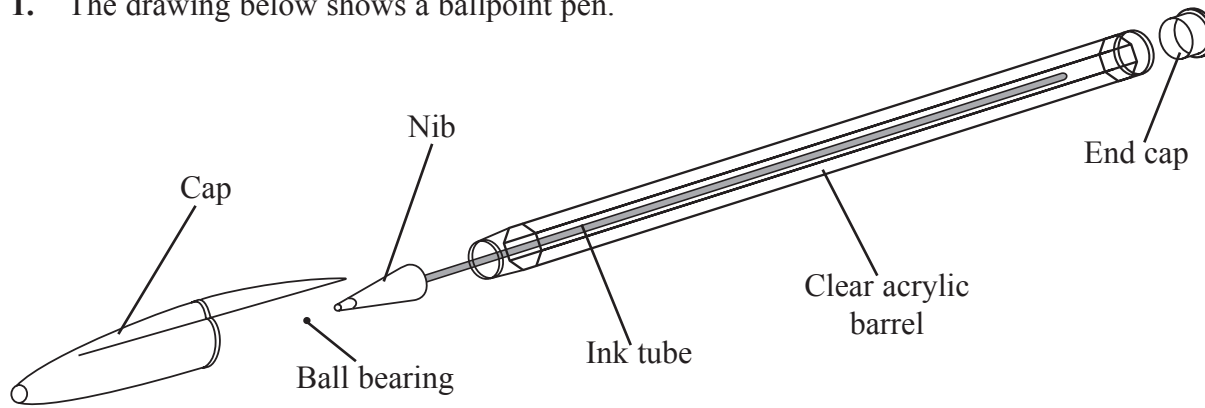




Answer ALL the questions. Write your answers in the spaces provided.

1. 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)



Leave  
blank

- (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)

Q1

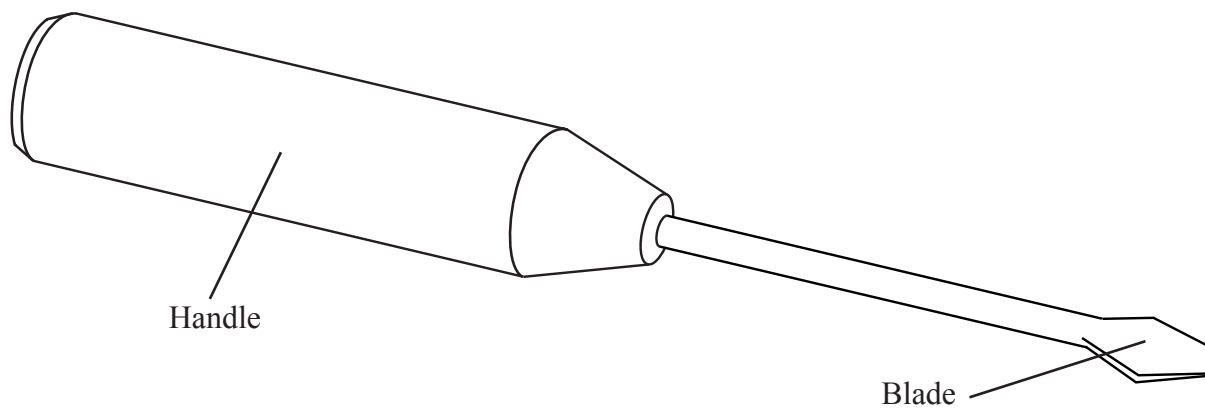


**BLANK PAGE**



Leave blank

2. The drawing below shows a screwdriver which has been made by a student in a school workshop.



(a) The blade of the screwdriver has been heat treated.

Give **three** health and safety risks associated with heat treatment.

1 .....

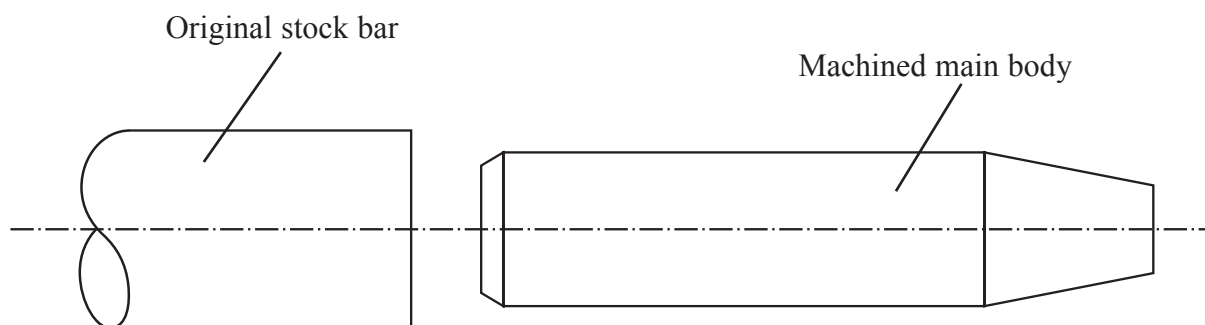
2 .....

3 .....

**(3)**

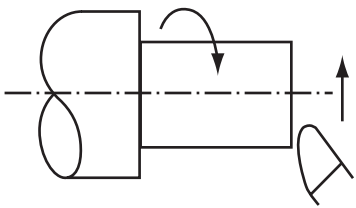
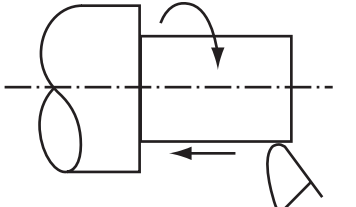
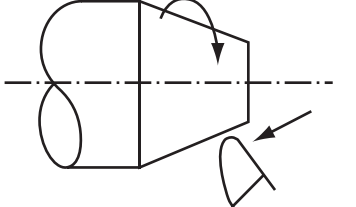
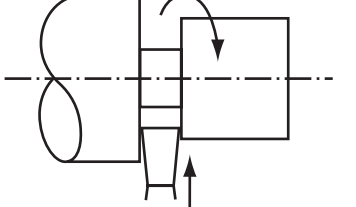


(b) Several turning processes have been used to manufacture the handle of the screwdriver.



The table below shows **four** of the turning processes used to manufacture the handle of the screwdriver.

Complete the table by naming the correct process given by **each** description.

Process Description	Process Name
	<p>The tool is moved at right angles to the centre across the end of the bar.</p> <p>.....</p>
	<p>The tool is moved along to reduce the diameter of the bar.</p> <p>.....</p>
	<p>The tool is moved at an angle.</p> <p>.....</p>
	<p>A narrow tool is fed into the work to trim to length from the stock bar.</p> <p>.....</p>

(4)



(c) The blade of the screwdriver must be securely joined into the handle.

Name **two** different methods of securely joining the blade into the handle.

1 .....

2 .....

(2)

(d) The handle of the screwdriver is plastic dip coated.

Explain **one** reason for plastic dip coating the handle of the screwdriver.

.....

.....

(2)

(e) A company manufactures the handles of the screwdriver in high volume using CNC machinery.

(i) Explain **two** reasons for using CNC machinery for the manufacture of the handles.

1 .....

.....

2 .....

.....

(4)

(ii) The manufacturer used a CAD system to model a new 'virtual' shape for the handle.

Give **three** reasons for creating 'virtual' shapes on screen.

1 .....

2 .....

3 .....

(3)





(f) Electronic links and ICT are used by manufacturers for easy and fast communication.

Describe **two** ways in which electronic links and ICT can be used by manufacturers for communication.

1 .....

.....

2 .....

.....

(4)

(Total 22 marks)

Leave blank

Q2

--	--



Leave  
blank

3. A company is designing a new bird seed feeder for sale in garden centre shops.

The specification for the bird seed feeder is that it must:

- hold bird seed securely and be easy to refill
- be clear of the ground and securely fixed
- allow birds access to the bird seed and keep the bird seed dry
- be made using materials and processes suitable for batch production

(a) In the spaces opposite, use sketches and, where necessary, brief notes to show **two different** design ideas for the bird seed feeder which 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.





<p><b>Design Idea 1</b></p>	<p>Leave blank</p>
<hr/> <p><b>Design Idea 2</b></p>	<p>(8)</p>

(8)

(8)



H 2 5 8 4 9 A 0 1 1 1 6



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 bird seed feeder must hold bird seed securely and be easy to refill.

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

(2)

(ii) The bird seed feeder must be clear of the ground and securely fixed.

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

(2)

(iii) The bird seed feeder must allow birds access to the bird seed and keep the bird seed dry.

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

(2)

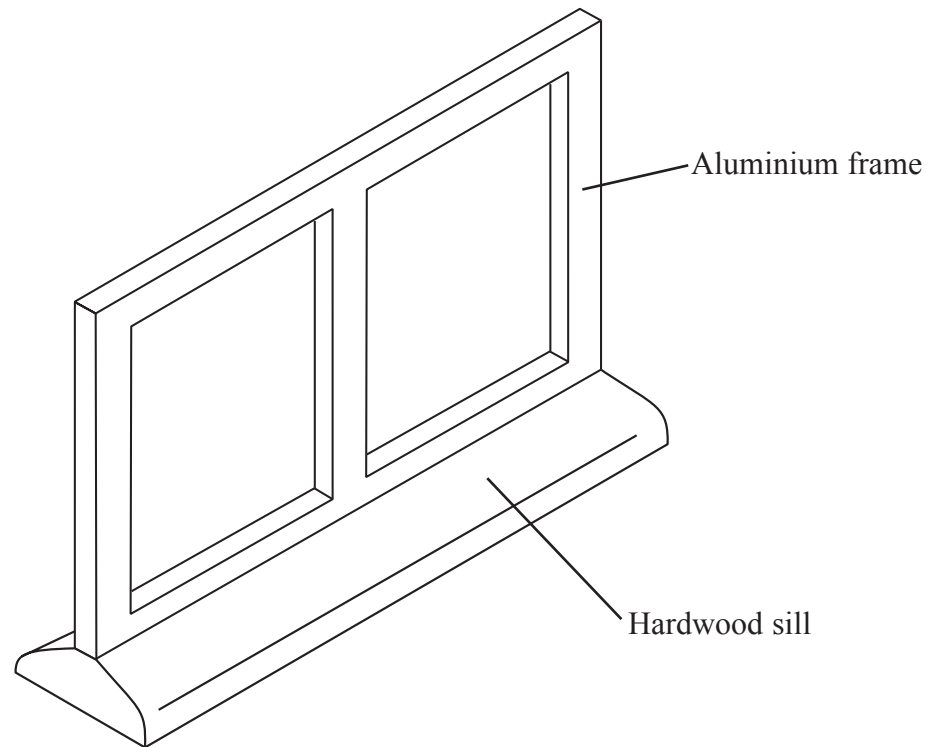
(Total 22 marks)

Q3



Leave blank

4. The window frame shown below is made from aluminium, a non-ferrous metal.



(a) (i) Give **three** properties of aluminium, a non-ferrous metal.

1 .....

2 .....

3 .....

(3)

(ii) Give **four** differences between ferrous and non-ferrous metals.

1 .....

2 .....

3 .....

4 .....

(4)



Leave  
blank

(b) The hardwood sill is made from mahogany.

Explain **two** advantages of using mahogany rather than pine, a softwood, for the sill.

- 1 .....
- .....
- 2 .....
- .....

(4)

(c) The window frame is sold with a British Standards label attached.

Describe **two** benefits to the consumer of being able to buy products with a British Standards label attached.

- 1 .....
- .....
- 2 .....
- .....

(4)

(d) During transportation the window frame has to be carefully wrapped and packaged.

Give **three** advantages to the environment of reducing product wrapping and packaging.

- 1 .....
- 2 .....
- 3 .....

(3)



Leave  
blank

(e) As a result of increased draught proofing and insulation with sealed double glazed windows, less energy is required in the heating of homes.

Explain **two** benefits for the environment of using less energy in the heating of homes.

1 .....

.....

2 .....

.....

(4)

Q4

(Total 22 marks)

**TOTAL FOR PAPER: 88 MARKS**

**END**



**BLANK PAGE**

