

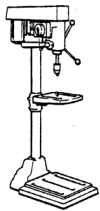
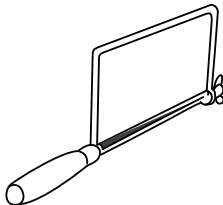
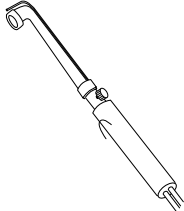

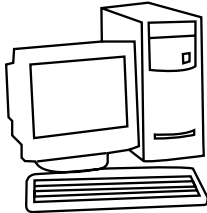
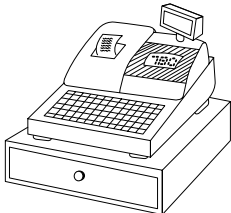
Answer ALL the questions. Write your answers in the spaces provided below.

1. The table below shows some tools and equipment.

(a) Complete the table by:

- (i) naming each tool or piece of equipment
- (ii) describing its use.

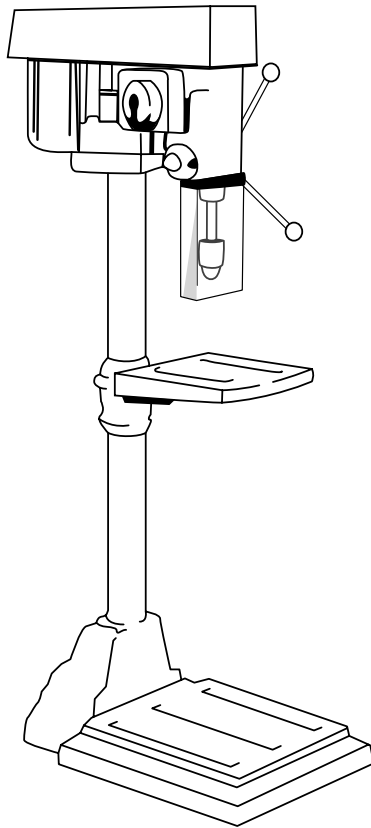
The first one has been done for you.

Tool/Equipment	Name	Use
	Pillar drilling machine	Used for drilling holes
		
		
		
		
		

(10)



(b) The drawing below shows a pillar drilling machine.



The pillar drilling machine is used for drilling holes.

Give **two** safety precautions that must be taken when using a pillar drilling machine.

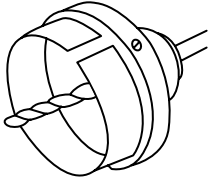
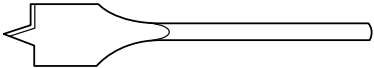
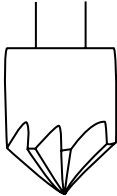
- 1
- 2

(2)



(c) The table below shows three different types of drill used in a school workshop.

In the table below, mark with a cross (☒) the correct name for each drill shown.

Drill type	Drill name
	<p>Flat bit <input type="checkbox"/></p> <p>Countersunk bit <input type="checkbox"/></p> <p>Hole saw <input checked="" type="checkbox"/></p> <p>Twist drill <input type="checkbox"/></p>
	<p>Flat bit <input type="checkbox"/></p> <p>Countersunk bit <input checked="" type="checkbox"/></p> <p>Hole saw <input type="checkbox"/></p> <p>Twist drill <input type="checkbox"/></p>
	<p>Flat bit <input checked="" type="checkbox"/></p> <p>Countersunk bit <input type="checkbox"/></p> <p>Hole saw <input type="checkbox"/></p> <p>Twist drill <input type="checkbox"/></p>

(3)



(d) The pillar drilling machine has been manufactured in batches.

Choose terms from the following list to complete the statements below about the manufacture of the pillar drilling machine.

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

Production line **Computer Integrated Manufacture (CIM)**

Quality control **Health and Safety** **CAD/CAM**

Statements about the manufacture of the pillar drilling machine.

1. A is used to assemble the various parts together.
2. ICT can be used to control the assembly of the parts of the pillar drilling machine using a system.
3. Regular checks are carried out in the manufacturing process as part of the process.

(3)

(e) A new pillar drilling machine is to be designed and made using CAD/CAM.

(i) Give **two** reasons why CAD may be used to design the new pillar drilling machine.

1

2 **(2)**

(ii) Describe **one** reason CAM may be used to manufacture parts of the new pillar drilling machine.

.....

..... **(2)**

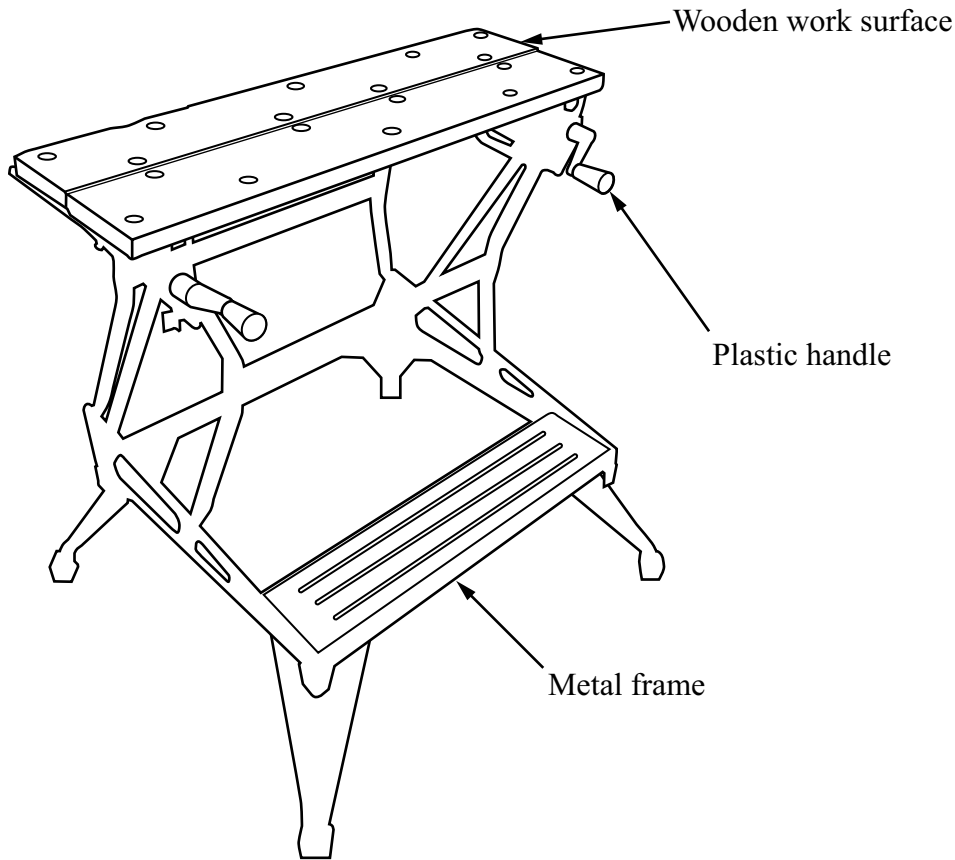
(Total 22 marks)

Q1

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2. The drawing below shows a portable workbench.



(a) (i) A ferrous metal is used for the frame.

Mark with a cross (☒) the ferrous metal in the list below:

- Brass Zinc Mild steel Aluminium

(1)

(ii) The plastic handle has been injection moulded from a thermoplastic.

Mark with a cross (☒) the thermoplastic in the list below:

- Epoxy resin ABS Carbon fibre Polyester

(1)

(b) The ferrous metal used for the frame has a plastic dip coated surface finish.

Give **two** reasons why the ferrous metal used for the frame has a plastic dip coated surface finish.

1

2

(2)



(c) (i) The wooden work surface is made from 25 mm thick plywood.

Use sketches and notes to show the construction of plywood.

(2)

(ii) Give **three** properties of plywood that make it suitable for the wooden work surface.

1

2

3

(3)

(iii) Describe **one** reason why plywood is used for the wooden work surface rather than chipboard.

.....

.....

(2)

(d) The 'kitemark' symbol shown below is found on the portable workbench.



Give **three** benefits for the consumer of the portable workbench being labelled with the 'kitemark' symbol.

1

2

3

(3)



(e) The portable workbench is manufactured in high volume using CAM.

Give **two** ways in which using CAM to manufacture the portable workbench will benefit the consumer.

1

2

(2)

(f) Manufacturers release new models of portable workbenches every few years.

Give **two** reasons why manufacturers release new models of portable workbenches every few years.

1

2

(2)

(g) Old portable workbenches are often thrown away instead of being recycled.

(i) Give **two** environmental disadvantages of throwing away old portable workbenches.

1

2

(2)

(ii) The portable workbench is made from plywood, a ferrous metal and a thermoplastic.

Describe **one** way in which **one** of these materials can be recycled.

.....

.....

(2)

Q2

(Total 22 marks)



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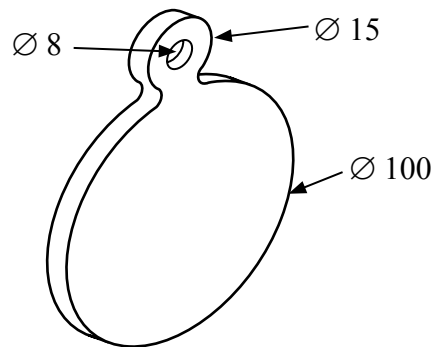
3. A cabinet to display medals is being designed.

The specification for the medal cabinet is that it must:

- be lockable and allow the medals to be seen
- have shelves that can be easily adjusted to different heights
- hold the medals in a fixed position
- be made using materials and processes suitable for one-off production.

ADDITIONAL INFORMATION

Details of the medals to be held in the cabinet:



Ø = Diameter
All dimensions in mm

(a) In the spaces opposite, use sketches and, where necessary, brief notes to show **two different** design ideas for the **medal cabinet** 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 OR DRAW IN THIS SPACE.

PLEASE USE THE SPACES OPPOSITE FOR YOUR DESIGNS.



Design Idea 1

(8)

Design Idea 2

(8)



(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 medal cabinet must be lockable and allow the medals to be seen.

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

(2)

(ii) The medal cabinet must have shelves that can be easily adjusted to different heights.

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

(2)

(iii) The medal cabinet must hold the medals in a fixed position.

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

(2)

(Total 22 marks)

Q3

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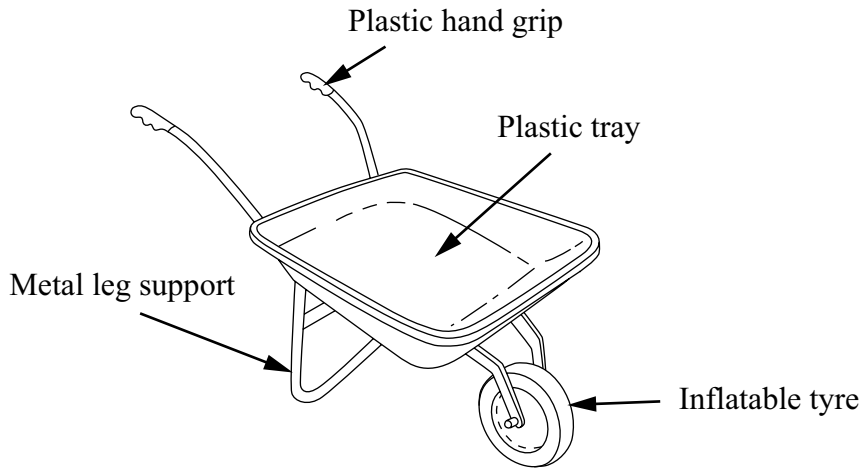


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4. The drawing below shows a wheelbarrow.

It is sold in do-it-yourself (DIY) stores.



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

- carry heavy loads
- go over rough, wet ground.

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

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

(i) **Quality**

Point

Reason

.....

(2)

(ii) **Environment**

Point

Reason

.....

(2)

(iii) **Safety**

Point

Reason

.....

(2)

(b) The leg support is made from mild steel tube.

One reason for making the leg support out of mild steel tube is that it can be easily joined by welding.

Give **two** other reasons why mild steel tube is a suitable material from which to make the leg support.

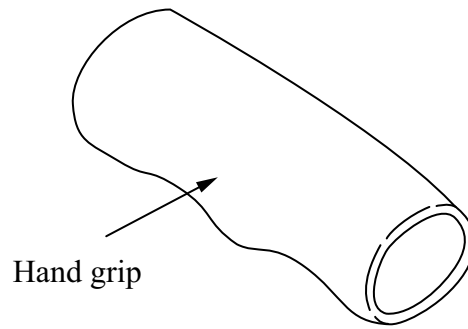
1

2

(2)



(c) The plastic hand grip is manufactured using the injection moulding process.



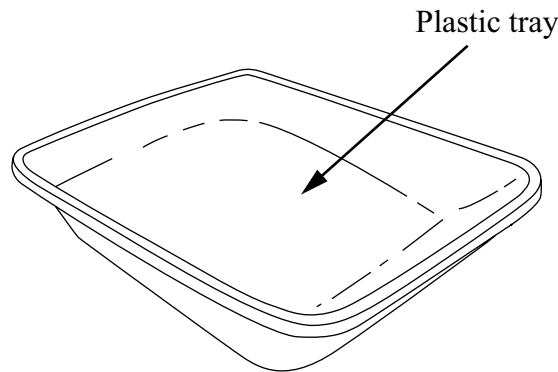
Give **two** reasons why the injection moulding process is suitable to manufacture the plastic hand grip.

1

2

(2)

(d) The plastic tray is made from ABS.



Give **two** properties of ABS that make it suitable for the tray.

For each property give **one** reason why it makes ABS suitable for the tray.

Property 1

Reason

.....

Property 2

Reason

.....

(4)



(e) The manufacturer of the wheelbarrow uses sampling during production.

Explain **one** reason for using sampling during the manufacture of the wheelbarrow.

.....
.....
(2)

(f) The leg support is painted.

Explain **one** reason why the leg support is painted.

.....
.....
(2)

(g) Two purposes of the wheelbarrow are to:

- carry heavy loads
- go over rough, wet ground.

Explain, under the following headings, how the wheelbarrow achieves these purposes.

(i) Carry heavy loads.

.....
.....
.....
.....
(2)

(ii) Go over rough, wet ground.

.....
.....
.....
.....
(2)

Q4

(Total 22 marks)

TOTAL FOR PAPER: 88 MARKS

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