



Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

GCSE ENGINEERING

Unit 1 Written Paper

Tuesday 24 May 2016

Morning

Time allowed: 1 hour

Materials

For this paper you must have:

- normal writing and drawing instruments.

Instructions

- Use black ink or black ball-point pen. Use pencil only for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in the answer book. Cross through any work you do not want to be marked.
- All dimensions are given in millimetres unless otherwise stated.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 75.
- You are reminded of the need for good English and clear presentation in your answers. Quality of Written Communication will be assessed in Question 4(b)(i).



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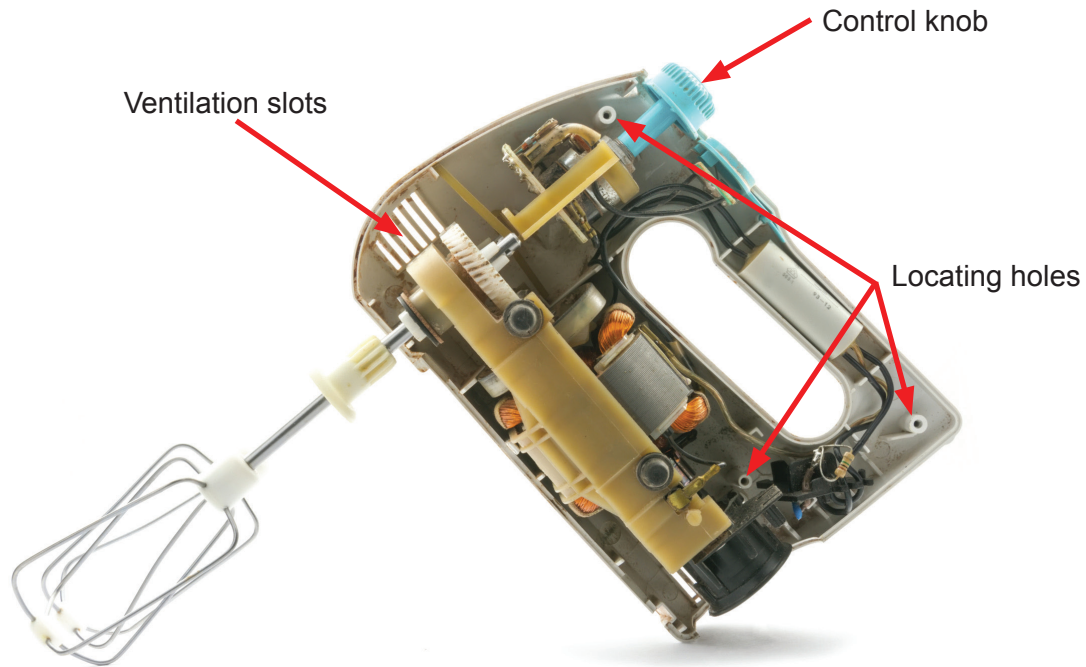
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Answer **all** questions in the spaces provided.

1 **Figure 1** shows the inside of an electric whisk.

Figure 1



1 (a) Describe the function of each labelled part.

[6 marks]

Control knob _____

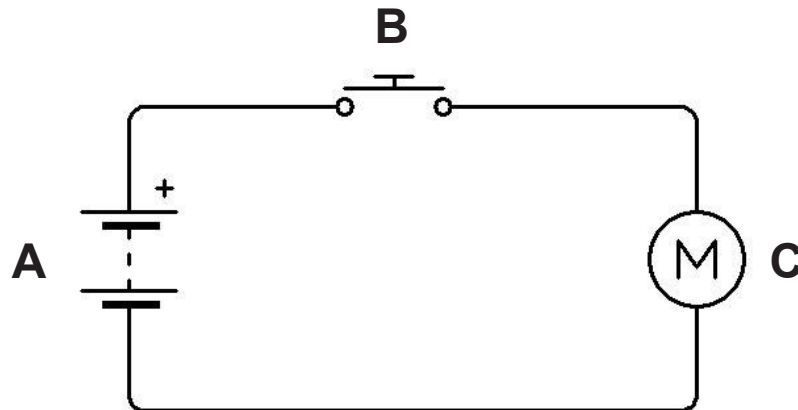
Locating holes _____

Ventilation slots _____



- 1 (b) Electrically powered tools operate using an electrical circuit as shown in **Figure 2**.

Figure 2



- 1 (b) (i) In the spaces below, identify the components labelled **A** to **C**.

[3 marks]

A _____

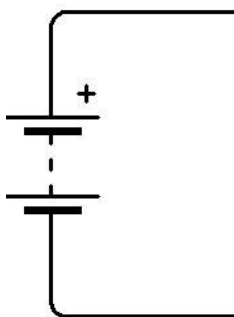
B _____

C _____

- 1 (b) (ii) Some electrical tools have Light Emitting Diodes (LEDs) that light up.

Complete the circuit diagram below to include an LED and resistor.

[2 marks]



Turn over ►



1 (b) (iii) Describe the function of an electrical switch.

[2 marks]

1 (b) (iv) Describe the function of a resistor.

[2 marks]

15



2 Figures 3 and 4 show two types of whisk.

Figure 3



Figure 4



Describe **three** differences between the two types of whisk.

[6 marks]

6

Turn over ►



3 (a) All metals are classified as ferrous or non-ferrous.

Complete the table below to show the correct category and a typical use for each metal. The first one has been completed for you as an example.

[6 marks]

Metal	Category	Typical use
Aluminium	Non-Ferrous	Drinks cans
Stainless Steel		
Copper		
Cast Iron		

3 (b) Using notes and sketches describe a welding process.

[4 marks]



3 (c) Riveting is a method of joining sheet materials together.

Give **one** advantage and **one** disadvantage of using riveting. In each case you should fully explain your answers.

[6 marks]

Advantage _____

Disadvantage _____

16

Turn over for the next question

Turn over ►



- 4 An electric jigsaw is shown in **Figure 5**. It can be used to cut sheet metals.

Figure 5



- 4 (a) Name **three** health and safety hazards when handling or cutting sheet metal.

For each hazard, suggest a safety measure.

[6 marks]

Hazard 1 _____

Safety measure _____

Hazard 2 _____

Safety measure _____

Hazard 3 _____

Safety measure _____



4 (b) (i) In industry, sheet materials are often cut using Computer Numerically Controlled (CNC) devices.

Explain how you would instruct a CNC device to cut a design from a sheet of material.

Quality of Written Communication will be assessed in your answer.

[6 marks]

4 (b) (ii) Give **two** advantages and **two** disadvantages of using CNC devices to cut materials instead of cutting them by hand.

[4 marks]

Advantage 1 _____

Advantage 2 _____

Disadvantage 1 _____

Disadvantage 2 _____



5 Garden hedge trimmers often look like the one shown in **Figure 6**.

Figure 6



A client asks a designer to create a new garden hedge trimmer.

Suggest **three** user requirements a designer would need to research before producing a specification for the trimmer.

For each requirement, state **one** reason why the designer would need the information. **[6 marks]**

Requirement 1 _____

Reason _____

Requirement 2 _____

Reason _____

Requirement 3 _____

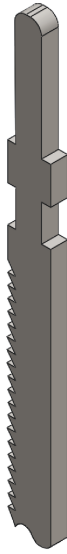
Reason _____

6



6 **Figure 7** shows an image of a typical jigsaw blade.

Figure 7

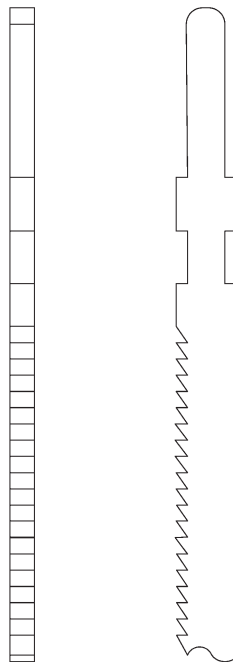


The maximum dimensions of the blade are as follows:

Length = 140 mm
Width = 12 mm
Thickness = 3 mm

Using standard drawing conventions, label the drawing below to show **two** dimensions of the blade.

[4 marks]



4

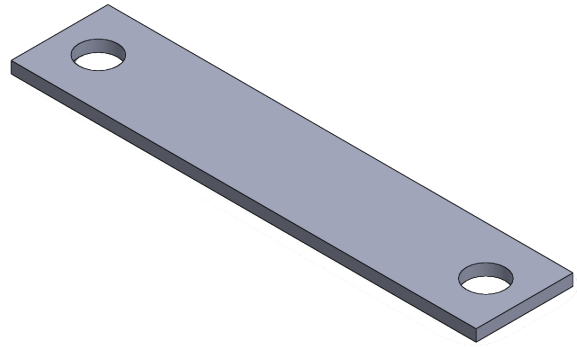
Turn over ►



7 A pillar drill is used to make two holes in a length of low carbon (mild) steel bar as shown in **Figure 8**.

Figure 8

Length of bar	200 mm
Width of bar	50 mm
Diameter of holes	20 mm
Distance between centres	160 mm



7 (a) Describe the process of accurately marking and drilling the holes.

[4 marks]



7 (b) (i) A manufacturer wants to make a batch of 100 of the bars shown in **Figure 8**.

Using notes and sketches show how the holes are drilled in the correct position without marking them out.

[4 marks]

7 (b) (ii) Give **four** benefits of using jigs or templates when manufacturing products.

[4 marks]

Benefit 1 _____

Benefit 2 _____

Benefit 3 _____

Benefit 4 _____

END OF QUESTIONS

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