

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										



General Certificate of Secondary Education

Engineering

48501

Unit 1 Written Paper

Mock Exam 1 – 2016 – 60 Minutes.

For this paper you must have:

- normal writing and drawing instruments.

Time allowed

- 1 hour

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 this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 75.
- The questions in Section A relate to the context referred to in the preliminary material that was previously issued.
- You are reminded of the need for good English and clear presentation in your answers. Quality of Written Communication will be assessed in Question 1 (c).

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	(15)
2	(10)
3	(6)
4	(6)
5	(4)
6	(9)
7	(12)
8	(6)
TOTAL	(68)

Section A

Answer all questions in the space provided

1. Figure one shows a cordless power drill.

Figure 1



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

6 Marks

Vent _____

Chuck _____

Screwdriver bit _____

1 (b). The casing on the hand held vacuum cleaner can be made by injection moulding process

Figure 2



1(b)(i) Name a suitable polymer for injection moulding.

(1 Mark)

(b)ii) Describe why the polymer you have named in part 1(b)(ii) is suitable for injection moulding?

(2 Marks)

Question 1 continues on the next page

1 (b)(iii) Using notes and/or sketches, describe the injection moulding process?

(6 Marks)

15

Section B

Answer all questions in the space provided

2. Figure three shows an isometric view of a motor used in a cordless drill hand held vacuum cleaner.

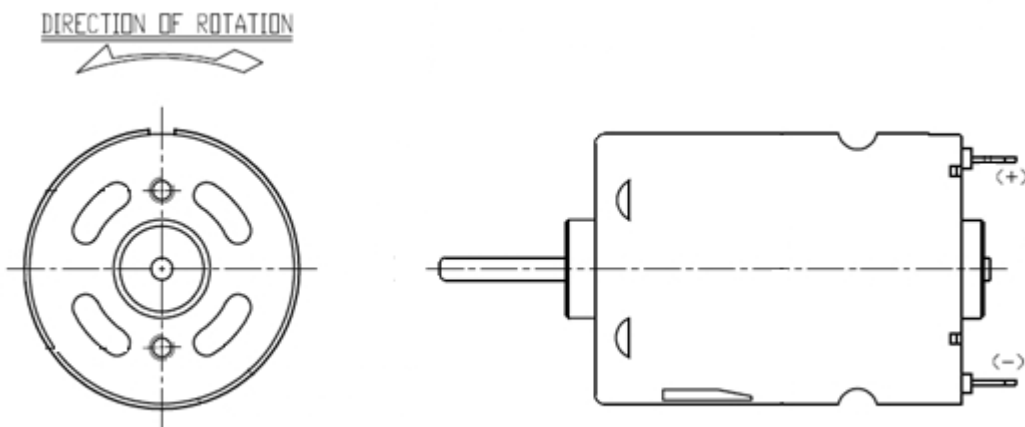
Figure 3



2(a) The motor diameter is 25mm diameter and the body width is 40mm
Using standard drawing conventions, add the dimensions to the drawing below.

4 Marks

Figure 4



Question 2 continues of the next page

2(b)(i) When designing new products engineers often use Computer Aided Design (CAD). Explain the benefits to the engineer of using CAD instead of drawing by hand. (3 Marks)

2(b)(ii) Engineers using exploded assembly drawings. Explain what is meant by an 'exploded assembly drawing'? (2 Marks)

2(b)(iii) Explain why there are only ever two views when drawing a round part in orthographic projection? (1 Mark)

3(b)(i) Expensive power drills have gearboxes made from metal.
Explain the benefits of using plastic gears in the gear box.
(3 Marks)

3(b)(ii) Metal gears used in power drill gear boxes are said to be more durable, explain why this is so?
(2 Marks)

3(b)(iii) Name a suitable polymer to manufacture gears from.
(1 Mark)

4 Hand held 'power sanders are made in different shapes and designs as shown in Figures 5 & 6

Figure 5



Figure 6



A client asks a designer to create a new design.

Suggest three user requirements a designer would need to consider before producing a specification for the handset.

For each user requirement, state a reason why the designer would need the information.

(6 Marks)

User requirement 1

Reason

User requirement 2

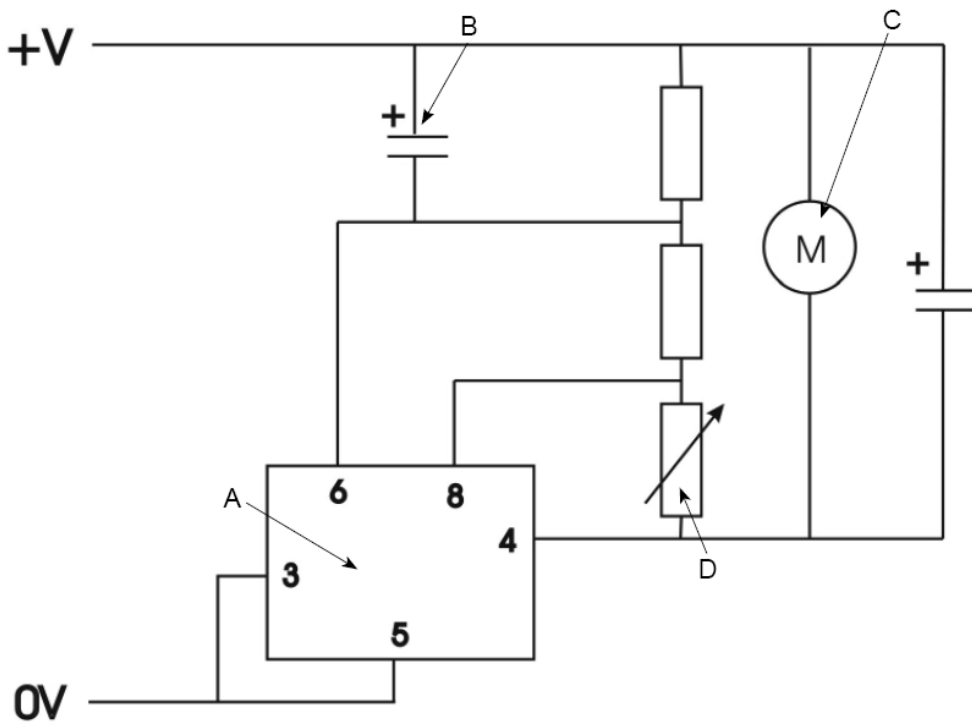
Reason

User requirement 3

Reason

6

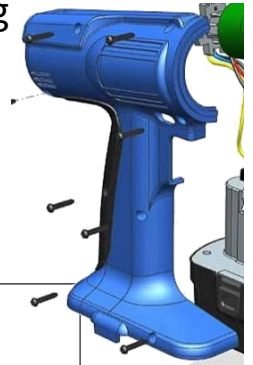
5 A speed controller circuit for an electrically powered vacuum cleaner is shown below.



Correctly identify the labelled components in the spaces below.

- A
- B
- C
- D

6 The table below lists 6 major operations to manufacture the outer casing of a power drill. Complete the table by inserting the identification letter in the correct box. Letters A-H (9 Marks)



Order	Operation	Tools and Equipment	Description
1	Make the mould	Vertical milling machine, cutting tool and vice	
2	Injection mould part		
3	Separate mould parts		
4	Deburr parts		Remove edges with a file, sand smooth
5	Finish Part		

Place moulded parts into vice and cut the sprue from each one **A**

File, Wet and Dry Paper **B**

Buffing wheel and spray gun **C**

Injection moulding machine, hopper, plastic pellets **D**

Place blank into vice, machine out the required shape. **E**

Remove scratches and spray. **F**

Hacksaw, Vice **G**

Place plastic pellets into the hopper, heat up and mould **H**

7(a) What impact has new technology had on the manufacture of parts.
Explain using different examples.

(6 Marks)

Example 1

Reason

Example 2

Reason

Example 3

Reason

6(b)(i) Modern manufacturing plants run efficiently using some of the following techniques. Explain below what it is/how it works.

(4 Marks)

Just In Time(JIT) Manufacture

Computer Integrated Manufacture

6(b)(ii) Whilst modern manufacturing plants use lots of new technology, give one example/area where a human is needed and why

(2 Marks)

8

Hand held power tools are usually powered by batteries.
Discuss the environmental effects of disposing of batteries.

You will be assessed on your Quality of Written Communication
in this question

(6 Marks)

6