

7.2 The Motor Effect

Question Paper

Course	AQA GCSE Physics
Section	7. Magnetism & Electromagnetism
Topic	7.2 The Motor Effect
Difficulty	Medium

Time allowed: 50
Score: /39
Percentage: /100

Question 1a

Figure 1 below shows a straight current carrying wire. The current is coming **out of the page**.

Figure 1



- (a) Complete **Figure 1** to show the pattern of magnetic field lines around the wire.

[2 marks]

[2 marks]

Question 1b

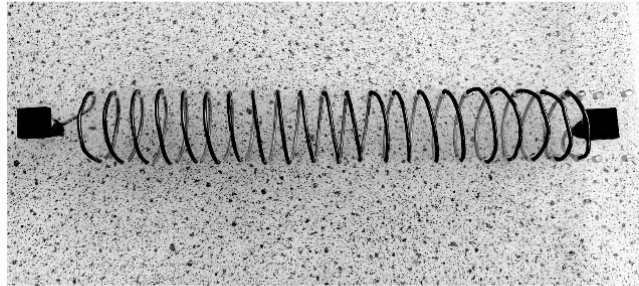
- (b) How would the pattern change if the direction of the current was reversed?

[1 mark]

[1 mark]

Question 1c

- (c) The picture below shows a long coil of wire called a solenoid.



When a current passes through the solenoid it produces a magnetic field.

Suggest three changes that would **increase** the strength of the magnetic field.

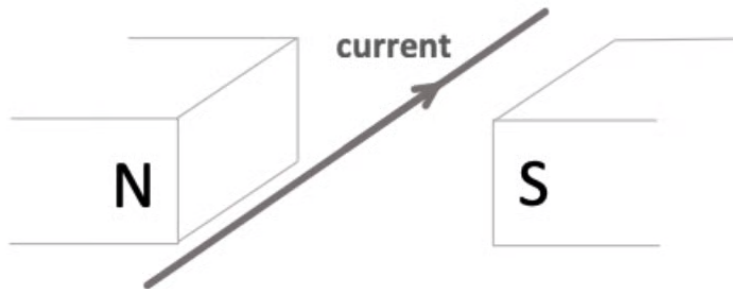
[3 marks]

[3 marks]

Question 2a

Figure 2 below shows a straight wire passing between the poles of two magnets.

Figure 2



When a current passes through the wire a force is exerted on the wire.

(a) What is the name given to this effect?

[1 mark]

[1 mark]

Question 2b

(b) Describe how the direction of the force can be determined using Fleming's Left-Hand Rule.

[4 marks]

[4 marks]

Question 2c

- (c) Add an arrow to **Figure 2**, showing the direction of the force.

[1 mark]

[1 mark]

Question 2d

- (d) Explain why this force acts on the wire.

[3 marks]

[3 marks]

Question 2e

- (e) Suggest three changes that would **increase** the force acting on the wire.

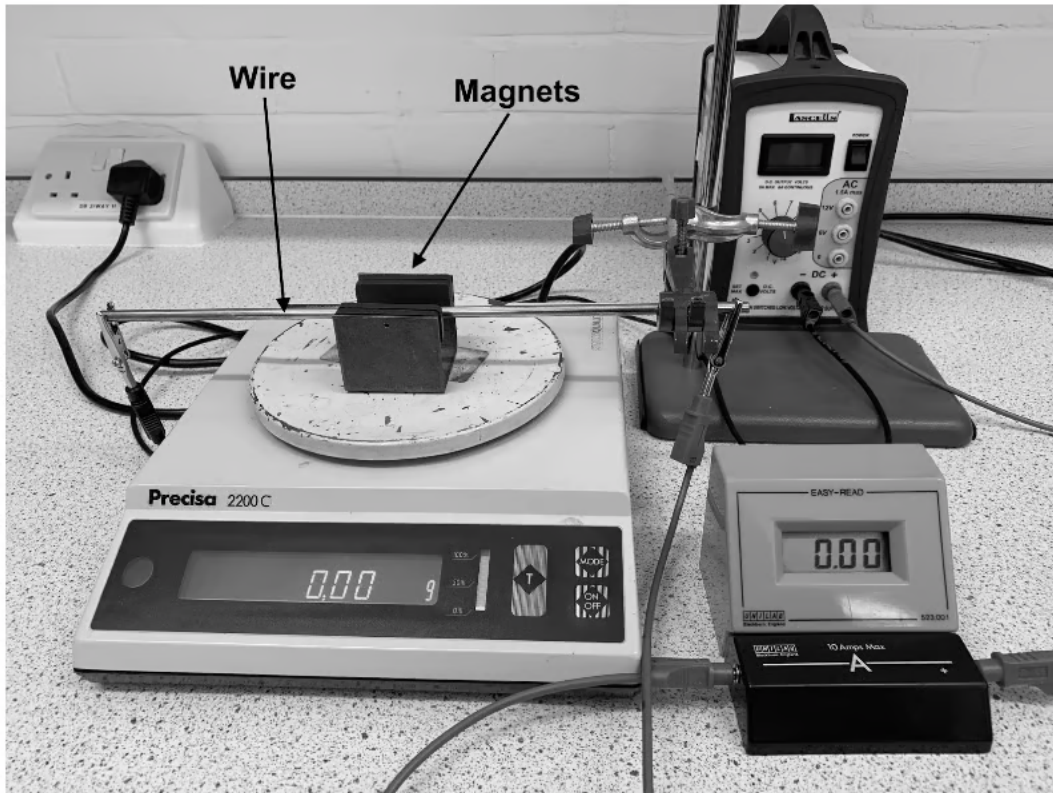
[3 marks]

[3 marks]

Question 3a

The apparatus shown in **Figure 3** below can be used to measure the force acting on a current-carrying wire placed in a magnetic field.

Figure 3



The balance is initially zeroed so that when the power supply is off, it shows no reading.

When the power supply is turned on, the balance shows a reading.

As the current is increased, the reading increases.

- (a) Explain in terms of forces why the reading increases.

[4 marks]

[4 marks]

Question 3b

- (b) For the above apparatus, when the current in the wire was 0.25 A, a force of 1.96 mN was exerted on the wire

The length of wire between the poles of the magnet was 0.042 m

Calculate the magnetic flux density between the poles of the magnet.

Give your answer to **2** significant figures.

(You may need to look up the appropriate formula on the Physics Equations Sheet).

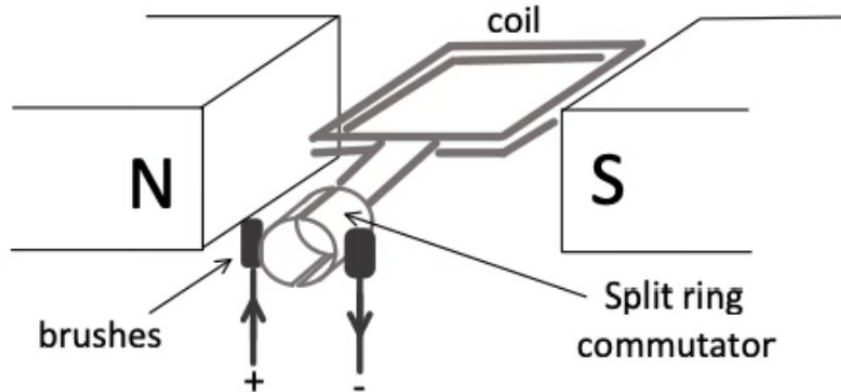
[4 marks]

[4 marks]

Question 4a

Figure 4 below shows a simple d.c. motor.

Figure 4



When a direct current is supplied to the coil, the coil starts to spin.

(a) Explain why.

[4 marks]

[4 marks]

Question 4b

(b) Describe three changes that would make the coil spin **faster**.

[3 marks]

[3 marks]

Question 4c

(c) Describe two changes that could **reverse** the direction of the coil.

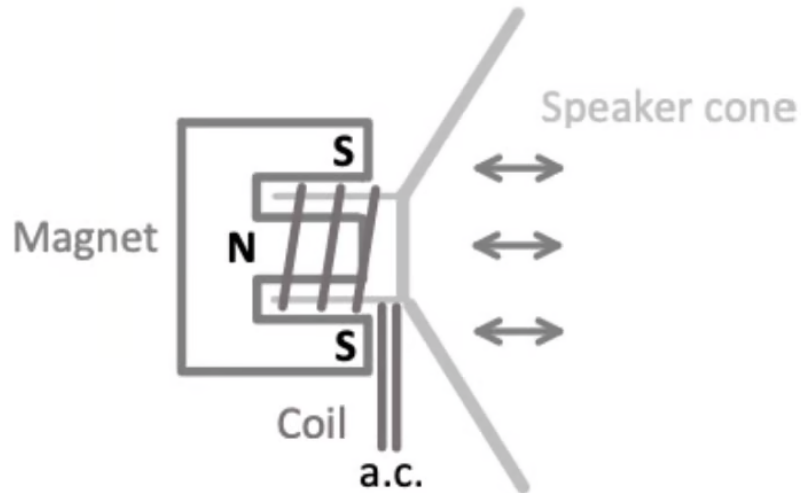
[2 marks]

[2 marks]

Question 5

Figure 5 below shows a loudspeaker.

Figure 5



The loudspeaker produces a sound when an alternating current is connected to the coil.

Explain why.

[4 marks]

[4 marks]