Questions are for both separate science and combined science students unless indicated in the question

Q1.

Some metals are magnetic and others are non-magnetic.

(a) Which of the following metals is magnetic?

Tick (✓) **one** box.

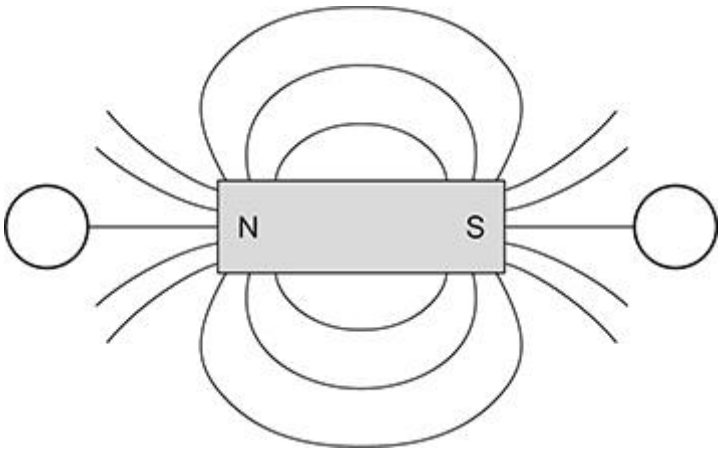
Aluminium	☐
Cobalt	☐
Copper	☐
Zinc	☐

(1)

(b) **Figure 1** shows magnetic field lines around a bar magnet.

The circles represent plotting compasses.

Figure 1

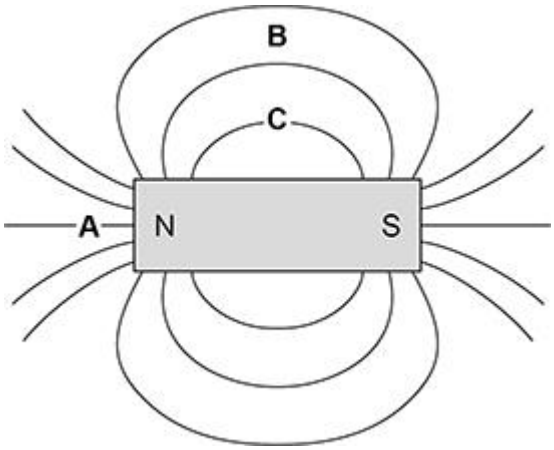


Draw **one** arrow in each circle on **Figure 1** to show the direction of the magnetic field at each place.

(2)

(c) **Figure 2** shows magnetic field lines around a bar magnet.

Figure 2



Which letter shows where the magnetic field is strongest?

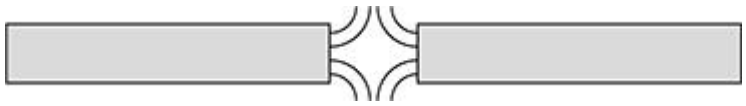
Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐

(1)

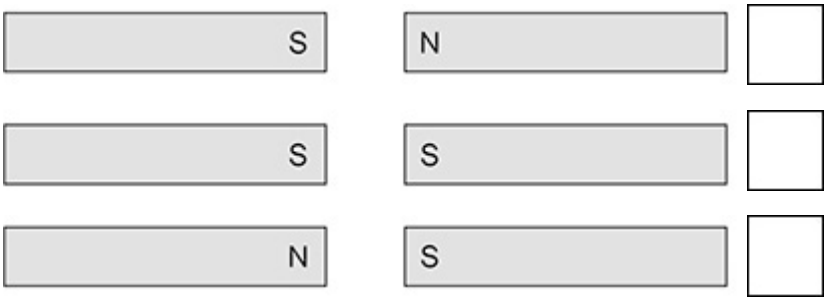
(d) **Figure 3** shows the magnetic field lines between two bar magnets.

Figure 3



Which diagram shows how the magnets are arranged in **Figure 3**?

Tick (✓) **one** box.



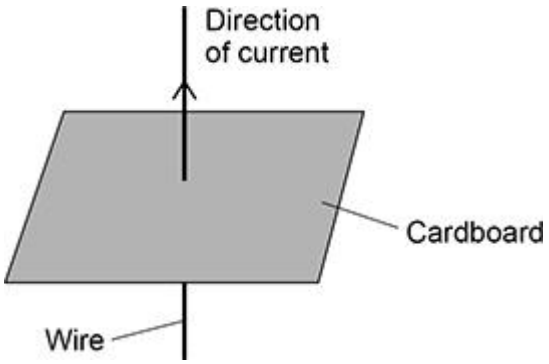
(1)

A teacher demonstrates how a current in a wire creates a magnetic field around the wire.

Figure 4 shows the wire passing through a piece of cardboard.

The current can be switched on and off.

Figure 4



(e) Describe how the teacher can use a plotting compass to demonstrate the magnetic effect of the current in the wire.

_____

_____

_____

_____

_____

_____

(2)

(f) The teacher decreases the current in the wire.

How does the strength of the magnetic field around the wire change?

Tick (✓) **one** box.

Decreases ☐

Stays the same ☐

Increases ☐

(1)

(g) The teacher reverses the direction of the current in the wire.

What happens to the magnetic field around the wire?

_____

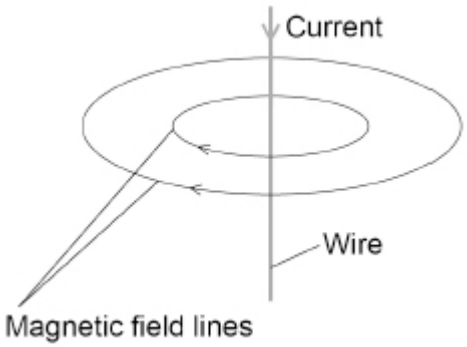
(1)

(Total 9 marks)

Q2.

Figure 1 shows the magnetic field pattern produced when there is a current in a wire.

Figure 1



(a) What do the arrows on the magnetic field lines represent?

_____

_____

(1)

(b) How could the strength of the magnetic field be increased?

Tick (✓) **one** box.

Change the direction of the current in the wire ☐

Increase the current in the wire ☐

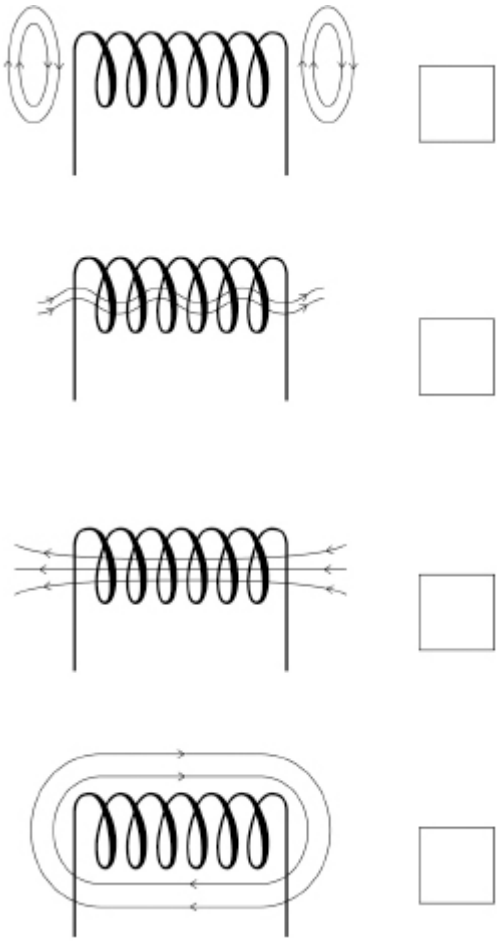
Increase the temperature of the wire ☐

(1)

(c) The wire is coiled to make a solenoid.

Which diagram in **Figure 2** shows the magnetic field pattern produced when there is a current in the solenoid?

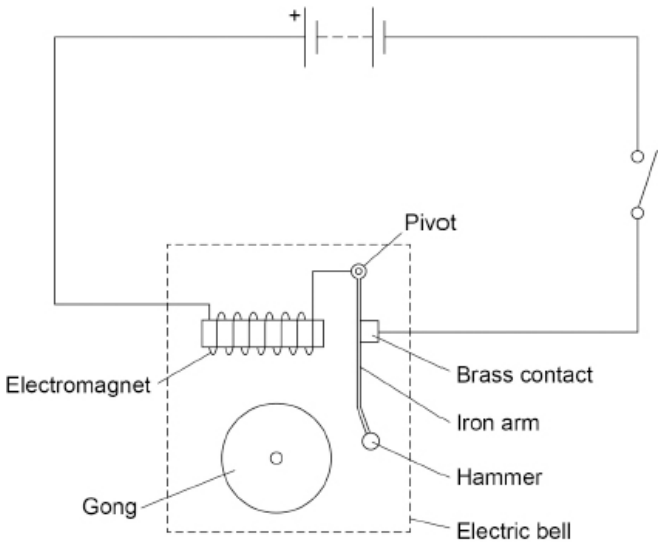
Figure 2



(1)

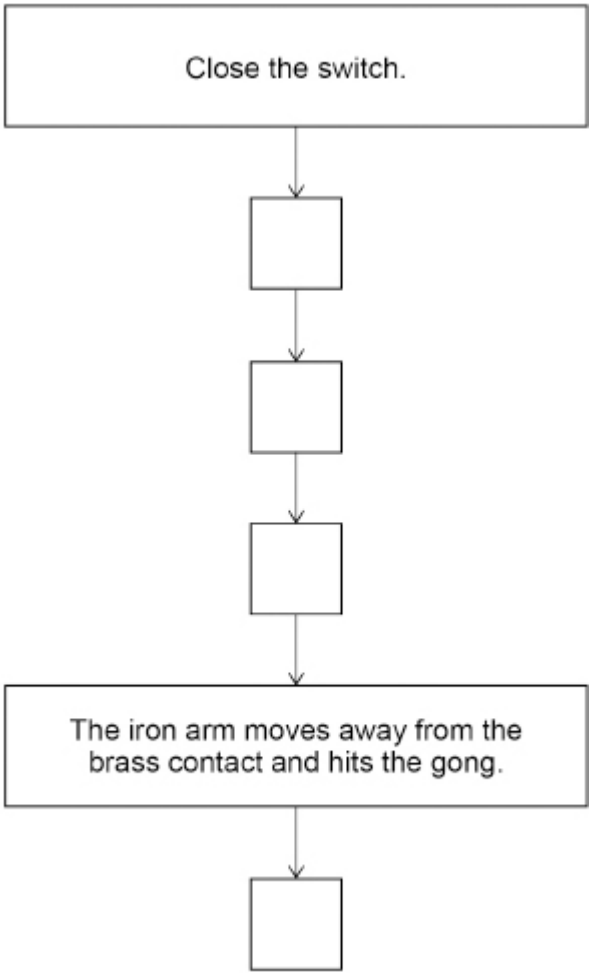
Figure 3 shows the parts of an electric bell.

Figure 3



(d) **Figure 4** shows an incomplete sequence of how the bell works.

Figure 4



Write **one** letter in each box to show the correct sequence.

Use each letter once. **(Physics only)**

A A magnetic field is created around the electromagnet.

B A resultant force acts on the iron arm causing it to move towards the electromagnet.

C The iron arm returns to its original position.

D There is a current in the circuit.

(2)

(e) Which of the following would increase the resultant force on the iron arm?

Tick (✓) **one** box. **(Physics only)**

Decrease the distance between the electromagnet and the iron arm	☐
Decrease the number of cells in the circuit	☐
Decrease the number of turns on the electromagnet	☐

(1)

(f) The iron arm of the bell vibrates with a frequency of 6.25 Hz.

Calculate the period of the iron arm.

Use the equation:

$$\text{period} = \frac{1}{\text{frequency}}$$

_____

_____

_____

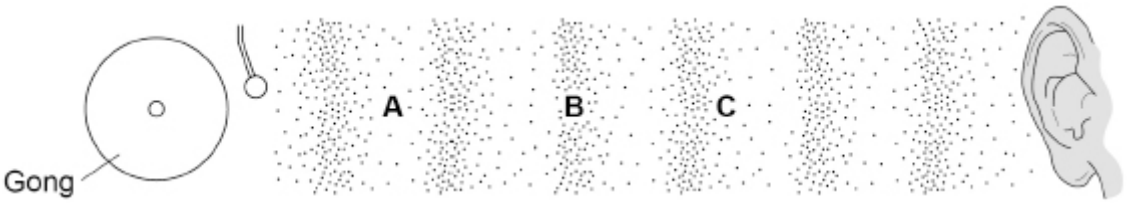
Period = _____ s

(2)

(g) The sound waves produced by the bell are longitudinal waves.

Figure 5 shows the position of the air particles at one point in time as the sound waves travel through the air.

Figure 5



Which letter represents an area of compression?

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐

(1)

(Total 9 marks)

Q3.

When two magnets are close together they exert a force on each other.

(a) Complete table below to show if the magnets would attract or repel.

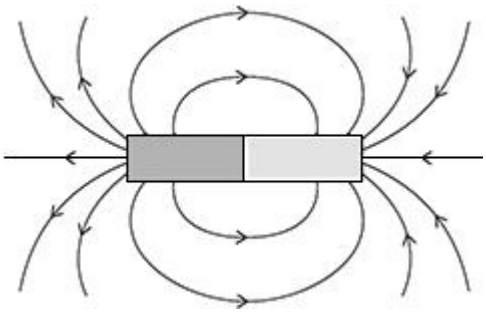
Tick (✓) **one** box in **each** row.

	Attract	Repel
		
		
		
		

(2)

(b) **Figure 1** shows the magnetic field around a bar magnet.

Figure 1



Which statements are true for the magnetic field shown in **Figure 1**?

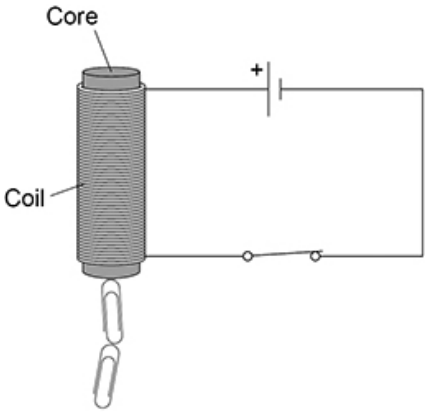
Tick (✓) **two** boxes.

The magnetic field gets weaker further from the magnet.	☐
The magnetic field is strongest at the poles.	☐
The magnetic field is uniform away from the poles.	☐
The magnetic field lines all meet at a single point.	☐
The magnetic field lines point from south to north.	☐

(2)

Figure 2 includes an electromagnet.

Figure 2



(c) Which metal is used to make the core of the electromagnet?

Tick (✓) **one** box.

Aluminium	☐
Copper	☐
Iron	☐
Magnesium	☐

(1)

(d) Complete the sentence.

Choose the answer from the box.

coil	metal core	paper clip

The switch is closed. There is a current in the _____.

(1)

(e) The number of turns on the coil is increased. The current remains the same.

How does this affect the strength of the magnetic field around the electromagnet?

Tick (✓) **one** box.

The magnetic field would be stronger. ☐

The magnetic field would stay the same. ☐

The magnetic field would be weaker. ☐

(1)

(f) The metal core was removed. The current remains the same.

How does this affect the strength of the magnetic field around the electromagnet?

Tick (✓) **one** box.

The magnetic field would be stronger. ☐

The magnetic field would stay the same. ☐

The magnetic field would be weaker. ☐

(1)

(Total 8 marks)