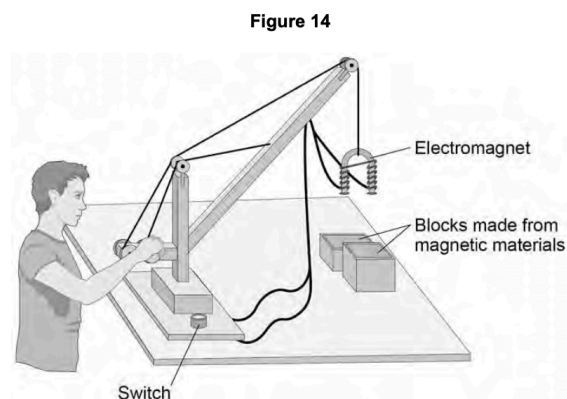


Q1. (2018)

08.3 Figure 14 shows a toy crane.



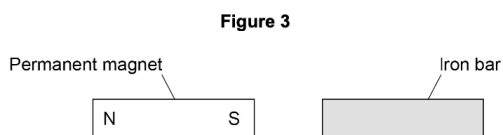
The toy crane uses an electromagnet to pick up and move the blocks.

Explain how this electromagnet is able to pick up and move the blocks.

[6 marks]

Q2. (2021)

Figure 3 shows an iron bar near a permanent magnet.



The iron bar becomes an induced magnet.

a)

02.2 Label the poles on the iron bar.

[1 mark]

b)

02.3 The magnet is turned around so that the north pole is closest to the iron bar.

Which statement about the iron bar is true?

[1 mark]

Tick (✓) **one** box.

The iron bar does not experience a magnetic force.

☐

The iron bar experiences a magnetic force of attraction.

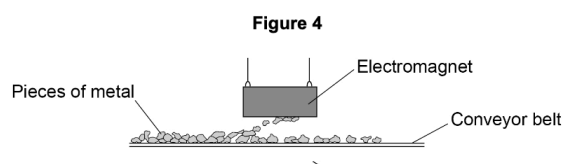
☐

The iron bar experiences a magnetic force of repulsion.

☐

Q3. (2021)

Figure 4 shows an electromagnet being used to separate pieces of different types of metal on a conveyor belt.



a)

0 2 . 4

Which **two** of the following types of metal would be attracted to the electromagnet?**[2 marks]**Tick (✓) **two** boxes.

- | | |
|-----------|--------------------------|
| Aluminium | ☐ |
| Copper | ☐ |
| Magnesium | ☐ |
| Nickel | ☐ |
| Steel | ☐ |

b)

0 2 . 5

What is an advantage of using an electromagnet instead of a permanent magnet to separate the types of metal?

[1 mark]Tick (✓) **one** box.

An electromagnet attracts more types of metal than a permanent magnet.

☐

An electromagnet can be switched on and off.

☐

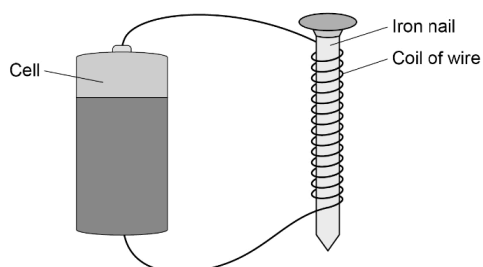
An electromagnet transfers less energy than a permanent magnet.

☐

Q4. (2021)

Figure 5 shows a simple electromagnet.

Figure 5



a)

0 2 . 6

What is the purpose of the iron nail inside the coil of wire?

[1 mark]Tick (✓) **one** box.

The iron nail makes the magnetic field stronger.

☐

The iron nail reduces the magnetic field to zero.

☐

The iron nail reverses the magnetic field.

☐

b)

0 2 . 7 Which of the following would increase the strength of the electromagnet?

[1 mark]

Tick (✓) **one** box.

Use a greater current.

☐

Use a shorter nail.

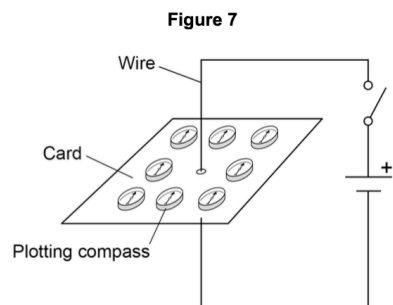
☐

Use a thinner wire.

☐

Q5. (2023)

Figure 7 shows some plotting compasses around a wire. There is no current in the wire.



0 3 . 5 When the switch is closed there is a current in the wire.

The current creates a magnetic field.

What shape are the magnetic field lines around the wire?

[1 mark]

Tick (✓) **one** box.

Circular

☐

Rectangular

☐

Square

☐

Triangular

☐

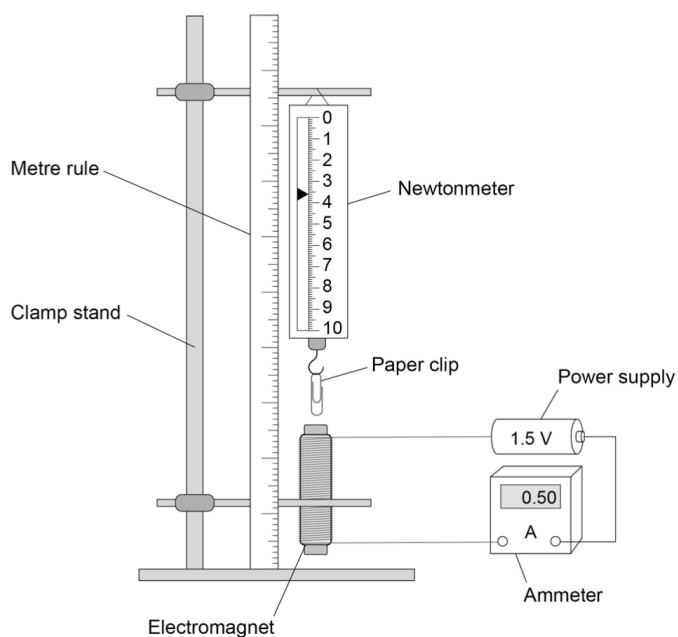
Q6. (2023)

A student investigated the force exerted by an electromagnet on a paper clip.

The student varied the distance between the paper clip and the electromagnet.

Figure 8 shows the equipment used.

Figure 8



The student recorded the reading on the newtonmeter for several different distances.

a)

0 3 . 6 The current in the electromagnet was the same for each distance.

Complete the sentence.

Choose the answer from the box.

[1 mark]

a control	the dependent	the independent
-----------	---------------	-----------------

In the investigation, the current was _____ variable.

b)

0 3 . 7 What is the size of the downward force on the paper clip in Figure 8?

[1 mark]

Force = _____ N

c)

0 3 . 8 The distance between the paper clip and the electromagnet is **increased**.

What happens to the size of the downward force?

[1 mark]