# Simple Phenomena of Magnetism

## Question Paper

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| Course | CIE IGCSE Physics |
| Section | 4. Electricity & Magnetism |
| Topic | Simple Phenomena of Magnetism |
| Difficulty | Medium |

**Time Allowed** 50

**Score** /34

**Percentage** /100

## Question 1a

A student magnetises a steel rod by using a permanent magnet.

Describe a method that the student could use.

**[2 marks]**

## Question 1b

Explain how the student could test that the steel rod has been magnetised.

**[2 marks]**

## Question 1c

Magnets can be made from soft iron or from steel.

State one difference between the magnetic properties of soft iron and steel.

**[1 mark]**

## Question 2a

Fig. 8.1 shows a sheet of paper. A bar magnet is underneath the paper. A student sprinkles iron filings onto the paper.

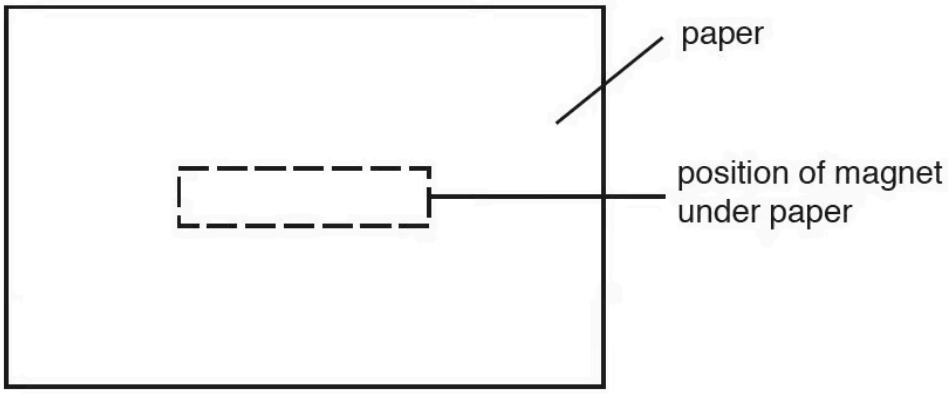


**Fig. 8.1**

On Fig. 8.1

- Label the position of each pole of the magnet. Use the label N for the north pole and S for the south pole.
- Draw magnetic field lines above the magnet and draw magnetic field lines below the magnet.
- Add arrows to show the direction of the magnetic field.

**[4 marks]**

## Question 2b

A student places a soft iron rod inside a coil of insulated wire. The coil is connected to a battery, as shown in Fig. 8.2.

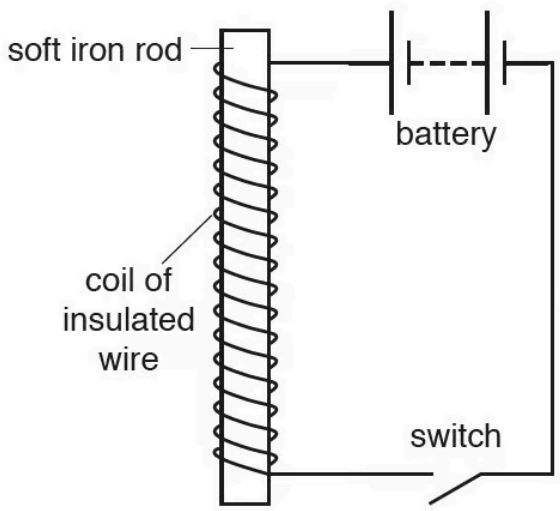


**Fig. 8.2**

(i) State the name given to the device shown in Fig. 8.2.

[1]

(ii) The student puts one end of the device in Fig. 8.2 just above a pile of iron filings.
He closes the switch for a short time and then opens it again.
Describe the effect this has on the iron filings.

[1]

(iii) The student removes the soft iron rod and replaces it with a steel rod.

He puts one end of the steel rod just above the pile of iron filings. He closes the switch for a short time and then opens it again.

Describe the effect this has on the iron fillings.

[1]

**[3 marks]**

## Question 3a

**Extended tier only**

Bar magnets produce a magnetic field.

State where, in relation to the bar magnet, the magnetic field is strongest and explain how scientists know this.

You may wish to use a diagram in your answer.

**[2 marks]**

## Question 3b

A student is making a compass from a steel sewing needle, a cork and a bowl of water. Fig. 1.1 shows this apparatus.

A compass consists of a freely rotating magnet.

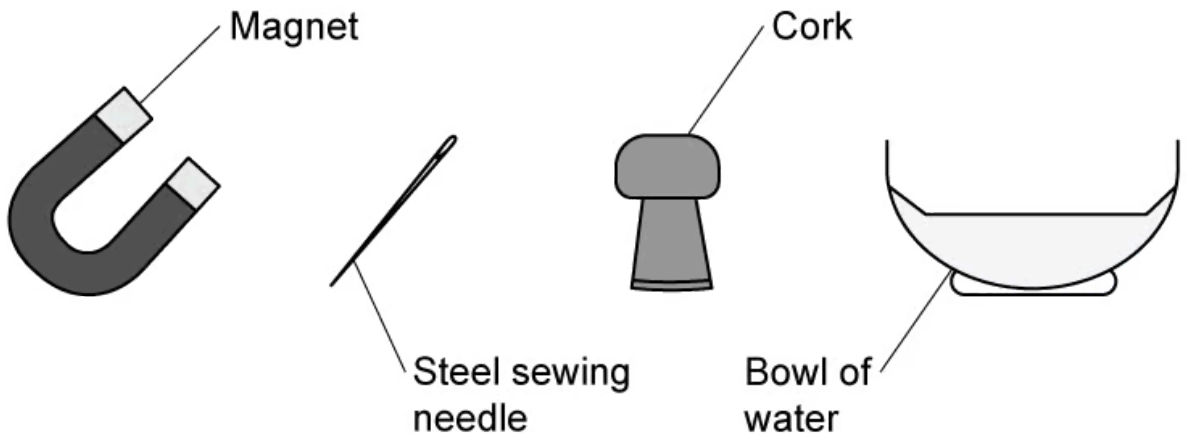


**Fig. 1.1**

Suggest how the student might make a compass from this equipment.

**[3 marks]**

## Question 3c

When the student brings a magnet close to the needle-cork compass, the needle spins to face the north pole of the magnet. When the student moves the magnet away, the needle always returns to the same position.

Suggest why this is the case.

**[1 mark]**

## Question 4a

A wooden toy train has permanent magnets that hold the carriages together. Fig. 1.1 shows the arrangement.

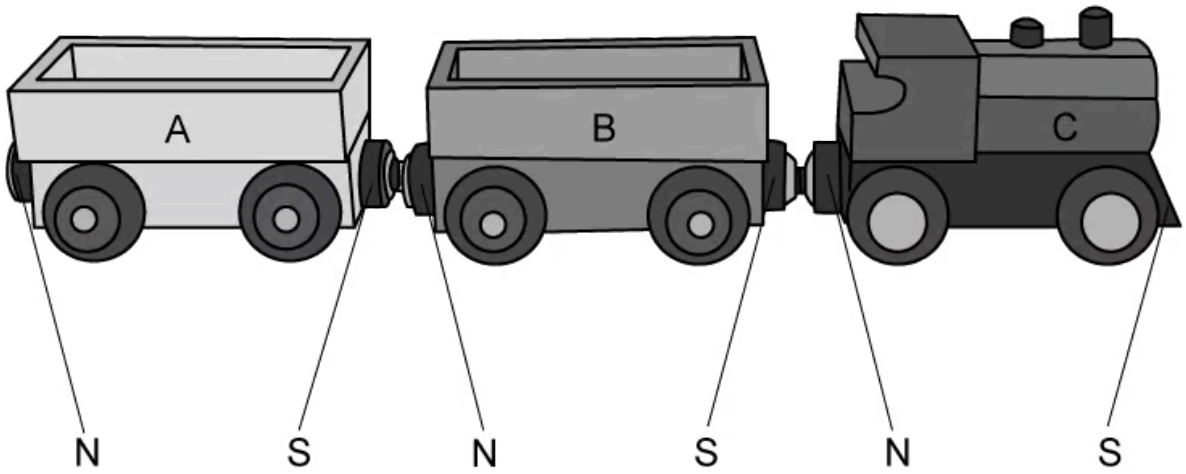


**Fig. 1.1**

The centre carriage (B) is removed and turned 180°.

Describe the effect this will have on the train.

**[3 marks]**

## Question 4b

Figure 1.2 shows one of the carriages with a magnet attached to each end.

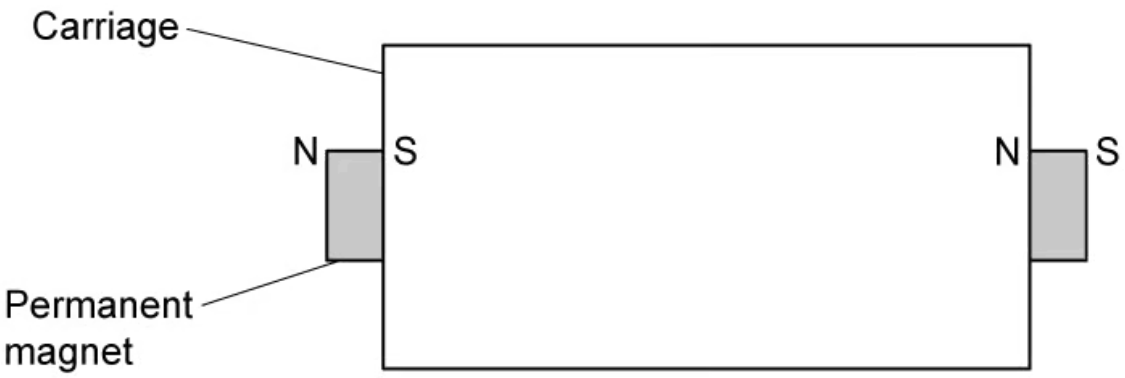


**Fig. 1.2**

Sketch the magnetic field lines inside the carriage.

**[3 marks]**

## Question 5a

A student is given three unknown metal strips and a bar magnet.

The student is also given the following information.

1 strip is magnetic and magnetised

1 strip is magnetic but not magnetised

1 strip is not magnetic

Describe a method the student could use to identify each strip.

**[4 marks]**

## Question 5b

Describe the difference between a magnetised and an unmagnetised magnetic material.

**[3 marks]**

## Question 6

Two bar magnets are placed next to each other as shown in Fig. 9.1.


**Fig. 9.1**

Magnet A is slowly moved towards magnet B. This causes magnet B to move away from magnet A.

(i) On Fig. 9.1, suggest the poles of each bar magnet.

Label N and S on each of the magnets.

[1]

(ii) State the term used to describe the nature of the forces acting between magnet A and magnet B.

[1]

(iii) Magnet B is removed and replaced with a steel bar of the same size.

Describe what happens when magnet A is slowly moved towards the steel bar.

[1]

**[3 marks]**