Magnetism and electromagnetism

Physics Paper 2 | 5 questions, 6 marks each

GCSE science 6-mark questions

This topic online

Name: _____ **Date:** _____ **Score:** _____ **/ 30**

Plan before you write: jot down the 6 or more ideas you need, then put them in a sensible order. For compare questions give both sides of each point; for evaluate questions use the information and finish with a conclusion.

1 Hassan has a bar magnet and an iron nail. When he holds the nail near the magnet, the nail picks up some steel paper clips. When he moves the magnet away, the paper clips fall off the nail.

Compare the bar magnet and the iron nail as magnets. Include how each one behaves with other magnets and materials.

(6 marks)

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2 A flat has an electric door lock. A coil of wire is wrapped around an iron core inside the door frame. A small iron bolt sits next to the core on a spring. When a resident presses a button in the flat, a current flows in the coil, the bolt is pulled towards the core and the door can be opened. When the button is released, the spring pushes the bolt back and the door is locked again.

Explain how the lock works, and explain two changes that would make the pull on the bolt stronger.

(6 marks)

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3 **Higher tier**

Grace places a straight horizontal wire between the poles of a horseshoe magnet. The wire runs at right angles to the magnetic field and 0.050 m of it is inside the field. She passes different currents through the wire and measures the force on it.

Current in A	Force in N
1.0	0.004
2.0	0.008
3.0	0.012
4.0	0.016

Use the data to describe the relationship between current and force, calculate the magnetic flux density of the magnet, and explain how Grace could work out the direction of the force and make it reverse.

(6 marks)

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4 **Higher tier**

A simple model motor has a rectangular coil of wire that can spin on an axle between the poles of two magnets. A direct current is fed into the coil through a split-ring commutator and two carbon brushes.

Explain why the coil starts to turn when the current is switched on, and why it keeps turning in the same direction.

(6 marks)

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5 **Higher tier | Separate science only**

Nadia sings into a moving-coil microphone at a school concert. Inside the microphone, a light diaphragm is attached to a small coil of wire. The coil sits around one pole of a permanent magnet, and its ends are connected to an amplifier.

Describe how the microphone turns the sound of Nadia's voice into an electrical signal that matches the sound.

(6 marks)

End of questions | Total 30 marks

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