KS3 SCIENCE · PHYSICS

Magnets and electromagnets: exam questions

Name _____
Total: 22 marks

1 Two bar magnets are placed end to end. State what happens when (a) a north pole faces a south pole, and (b) a north pole faces a north pole. **[2 marks]**

2 Name two materials that a magnet attracts and one material that it does not attract. **[2 marks]**

3 State what is meant by a magnetic field. **[1 mark]**

4 Describe how to use a plotting compass to find the shape of the magnetic field around a bar magnet. **[3 marks]**

5 A student draws the field lines round a bar magnet. State (a) which way the arrows on the lines should point, and (b) how the drawing shows where the field is strongest. **[2 marks]**

6 Explain why a compass needle points north. **[2 marks]**

7 Describe how to make an electromagnet. **[2 marks]**

8 State three ways to make an electromagnet stronger. **[3 marks]**

9 A student tests an electromagnet. With 10 turns on the coil it holds 4 paper clips. With 20 turns it holds 8 paper clips. (a) The pattern carries on. Predict how many paper clips it holds with 30 turns. (b) Name one thing the student must keep the same to make the test fair. **[2 marks]**

10 A scrapyard crane uses an electromagnet to move scrap steel. Explain why a permanent magnet would not do this job. **[2 marks]**

11 An electric motor has a coil of wire between the poles of a magnet. State what happens to the coil when a current flows in it. **[1 mark]**

KS3 SCIENCE · PHYSICS

Magnets and electromagnets: mark scheme

Total: 22 marks

1 [2 marks]

- (a) They attract **(1)**
- (b) They repel **(1)**

2 [2 marks]

- Attracts: any two of iron, steel, nickel, cobalt **(1)**
- Does not attract: for example copper, aluminium, plastic, wood or glass (any one) **(1)**

3 [1 mark]

- The space around a magnet where its magnetic force acts (accept: where a magnetic material or another magnet feels a force) **(1)**

4 [3 marks]

- Put the compass near the magnet and mark the direction its needle points **(1)**
- Move the compass to other places round the magnet and mark the direction each time **(1)**
- Join the marks to make field lines (accept: draw lines that follow the arrows) **(1)**

5 [2 marks]

- (a) From the north pole to the south pole **(1)**
- (b) The lines are closest together where the field is strongest (accept: the lines are closest together at the poles) **(1)**

6 [2 marks]

- The needle is a magnet (that can turn freely) **(1)**
- The Earth has a magnetic field, and the needle lines up with it **(1)**

7 [2 marks]

- Wind insulated wire into a coil round an iron core (accept: round an iron nail; accept wire without the word insulated) **(1)**
- Connect the wire to a cell or a power supply, so that a current flows in the coil **(1)**

8 [3 marks]

- Put more turns on the coil **(1)**
- Use a bigger current **(1)**
- Use an iron core (accept: put a soft iron core inside the coil) **(1)**

9 [2 marks]

- (a) 12 paper clips **(1)**
- (b) The current, or the core (accept: the same size of paper clip) **(1)**

10 [2 marks]

- A permanent magnet is magnetic all the time (accept: it cannot be switched off) **(1)**
- So it could not let go of the steel. An electromagnet drops the steel when its current is switched off **(1)**

11 [1 mark]

- The coil spins (accept: turns, or there is a force on the coil) **(1)**