

Past-paper walk-through

Simple phenomena of magnetism ■ 4.1

eXercise

Questions in this set

- 0625/21 N25 Q24 ■ 1 mark
- 0625/22 N25 Q24 ■ 1 mark
- 0625/21 J25 Q24 ■ 1 mark
- 0625/41 J25 Q6 ■ 4 marks
- 0625/21 J24 Q24 ■ 1 mark
- 0625/21 J24 Q25 ■ 1 mark
- 0625/21 N23 Q24 ■ 1 mark
- 0625/21 J23 Q23 ■ 1 mark

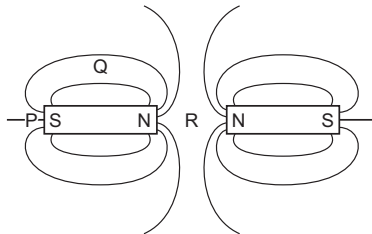
Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 24

0625/21 N25 ■ Q24 ■ 1 mark

24 The diagram shows part of the magnetic field around two magnets.



Which list gives the order of magnetic field strengths at the positions P, Q and R, from weakest to strongest?

A $P \rightarrow Q \rightarrow R$

Question 24

B $P \rightarrow R \rightarrow Q$

C $Q \rightarrow P \rightarrow R$

D $R \rightarrow Q \rightarrow P$

Solution 24

Answer: **D**

Why

- The magnetic field is strongest where the field lines are packed most closely together.
- It is weakest where they are furthest apart.
- So rank the three positions by how tightly the lines are spaced around each.

Question 24

0625/22 N25 ■ Q24 ■ 1 mark

24 Which statements about magnets are correct?

- 1 Permanent magnets are made of steel.
- 2 Electromagnets are temporary magnets.
- 3 A magnet can be used to induce magnetism in an iron bar.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

Solution 24

Answer: **A**

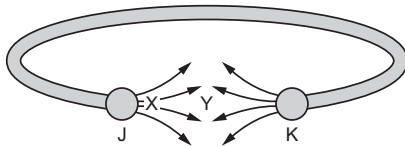
Why

- Permanent magnets are made of steel, which is magnetically hard – statement 1 is right.
- An electromagnet loses its magnetism when the current stops, so it is temporary – statement 2 is right.
- Bringing a magnet near an iron bar induces magnetism in it – statement 3 is right too.

Question 24

0625/21 J25 ■ Q24 ■ 1 mark

- 24** The diagram shows a bracelet containing two magnets. The arrows represent the pattern and the direction of the magnetic field due to the magnets.



Which row identifies the magnetic pole at J, the magnetic pole at K and where the magnetic field is the strongest?

	magnetic pole at J	magnetic pole at K	where the magnetic field is the strongest
A	N	N	X

Question 24

B	N	N	Y
C	S	S	X
D	S	S	Y

Solution 24

Answer: **A**

Why

- Outside a magnet, field lines always run from the north pole to the south pole.
- So the arrow direction tells you which end is which.
- Where two magnets are held together the touching poles must be opposite, or they would repel.

Question 6

0625/41 J25 ■ Q6 ■ 4 marks

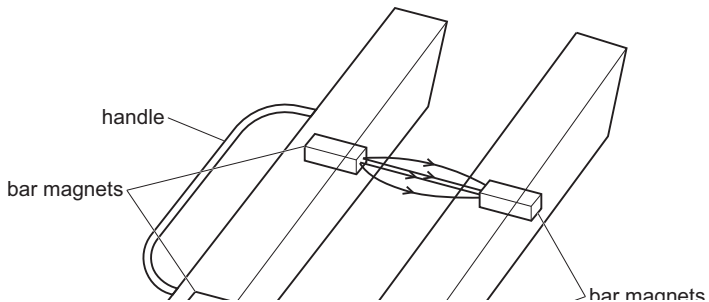
- 6 Fig. 6.1 shows a person using a magnetic window cleaner. The part on the outside of the window is attracted to the inside part through the glass window.



Question 6

Fig. 6.1

Each part of the window cleaner contains two magnets. Fig. 6.2 shows the magnetic field between the parts of the window cleaner.



Question 6

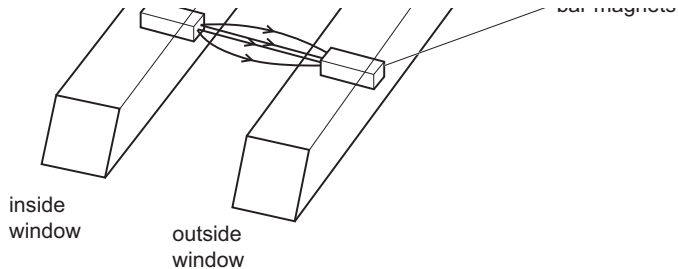


Fig. 6.2

- (a) Glass is **not** a magnetic material.

State the difference between magnetic and non-magnetic materials.

Question 6

- (b)** Suggest a suitable material for the magnets in the window cleaner. Explain your answer.

Question 6

- (c) Label the poles of the magnets in Fig. 6.2. [1]
- (d) State how the field lines in Fig. 6.2 show different strengths of the magnetic field between the magnets.

Question 6

[Total: 4]

Solution 6

(a) Mark scheme

- any one from:
 -
- magnetic materials are attracted to magnets
- ■
- non-magnetic materials are not attracted to magnets
- ■
- magnetic materials experience a force in magnetic fields
- ■

Solution 6

- non-magnetic materials don't experience a force in magnetic fields

Solution 6

(b)

Mark scheme

- any one from:
 - ■
 - steel as it stays magnetised
 - ■
 - steel makes a permanent magnet

Solution 6

(c)

Mark scheme

- N and S poles correctly labelled
- braille: north to south owtte

Solution 6

(d)

Mark scheme

- field lines close(r) indicates strong(er) (magnetic) field owtte ORA

Question 24

0625/21 J24 ■ Q24 ■ 1 mark

24 Which row describes suitable materials for use in a temporary magnet and in a permanent magnet?

	temporary magnet	permanent magnet
A	soft iron	soft iron
B	soft iron	steel
C	steel	soft iron
D	steel	steel

Solution 24

Answer: **B**

Why

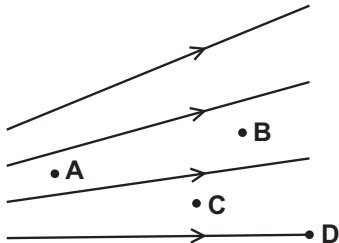
- A temporary magnet must magnetise and demagnetise easily – a *soft* material.
- A permanent magnet must keep its magnetism – a *hard* material.
- Soft iron is the temporary one and steel the permanent one.

Question 25

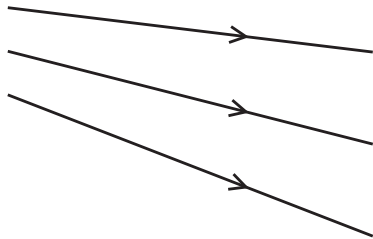
0625/21 J24 ■ Q25 ■ 1 mark

25 A magnetic field is represented in the diagram by magnetic field lines.

At which point is the magnetic field strongest?



Question 25



Solution 25

Answer: **A**

Why

- Magnetic field strength is shown by how close together the field lines are.
- The field is strongest where the lines are most tightly packed.
- That is nearest the poles, where the lines converge.

Question 24

0625/21 N23 ■ Q24 ■ 1 mark

24 Which metal could be used for a permanent magnet and which metal could be used for the core of an electromagnet?

	permanent magnet	core of electromagnet
A	iron	copper
B	iron	steel
C	steel	copper
D	steel	iron

Solution 24

Answer: **D**

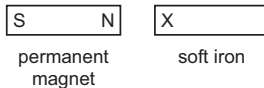
Why

- A permanent magnet must keep its magnetism, so it needs a magnetically *hard* material – steel.
- An electromagnet's core must magnetise and demagnetise easily, so it needs a *soft* one – iron.
- Copper is not magnetic at all, so it can be neither.

Question 23

0625/21 J23 ■ Q23 ■ 1 mark

23 An unmagnetised piece of soft iron is placed close to a strong permanent magnet, as shown.



What is the induced polarity of end X of the soft iron and in which direction does the magnetic force act on the soft iron?

	polarity of end X	direction of force on the soft iron
A	N	to the left
B	N	to the right
C	S	to the left

Question 23

✓	✓	to the left
D	S	to the right

Solution 23

Answer: **C**

Why

- A magnet induces the *opposite* pole in the nearby end of a piece of soft iron.
- Opposite poles attract, so the iron is always pulled *towards* the magnet.
- So end X takes the pole opposite to the magnet's nearest face, and the force on the iron is towards the magnet.