

1 Which statement about a magnet is correct?

- A A magnet attracts a gold rod.
- B A magnet does not attract a plastic rod.
- C A magnet never repels another magnet.
- D A magnet sometimes repels an unmagnetised nickel rod.

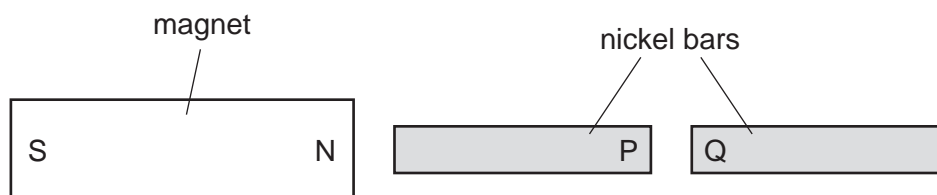
2 A student wishes to make a permanent magnet. She has an iron rod and a steel rod.

Which rod should she use to make the permanent magnet, and is this rod a hard magnetic material or a soft magnetic material?

	rod	type of magnetic material
<b>A</b>	iron	hard
<b>B</b>	iron	soft
<b>C</b>	steel	hard
<b>D</b>	steel	soft

3 Two nickel bars are placed close to the N-pole of a bar magnet.

The nickel bars become magnetised.



Which row states the pole induced at P, the pole induced at Q, and the type of magnetic force between P and Q?

	pole induced at P	pole induced at Q	force between P and Q
<b>A</b>	N	S	attraction
<b>B</b>	N	S	repulsion
<b>C</b>	S	N	attraction
<b>D</b>	S	N	repulsion

4 A student wishes to make a permanent magnet. She has an iron rod and a steel rod.

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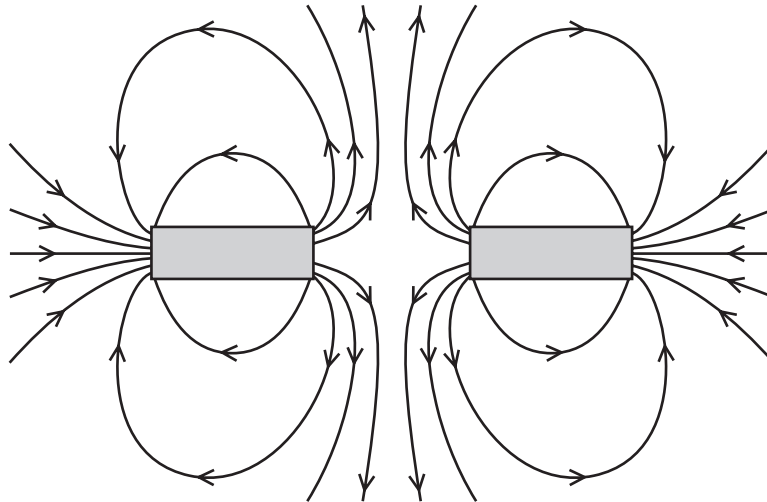
5 Which statement about magnetism is correct?

- A** An unmagnetised iron bar becomes magnetised when it is placed near a magnet.
- B** An unmagnetised steel bar can be magnetised by passing a current through it.
- C** The direction of magnetic field lines is from an S-pole to an N-pole.
- D** The N-poles of two magnets attract each other.

6 In which pair are both materials magnetic?

- A** aluminium and copper
- B** copper and iron
- C** iron and steel
- D** steel and aluminium

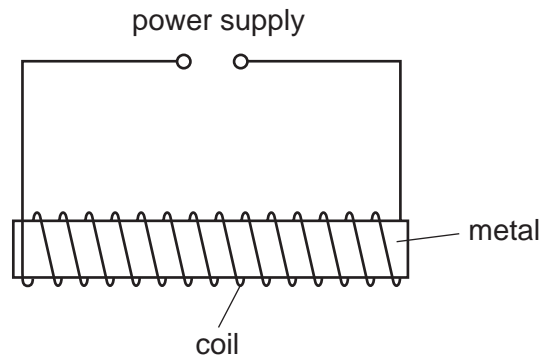
7 The diagram shows the magnetic field around two bar magnets.



Which diagram shows the poles of the magnets?

- |   |       |  |       |
|---|-------|--|-------|
| A | N   S |  | N   S |
| B | N   S |  | S   N |
| C | S   N |  | N   S |
| D | S   N |  | S   N |

8 The diagram shows apparatus that can be used to make a magnet.

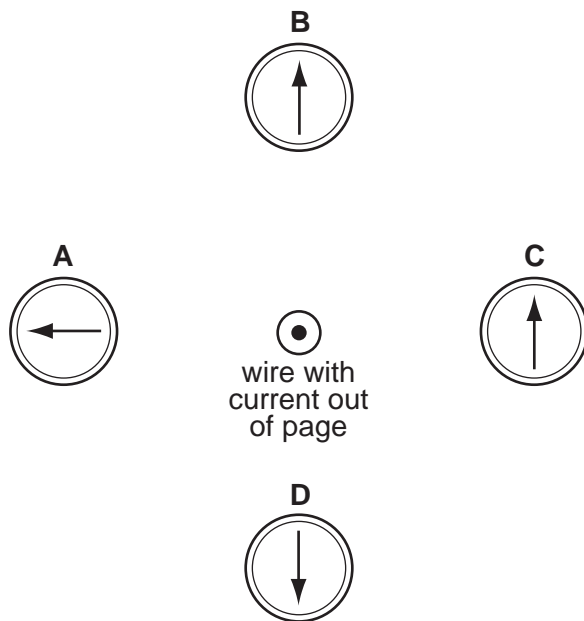


Which metal and which power supply are used to make a **permanent** magnet?

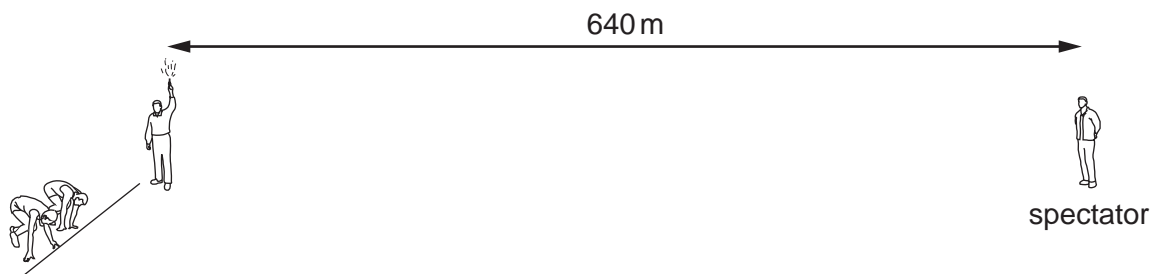
	metal	power supply
A	iron	6V a.c.
B	iron	6V d.c.
C	steel	6V a.c.
D	steel	6V d.c.

- 9 A wire perpendicular to the page carries an electric current in a direction out of the page. There are four compasses near the wire.

Which compass shows the direction of the magnetic field caused by the current?



- 10 A man holding a starting pistol stands 640 m away from a spectator.



The spectator hears the sound of the starting pistol 2.0 s after seeing the flash from the pistol.

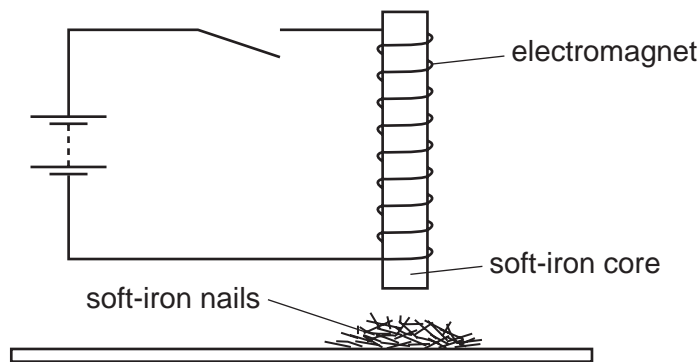
Using this information, what is the speed of sound in air?

- A** 160 m/s      **B** 320 m/s      **C** 640 m/s      **D** 1280 m/s

11 Which group contains only non-ferrous metals?

- A aluminium, brass, iron
- B brass, copper, lead
- C copper, iron, steel
- D copper, lead, steel

12 An electromagnet with a soft-iron core is connected to a battery and an open switch. The soft-iron core is just above some small soft-iron nails.



The switch is now closed, left closed for a few seconds, and then opened.

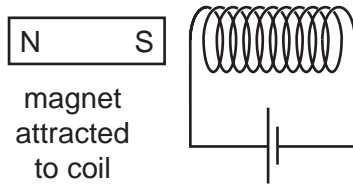
What do the soft-iron nails do as the switch is closed, and what do they do when the switch is then opened?

	as switch is closed	as switch is opened
<b>A</b>	nails jump up	nails fall down
<b>B</b>	nails jump up	nails stay up
<b>C</b>	nails stay down	nails jump up
<b>D</b>	nails stay down	nails stay down

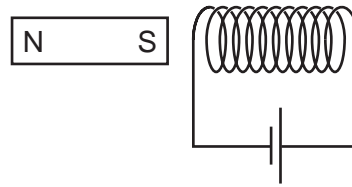
13 Which action will demagnetise a magnetised piece of steel?

- A Cool it in a freezer for several hours.
- B Hit it repeatedly with a hammer.
- C Put it in a coil carrying a direct current (d.c.).
- D Put it near an unmagnetised piece of iron.

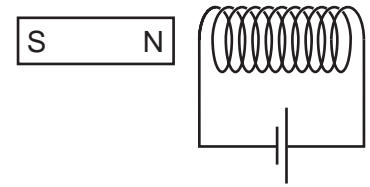
- 14 A student investigates the force on a bar magnet placed near a current-carrying coil. She carries out three different experiments.



experiment 1



experiment 2



experiment 3

In experiment 1, the magnet is attracted to the coil.

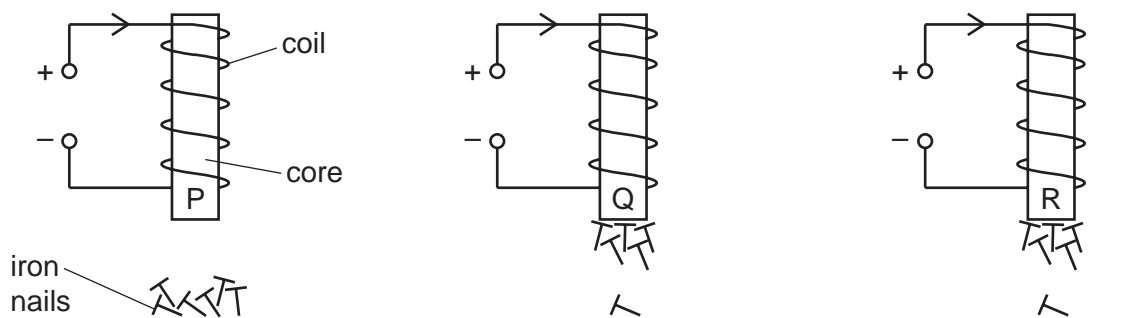
Which row shows what happens in the other two experiments?

	experiment 2	experiment 3
<b>A</b>	magnet attracted	magnet attracted
<b>B</b>	magnet attracted	magnet repelled
<b>C</b>	magnet repelled	magnet attracted
<b>D</b>	magnet repelled	magnet repelled

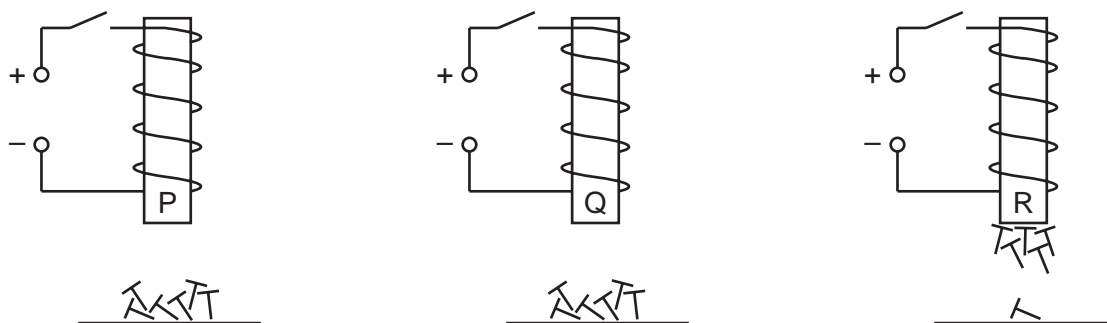
15 Three cores of different metals, P, Q and R, are placed inside identical coils of wire.  
At least one of the metals is non-ferrous.

The cores are held above some iron nails.

The three diagrams below show what happens when there is a current in the coils.



The three diagrams below show what happens when the current is then switched off.



Which row identifies whether the core metals are ferrous or non-ferrous?

	ferrous	non-ferrous
<b>A</b>	P	Q and R
<b>B</b>	P and Q	R
<b>C</b>	Q and R	P
<b>D</b>	R	P and Q

16 Which row states whether each metal is ferrous or non-ferrous?

	ferrous	non-ferrous
<b>A</b>	aluminium	copper
<b>B</b>	copper	iron
<b>C</b>	iron	steel
<b>D</b>	steel	aluminium

17 Which procedure may be used to demagnetise a steel bar?

- A** cooling it in a freezer for several hours
- B** earthing it with a copper wire for several seconds
- C** removing it slowly from a coil carrying an alternating current (a.c.)
- D** rubbing it in one direction with a woollen cloth

18 Which statement about a permanent bar magnet is correct?

- A** It is made from a soft magnetic material.
- B** It repels a non-magnetic material.
- C** Its field lines cross each other where the magnetic field is strong.
- D** Its N-pole repels the N-pole of another magnet.

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

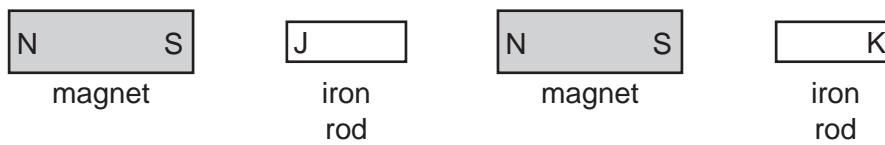
	permanent magnet	core of electromagnet
<b>A</b>	iron	copper
<b>B</b>	iron	steel
<b>C</b>	steel	copper
<b>D</b>	steel	iron



20 Which metal is suitable to use to make a permanent magnet?

- A aluminium
- B brass
- C iron
- D steel

21 The diagram shows two magnets and two iron rods placed in a line.

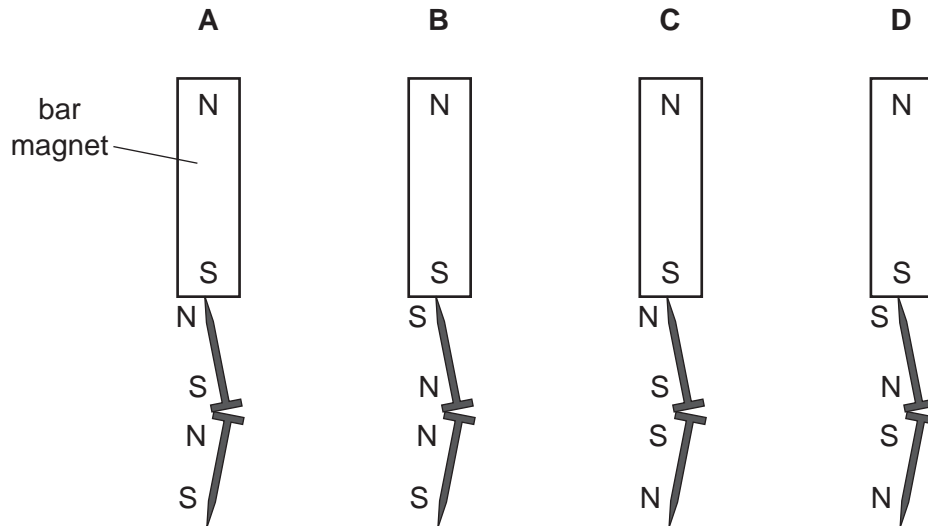


Which magnetic poles are induced at the ends J and K of the iron rods?

	pole induced at end J	pole induced at end K
<b>A</b>	N	N
<b>B</b>	N	S
<b>C</b>	S	N
<b>D</b>	S	S

22 Two iron nails hang from a bar magnet.

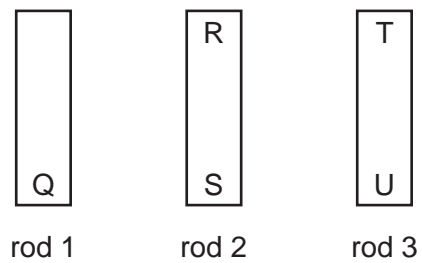
Which diagram shows the magnetic poles induced in the nails?



23 Which row correctly shows whether copper and steel are ferrous or non-ferrous?

	copper	steel
<b>A</b>	ferrous	ferrous
<b>B</b>	ferrous	non-ferrous
<b>C</b>	non-ferrous	ferrous
<b>D</b>	non-ferrous	non-ferrous

24 The ends of three metal rods are tested by holding end Q of rod 1 close to the others in turn.



The results are as follows.

End Q: attracts end R,  
attracts end S,  
attracts end T,  
repels end U.

Which of the metal rods is a magnet?

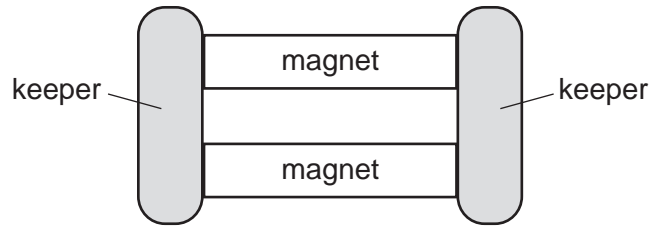
- A** rod 1 only
- B** rod 1 and rod 2
- C** rod 1 and rod 3
- D** rod 3 only

25 A permanent magnet is made from metal and an electromagnet uses a metal core.

Which metal is suitable for each of these purposes?

	permanent magnet	core of electromagnet
<b>A</b>	iron	iron
<b>B</b>	iron	steel
<b>C</b>	steel	iron
<b>D</b>	steel	steel

- 26 The diagram shows two bar magnets, stored with metal keepers across the ends. The keepers help to keep the magnets magnetised.

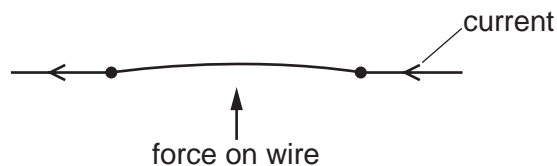


The material used for the keepers becomes strongly magnetised when placed in contact with the magnets, but does not remain magnetised when taken away from the magnets.

What is a suitable metal to use for the magnets and what is a suitable metal to use for the keepers?

	metal for magnets	metal for keepers
<b>A</b>	iron	iron
<b>B</b>	iron	steel
<b>C</b>	steel	iron
<b>D</b>	steel	steel

- 27 The diagram shows a thin copper wire in a magnetic field. The current in the wire is from right to left. This causes an upward force on the wire.



The direction of the current and the direction of the magnetic field are both reversed.

In which direction does the force act on the wire, after these changes are made?

- A** downwards
- B** into the page
- C** out of the page
- D** upwards

28 Which statement about magnetism is correct?

- A Aluminium is a ferrous metal.
- B A steel magnet can be demagnetised by heating it.
- C The core of an electromagnet is usually made of steel.
- D The magnetic field lines around a bar magnet are evenly spaced.

29 An electromagnet is used to separate magnetic metals from non-magnetic metals.

Why is steel **not** suitable as the core of the electromagnet?

- A It forms a permanent magnet.
- B It has a high density.
- C It has a high thermal capacity.
- D It is a good conductor of electricity.

30 An old and expensive steel watch becomes magnetised.

The owner wants to use the watch again. He must demagnetise the watch.

What is the **best** method to do this?

- A Heat it until it glows red hot.
- B Pass direct current through it.
- C Place it in a plastic bag and put the bag in hot water for several hours.
- D Place it in a solenoid that carries alternating current and then slowly remove it.

31 A hard magnetic material can be used to make a permanent magnet.

A soft magnetic material can be used to make a temporary magnet.

Which row shows whether iron and steel are hard or soft magnetic materials?

	iron	steel
<b>A</b>	hard	hard
<b>B</b>	hard	soft
<b>C</b>	soft	hard
<b>D</b>	soft	soft

32 How can a permanent magnet be demagnetised?

**A** cool the magnet for a long time

**B** hit the magnet repeatedly with a hammer

**C** leave the magnet in a coil which is connected to a battery

**D** shine bright light onto the magnet

33 In which pair are both metals ferrous?

**A** aluminium and copper

**B** aluminium and steel

**C** copper and iron

**D** iron and steel

34 Which statement describes a property of a magnet?

- A It attracts ferrous materials.
- B It could have only one pole (north or south).
- C It points in a random direction when suspended.
- D It repels non-ferrous materials.

35 Which procedure may be used to demagnetise a steel bar?

- A cooling it in a freezer
- B earthing it with a copper wire
- C placing it in a solenoid carrying a large direct current (d.c.)
- D striking it repeatedly with a hammer

36 The diagram shows a magnet being brought near to an unmagnetised iron bar. This causes the iron bar to become magnetised.



Which magnetic pole is induced at X and how is the iron bar affected?

	pole induced	effect on iron bar
A	north	attracted
B	north	repelled
C	south	attracted
D	south	repelled

37 A student wishes to make a permanent magnet. She has an iron rod and a steel rod.

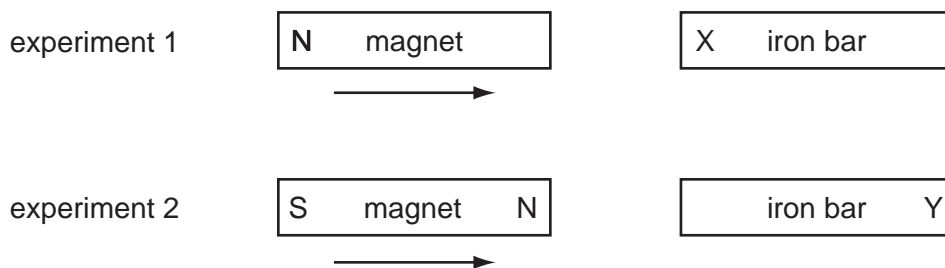
Which rod should she use to make the permanent magnet, and is this rod a hard magnetic material or a soft magnetic material?

	rod	type of magnetic material
<b>A</b>	iron	hard
<b>B</b>	iron	soft
<b>C</b>	steel	hard
<b>D</b>	steel	soft

38 Which test could be used to find which end of a magnet is the north pole?

- A** putting it near a compass needle
- B** putting it near a ferrous metal
- C** putting it near a non-ferrous metal
- D** putting it near a steel spoon

39 In two separate experiments, a magnet is brought near to an unmagnetised iron bar. This causes the bar to become magnetised.

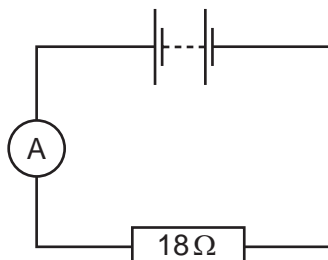


Which magnetic poles are induced at X and at Y?

	pole induced at X	pole induced at Y
<b>A</b>	N	N
<b>B</b>	N	S
<b>C</b>	S	N
<b>D</b>	S	S



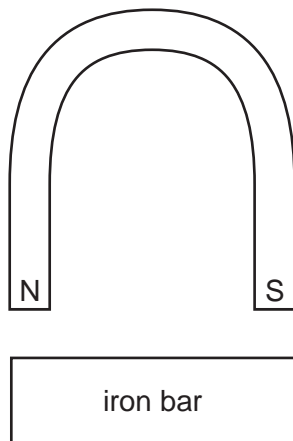
- 40 An ammeter and an  $18\Omega$  resistor are connected in series with a battery. The reading on the ammeter is  $0.50\text{ A}$ . The resistance of the battery and the ammeter can be ignored.



What is the electromotive force (e.m.f.) of the battery?

- A**  $9.0\text{ N}$       **B**  $9.0\text{ V}$       **C**  $36\text{ N}$       **D**  $36\text{ V}$
- 41 Which test could be used to find which end of a magnet is the north pole?
- A** putting it near a compass needle
  - B** putting it near a ferrous metal
  - C** putting it near a non-ferrous metal
  - D** putting it near a steel spoon

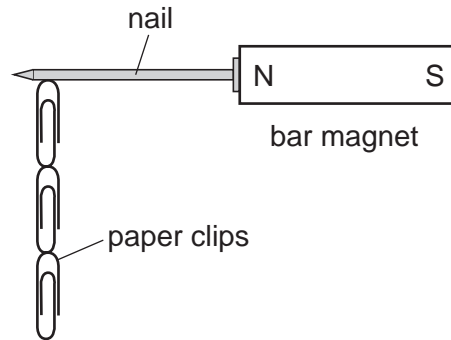
42 A horseshoe magnet is brought near to an unmagnetised iron bar.



Which row in the table shows the magnetic poles induced in the iron bar and the direction of the forces between the bar and the magnet?

	magnetic poles induced in iron bar	force between iron bar and magnet
<b>A</b>	N S	attraction
<b>B</b>	N S	repulsion
<b>C</b>	S N	attraction
<b>D</b>	S N	repulsion

43 Four nails, **A**, **B**, **C** and **D**, are tested to find which makes the strongest permanent magnet.



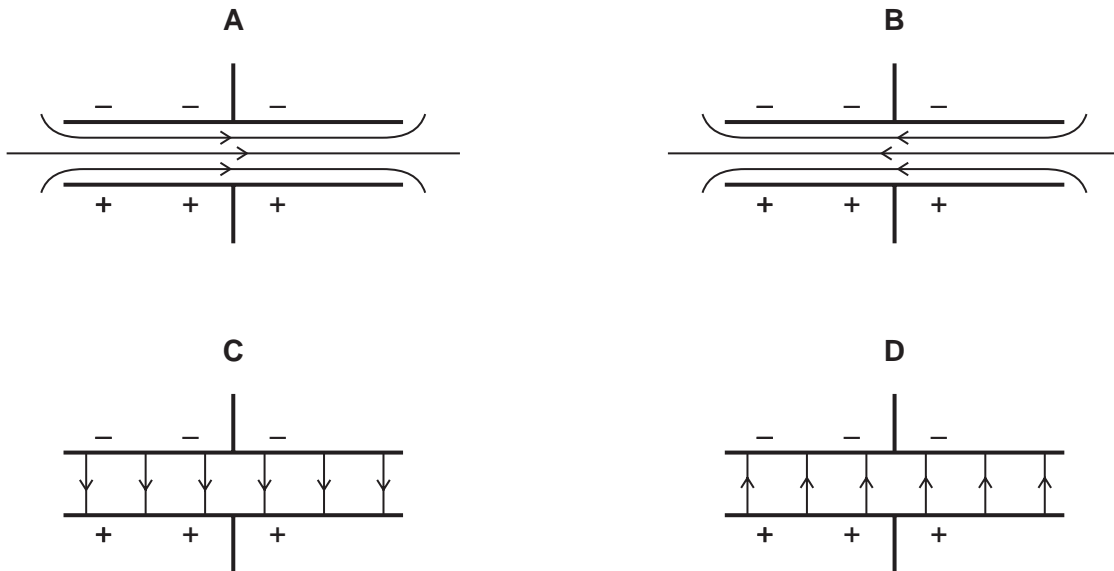
One of the nails is placed against a bar magnet and the number of paper clips which the nail can support is recorded. The bar magnet is then removed and the number of paper clips remaining attached to the nail is recorded. Each nail is tested in turn.

Which nail becomes the strongest permanent magnet?

nail	number of paper clips attached to the nail	
	bar magnet present	bar magnet removed
<b>A</b>	2	0
<b>B</b>	2	1
<b>C</b>	4	3
<b>D</b>	5	2

44 Each diagram shows two charged metal plates.

Which diagram shows the pattern and the direction of the electric field between the plates?



45 In which pair are both materials magnetic?

- A** aluminium and copper
- B** copper and iron
- C** iron and steel
- D** steel and aluminium

46 Which methods could be used to demagnetise a magnet?

method 1: place it in an east-west direction and hammer it

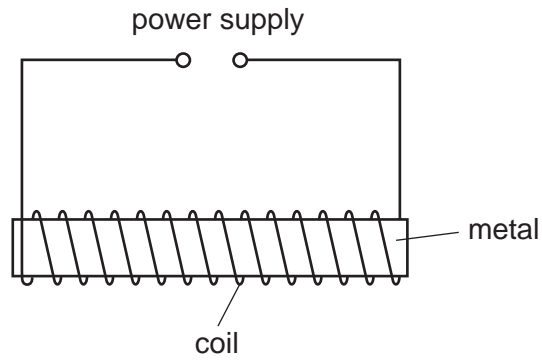
method 2: place it in an east-west direction and heat it until it is red hot

method 3: pull it slowly from a coil that is carrying an alternating current

method 4: put it slowly into a coil that is carrying a direct current

- A** methods
- B** methods
- C** methods 1 and 2 only
- D** methods 3 and 4 only

47 The diagram shows apparatus that can be used to make a magnet.



Which metal and which power supply are used to make a **permanent** magnet?

	metal	power supply
<b>A</b>	iron	6V a.c.
<b>B</b>	iron	6V d.c.
<b>C</b>	steel	6V a.c.
<b>D</b>	steel	6V d.c.