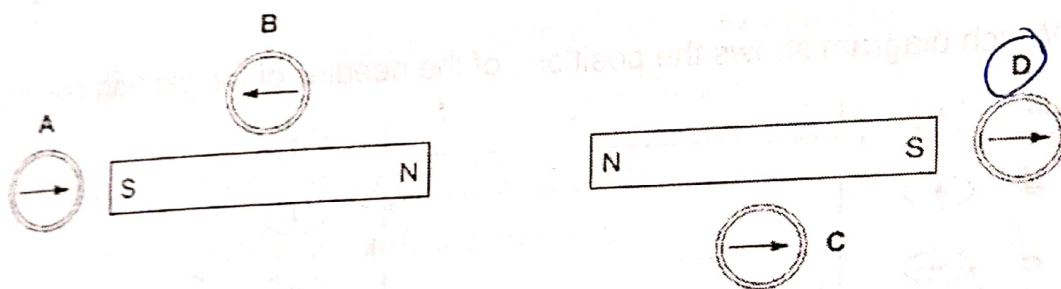
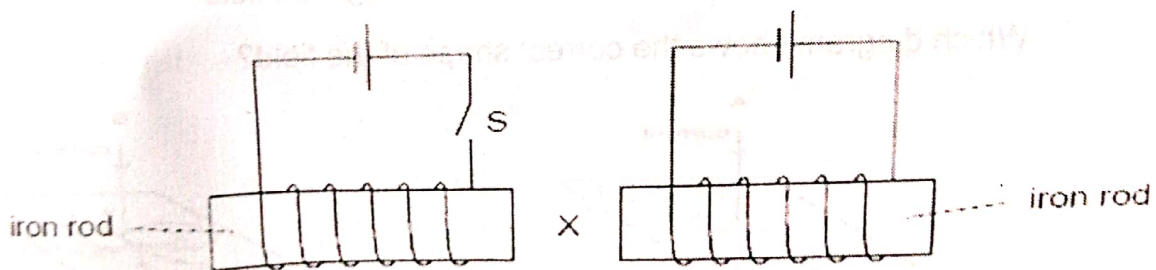


# Magnetism and Electromagnetism

- 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.
- A permanent magnet is brought near to a piece of copper. The copper is not attracted by the magnet. Why is there no attraction?
  - A. Copper is ferrous but is only attracted by an electromagnet.
  - B. Copper is ferrous but is not attracted by any type of magnet.
  - C. Copper is not ferrous and is only attracted by an electromagnet.
  - D. Copper is not ferrous and is not attracted by any type of magnet.
- Four plotting compasses are placed in the magnetic field of two identical bar magnets as shown in the diagram. Which compass is shown pointing in the wrong direction?
  - A
  - B
  - C
  - D



- Two circuits are set up as shown. The iron rods are placed close together, and are free to move.



What happens to the size of the gap at X when switch S is closed?

- A. It decreases.
- B. It decreases then increases.
- C. It increases.
- D. It does not change.

5. From which materials are the coil and the core of an electromagnet made?

	coil	core
A	copper	copper
<b>B</b>	copper	iron
C	iron	copper
D	iron	iron

6. A student investigates which end of a magnetic compass needle is attracted to a bar magnet. What does the investigation show?
- A. Both ends of the compass needle are attracted by the north pole of the magnet.
  - B. Both ends of the compass needle are attracted by the south pole of the magnet.
  - C. One end of the compass needle is attracted by the North pole and the other end by the South pole.**
  - D. The compass needle is not attracted by either end of the magnet.

7. A brass rod is positioned in an east-west direction and a plotting compass is placed at each end.

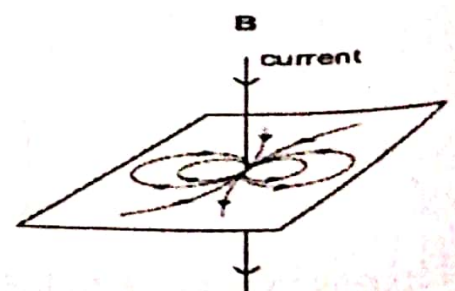
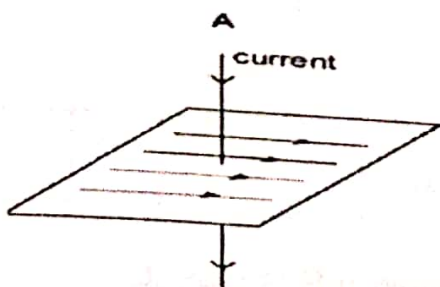


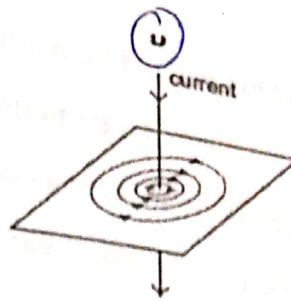
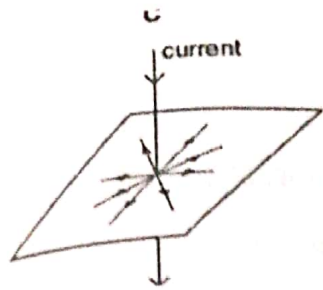
Which diagram shows the positions of the needles of the plotting compasses.



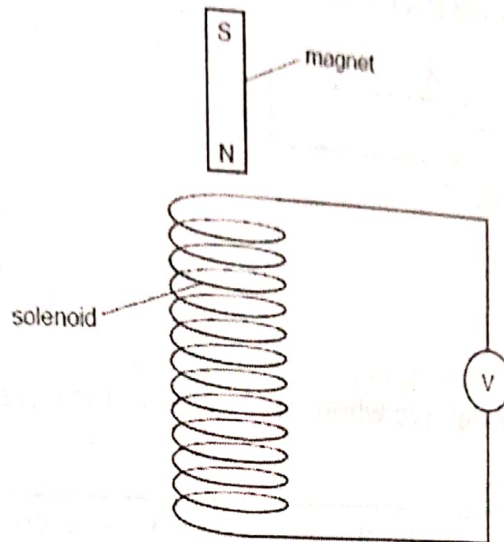
8. A straight wire carrying a current produces a magnetic field.

Which diagram shows the correct shape of the field?





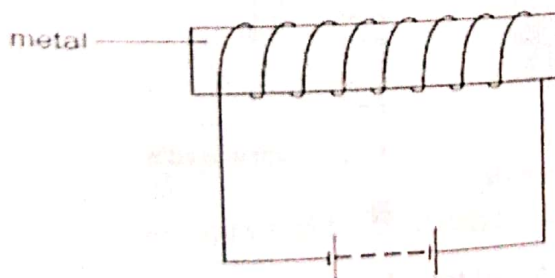
9. The diagram shows a solenoid connected to a sensitive voltmeter.



Which of the following would give a zero reading on the voltmeter?

- A. holding the magnet stationary inside the solenoid
- B. moving the magnet away from the solenoid
- C. moving the magnet towards the solenoid
- D. moving the solenoid towards the magnet

10. A student wishes to use a magnetizing coil to make a permanent magnet from a piece of metal.



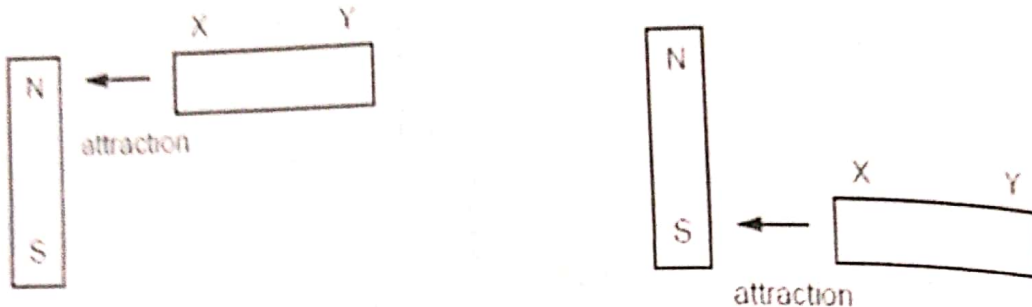
Which metal should she use?

- A. aluminium
- B. copper
- C. iron
- D. steel

11. How can a permanent magnet be demagnetized?

- A. cool the magnet for a long time
- B**. hit the magnet repeatedly with a hammer
- C. leave the magnet in a coil which carries direct current
- D. pass a small current through the magnet

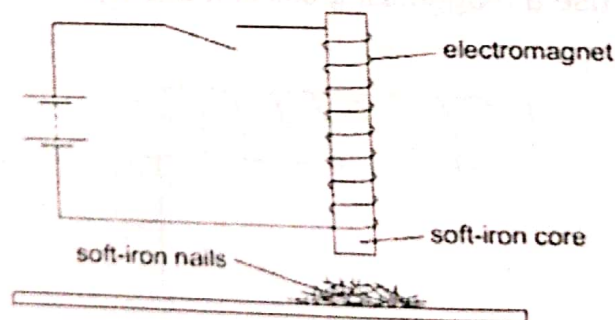
12. A metal rod XY is placed near a magnet. End X is attracted when it is placed near to the north pole of the magnet, and also when it is placed near to the South pole.



How does end Y behave when it is placed in turn, near to the two poles of the magnet?

	Y near north pole	Y near south pole
<b>A</b>	attraction	attraction
B	attraction	repulsion
C	repulsion	attraction
D	repulsion	repulsion

13. 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

14. An electromagnet is used to separate magnetic metals from non-magnetic metals. Why is steel unsuitable as the core of the electromagnet?

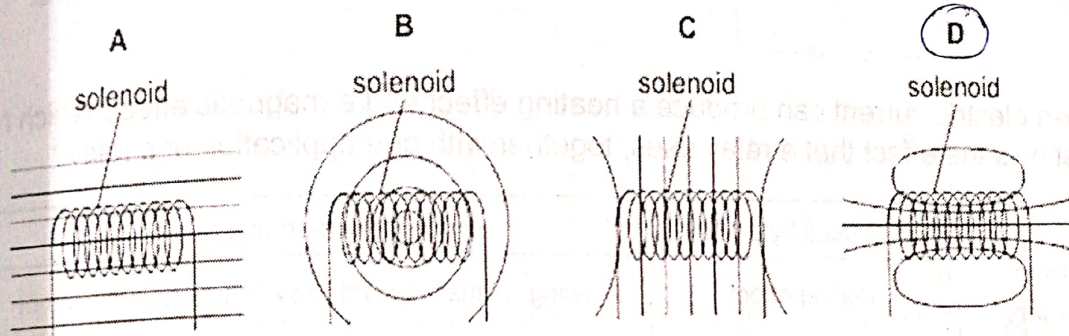
A. It is a good conductor of electricity.

**B.** It forms a permanent magnet.

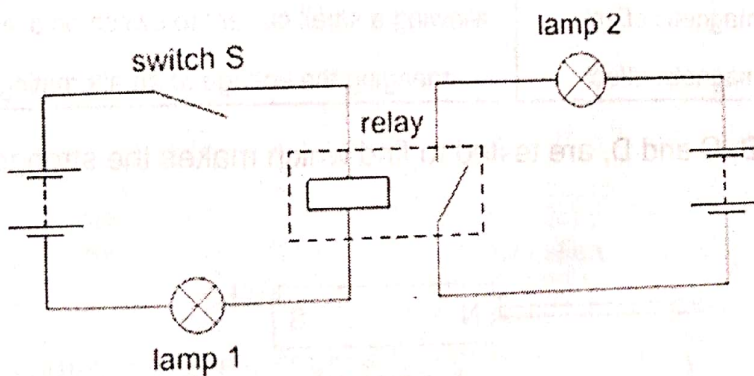
C. It has a high density.

D. It has a high thermal capacity.

15. Which diagram shows the pattern of the magnetic field produced by a current-carrying solenoid?



16. The circuit shown contains a relay. Both lamps are initially off.

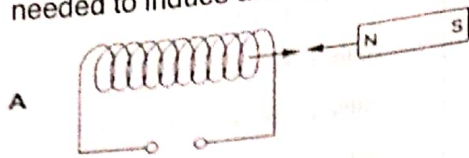


When switch S is closed, the relay operates. What is the state of the lamps?

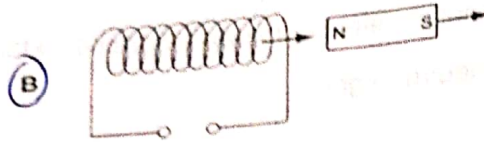
	lamp 1	lamp 2
<b>A</b>	on	on
<b>B</b>	on	off
<b>C</b>	off	on
<b>D</b>	off	off

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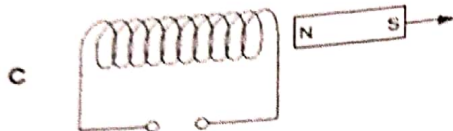
17. Which diagram shows a movement that will not produce the changing magnetic field needed to induce an e.m.f. in the coil?



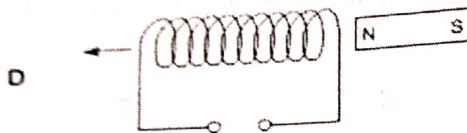
moving a magnet and a coil towards each other at the same speed



moving a magnet and a coil in the same direction at the same speed



moving a magnet away from a fixed coil

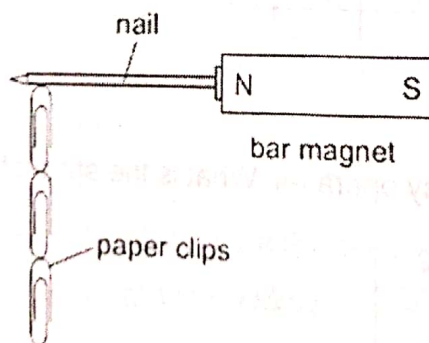


moving a coil away from a fixed magnet

18. An electric current can produce a heating effect and a magnetic effect. Which row shows the effect that a relay uses, together with one application of a relay?

	effect used by a relay	one application of a relay
A	heating effect	allowing a small current to switch on a large current
B	heating effect	changing the voltage of an alternating current
C	magnetic effect	allowing a small current to switch on a large current
D	magnetic effect	changing the voltage of an alternating current

19. 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?

Level 9

Physics

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

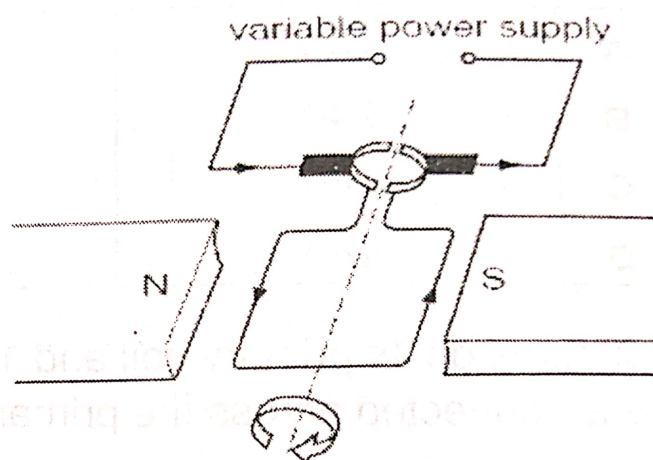
22. A student carries out an experiment to see the effect of a magnetic field on a wire carrying a current. The wire moves upwards as shown. What should the student do to make the wire move downwards?

- A. change the direction of the current
- B. move the poles of the magnet closer together
- C. send a smaller current through the wire
- D. use a stronger magnet

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24. A current-carrying coil in a magnetic field experiences a turning effect.



How can the turning effect be increased?

- A. increase the number of turns on the coil
- B. reduce the size of the current
- C. reverse the direction of the magnetic field
- D. use thinner wire for the coil