

Edexcel IGCSE Physics

6 - Magnetism and Electromagnetism

Flashcards

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What are the two poles of a magnet?



What are the two poles of a magnet?

North and South.

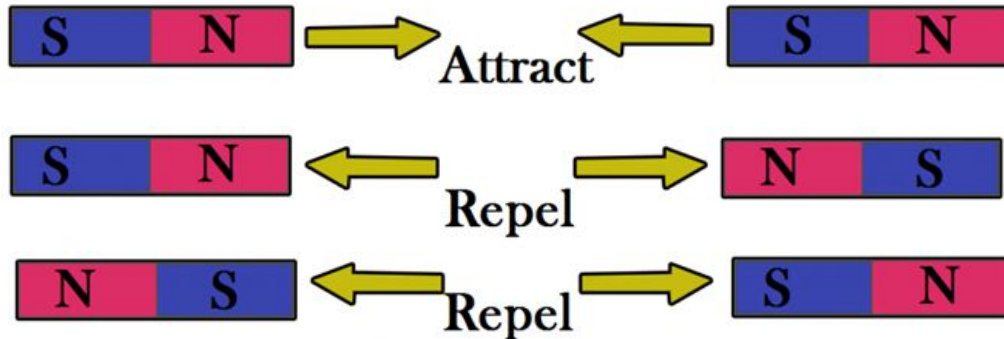


How do these different poles of the magnet interact?



How do these different poles of the magnet interact?

Like poles repel, unlike poles attract each other.



What is a permanent magnet?



What is a permanent magnet?

- A magnet that can produce its own magnetic field and will repel and attract other magnets when it is in contact with them
- It is made from a magnetic material
- It cannot be demagnetised



Explain what a hard magnetic material is.



Explain what a hard magnetic material is.

Hard magnetic materials get magnetised when an external magnetic field is applied and stay magnetised permanently when the external field is removed.



Explain what a soft magnetic material is.



Explain what a hard magnetic material is.

Soft magnetic materials get magnetised when an external magnetic field is applied but they get demagnetised (lose their magnetic field) when the external field is removed.



Name four magnetic materials.



Name four magnetic materials.

1. Iron
2. Cobalt
3. Nickel
4. Steel (**Iron**+Carbon)



What is a magnetic field?



What is a magnetic field?

A region surrounding a magnet where other magnets will experience a force.



Which direction do the field lines in a magnetic field point?



Which direction do the field lines in a magnetic field point?

From north to south.



Does a high concentration of field lines mean the field is strong or weak?



Does a high concentration of field lines mean the field is strong or weak?

Strong



True or false? - Magnetic field lines
never cross each other.



True or false? - Magnetic field lines never cross each other.

True

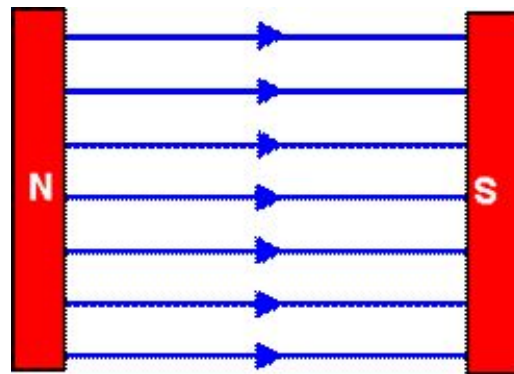


How can you produce a uniform magnetic field?



How can you produce a uniform magnetic field?

By placing opposite poles of two magnets across each other, you can create a uniform magnetic field where magnetic field lines are separated with a fixed distance between 2 magnets.



How is a plotting compass used to map out a magnetic field?



How is a plotting compass used to map out a magnetic field?

- Place a compass (containing a needle magnet) on a piece of paper near the field
- Move the compass to different places on the paper
- Draw an arrow in each position in the same direction as the needle points
- Once you have gathered enough data, you can join the arrows to make a complete field pattern

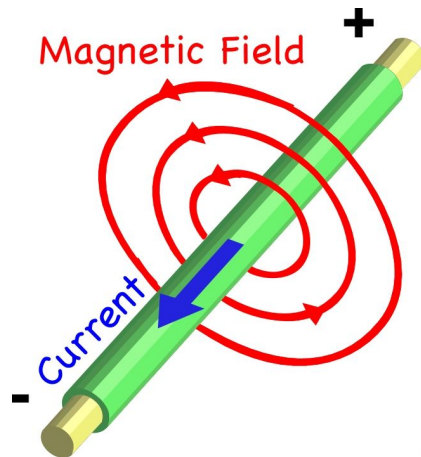


What must happen for a circular magnetic field to be created around a wire?



What must happen for a magnetic field to be created around a wire?

When current flows through a wire it induces a magnetic field.

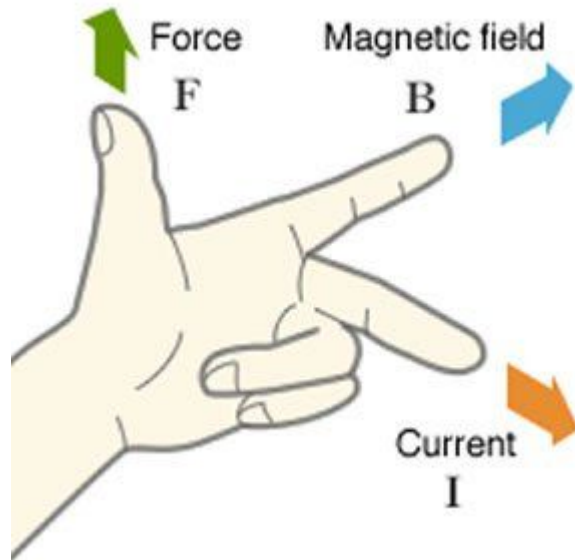


Use your hand to show Fleming's Left Hand rule, stating which finger represent field quantity.



Use your hand to show Fleming's Left Hand rule, stating which finger represent field quantity.

- Force (thumb)
- Magnetic field (index finger)
- Current (second finger)
- FBI



What is the relationship (direction wise)
between current, magnetic field and
force?



What is the relationship (direction wise) between current, magnetic field and force?

They all act perpendicular to each other.



How can we increase the magnitude of the force acting on a current-carrying wire inside a magnetic field?



How can we increase the magnitude of the force acting on a current-carrying wire inside a magnetic field?

- Increase the size of the current
- Increase the strength of magnetic field
(Use stronger magnet)



What is the motor effect?



What is the motor effect?

A current carrying wire is placed in a magnetic field and experiences a force that pushes the wire. The field from the current carrying wire interacts with the other magnetic field (the magnetic field it is placed in) so a force is applied on the wire. This force pushes the wire therefore the wire rotates.



How do loudspeakers use current to work?



How do loudspeakers use current to work?

- A coil is placed inside a magnet
- An alternating current in this coil causes a magnetic field
- When the field interacts with the magnet, a force is produced (the motor effect)
- This force pushes and pulls the wire/cone of the speaker, causing it to move in different directions.
- Due to the alternating current, the force causes the cone to vibrate
- This causes pressure variations in the air (sound waves)



How do microphones convert sound into electrical signals?



How do microphones convert sound into electrical signals?

- When sound is produced, the pressure variations in the waves cause the diaphragm to vibrate
- A coil of wire is connected to the diaphragm, so as the diaphragm moves, so does the coil of wire
- The coil of wire is in a magnet so when it moves a voltage is induced in the coil
- As there is a complete circuit a current is also created



If the current and the magnetic field are parallel to each other, which direction would the force act in?



If the current and the magnetic field are parallel to each other, which direction would the force act in?

No force will act when magnetic field is parallel to the current.



How are electric motors kept rotating?



How are electric motors kept rotating?

A commutator is used. This switches the current direction every half turn, which ensures that the coil keeps spinning.



How do you produce an electric current using a magnet and a conductor on a small-scale?



How do you produce an electric current using a magnet and a conductor on a small-scale?

- Moving a coil of wire into a magnet
- Or, moving a magnet into a coil of wire

Once a voltage is induced, assuming there is a complete circuit, a current will also be induced.



How is electrical current produced on a large-scale?



How is electrical current produced on a large-scale?

An electromagnet is rotated around a coil.



What factors affect the size of an induced voltage?



What factors affect the size of an induced voltage?

- The number of turns on the coil of wire
- How strong the magnetic field is
- How fast you move the magnet



How does a dynamo generate current?



How does a dynamo generate current?

A coil of wire rotates inside a magnetic field. A commutator is used to ensure it continues rotating in the same direction, therefore keeping the current flowing in the same direction (d.c. current).



How is electromagnetic induction used in alternators to generate alternating current?



How is electromagnetic induction used in alternators to generate alternating current?

A coil of wire rotates in a magnetic field. The end of this coil is connected to slip rings which will cause the current to change direction while rotating. This means a.c is produced.

