Edexcel GCSE Physics

Topic 12.7-12.14P - The Motor Effect

Flashcards

What is an electromagnet?

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- A solenoid with an added iron core
- Adding the iron core increases the strength of the magnetic field

What is the motor effect? (Higher)

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When a force is exerted between a magnetic field and a current-carrying conductor placed in that field.

What rule is used to determine the force produced by the motor effect? (Higher)

What rule is used to determine the force produced by the motor effect? (Higher)

Fleming's Left-Hand Rule

When using Fleming's left hand rule what does the forefinger represent? (Higher)

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The forefinger points in the direction of the **magnetic field**.

When using Fleming's left hand rule what does the second finger represent? (Higher)

When using Fleming's left hand rule what does the second finger represent? (Higher)

The second finger points in the direction of **current flow** in the conductor.

When using Fleming's left hand rule what does the thumb represent? (Higher)

When using Fleming's left hand rule what does the thumb represent? (Higher)

The thumb points in the direction of the force produced by the motor effect.

What factors affect the size of the force on a current-carrying wire in a magnetic field? (Higher)

What factors affect the size of the force on a current-carrying wire in a magnetic field? (Higher)

- The magnitude of the current flowing through the conductor
- The strength of the magnetic field that the conductor is placed in

If the direction of current in a current-carrying wire placed in a uniform magnetic field is reversed, what happens to the force? (Higher)

If the direction of current in a current-carrying wire placed in a uniform magnetic field is reversed, what happens to the force? (Higher)

The direction of the force is reversed.

If the strength of the current in a current-carrying wire placed in a uniform magnetic field is increased, what happens to the force? (Higher)

If the strength of the current in a current-carrying wire placed in a uniform magnetic field is increased, what happens to the force? (Higher)

The strength of the force is increased.

Give the equation linking force, magnetic flux density, current and length (Higher)

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force (N) = magnetic flux density (T) x current (A) x length (m)

$$F = BIL$$

What criteria must be met for the equation linking force, magnetic flux density, current and length to hold? (Higher)

What criteria must be met for the equation linking force, magnetic flux density, current and length to hold? (Higher)

The conductor must be at right-angles to the magnetic field it is placed in.

What is the unit used for magnetic flux density? (Higher)

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Tesla, T

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

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

No force will act.

How does an electric motor work? (Higher)

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- A coil of wire, carrying a current, is placed in a magnetic field
- The forces on the two sides perpendicular to the field experience forces in opposite directions
- This causes a rotational effect

How are electric motors kept rotating? (Higher)

How are electric motors kept rotating? (Higher)

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