OCR (B) Physics GCSE

Topic 3.6 - How do electric motors work?

(Higher)

Flashcards

What is the motor effect?

What is the motor effect?

The force experienced by a current-carrying wire placed in a magnetic field, causing the wire to be forced out of the field.

Describe the mechanism of the motor effect

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- When a current-carrying wire produces a magnetic field within the field of a permanent magnet, the two fields interact.
- The wire experiences a force pushing it away from the magnetic field, at right angles to the direction of the permanent field and the current.

How can you predict the direction of the motor effect?

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Using Fleming's left hand rule.

Thu**m**b = **M**ovement

First finger = **F**ield

Se**c**ond finger = **C**urrent

What is conventional current?

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A model for current which flows in the opposite direction to electrons. Conventional current flows from positive to negative.

What kind of current is used in Fleming's rule?

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Conventional current.

Which factors affect the strength of the motor force?

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- The length of wire placed in the field
- The current in the wire
- The strength of the permanent field

Give an equation linking force with current, including all units

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Force (N) = magnetic flux density (T) x current (A) x length of wire (m)

F = BIL

Describe how an electric motor works

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- A rectangular wire, or coil, lies between two permanent magnetic poles, so current flows up one side and down the other.
- The motor effect produces a couple on the coil, causing one side to move upwards and the other to move downwards, causing the wire to rotate.