WJEC England Physics A Level

2.1 Conduction of Electricity

Flashcards

What is electric current? State its units.

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The rate of flow of charge. It is measured in amps A where $A = Cs^{-1}$.

Give the symbol equation relating charge, current and time (include units).

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$$I = \frac{\Delta Q}{\Delta t}$$

Q = charge (Coulombs)

I = current (Amps)

t = time (seconds) where Δ is the change

In electricity what does ‘e’ represent?
What are the units of ‘e’?

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e is the elementary charge - ie. a proton has charge +e, an electron has charge -e

The units are Coulombs.

Give two examples of possible charge carriers.

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1. Electrons - in metals.
2. Ions - in electrolytes (aqueous solutions).

True or false? Current flows from negative to positive.

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False.

Conventional current is the ‘flow of positive charge’ - it is in the opposite direction to the movement of the electrons in the circuit.

How can you measure the current in a circuit?

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You can measure the current in a circuit with an ammeter connected in series with the component.

What is meant by ‘mean drift velocity’?

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The average velocity of the charge carriers due to the applied electric field.

It has to be an average because they’re often moving randomly in all directions.

What equation uses the drift velocity to calculate current?

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$$I = Anev$$

Where I = current, A = cross-sectional area of conductor, n = number density of charge carriers, e = the elementary charge, v = mean drift velocity

What are the units of ‘number density of charge carriers’ in the equation relating current and drift velocity?

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m^{-3}