

# Edexcel Physics A-Level

## Topic 3.1 - Electrical Quantities

### Flashcards

This work by [PMT Education](https://www.pmt.education) is licensed under [CC BY-NC-ND 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)



Define electrical current.



Define electrical current.

Electrical current is the rate of flow of charge.



State the defining equation for current.



State the defining equation for current.

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



# What is the unit of current?



What is the unit of current?

Ampere (Amps), A



# Define voltage.





Define voltage.

Voltage is the work done per unit charge.



State the defining equation for voltage.



State the defining equation for voltage.

$$V = \frac{W}{Q}$$



What equation links current, voltage and resistance?



What equation links current, voltage and resistance?

Voltage (V) = Current (A) x Resistance  
( $\Omega$ )

$$V = IR$$



# What is Ohm's Law?



## What is Ohm's Law?

If Ohm's Law is obeyed, the current and voltage passing through a component are directly proportional, when at a constant temperature.



Describe the distribution of current in a series circuit.





Describe the distribution of current in a series circuit.

In a series circuit, the current is the same at all positions in the circuit.



What law is the distribution of current in a series circuit a consequence of?



What law is the distribution of current in a series circuit a consequence of?

The law of the conservation of charge. Charge cannot be created or destroyed and so in a closed loop, the flow of charge must be the same throughout.



Describe the distribution of current in a parallel circuit.



Describe the distribution of current in a parallel circuit.

In a parallel circuit, the current is split between the different branches. The current entering each branch must be the same as the current leaving it.



Explain how the conservation of charge applies to parallel circuits.



Explain how the conservation of charge applies to parallel circuits.

Charge cannot be created or destroyed meaning the total current leaving the source must equal the sum of the currents in all the individual branches.



What law is the distribution of potential differences in a circuit a consequence of?





What law is the distribution of potential differences in a circuit a consequence of?

The law of the conservation of energy.



Describe the distribution of potential differences in a series circuit.



Describe the distribution of potential differences in a series circuit.

The total potential difference is split across all the components in a series circuit, in the ratio of their resistances.



Describe the distribution of potential differences in a parallel circuit.



Describe the distribution of potential differences in a parallel circuit.

The sum of the potential differences in each branch of a parallel circuit, is the same and will be equal to the potential difference of the source.



What equation relates power, current and potential difference?



What equation relates power, current and potential difference?

$$P = IV$$



How can you calculate the work done over a given time period, by a component with a known potential difference and current?





How can you calculate the work done over a given time period, by a component with a known potential difference and current?

Combining  $P = W/t$  and  $P = IV$  gives:

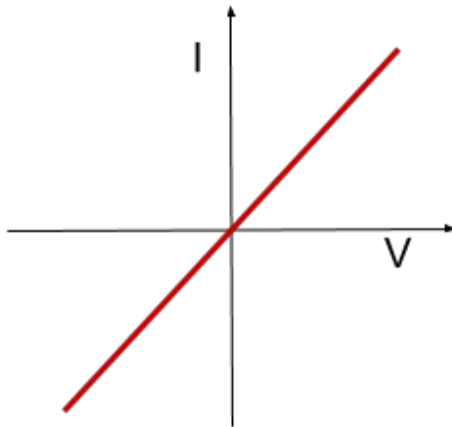
$$W = IVt$$



What is the IV characteristic for an ohmic conductor?



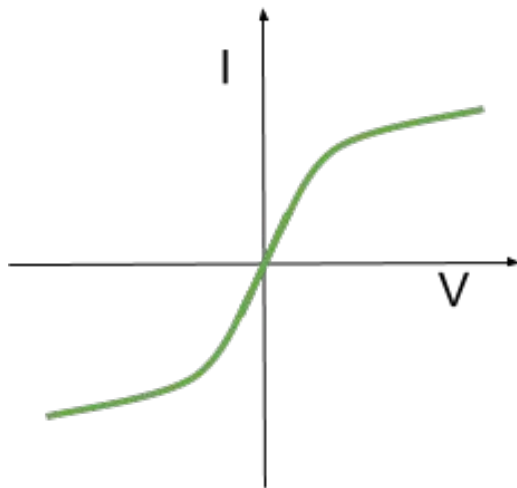
# What is the IV characteristic for an ohmic conductor?



What is the IV characteristic for a filament bulb?



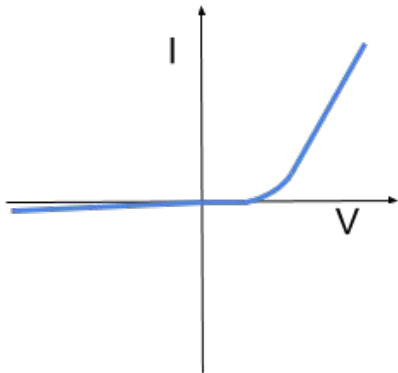
# What is the IV characteristic for a filament bulb?



# What is the IV characteristic for a diode?



# What is the IV characteristic for a diode?



Explain the IV characteristic for a filament bulb.





Explain the IV characteristic for a filament bulb.

- The higher the current, the higher the temperature of the metal filament
- The higher the temperature, the higher the KE of the metal ions and so the more they vibrate
- This makes it harder for current to flow and so the resistance of the bulb increases

