WJEC A-Level Physics

2.3 D.C Circuits

Flashcards

How can you measure the current in a circuit?

How can you measure the current in a circuit?

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

How do you measure the potential difference across a component?

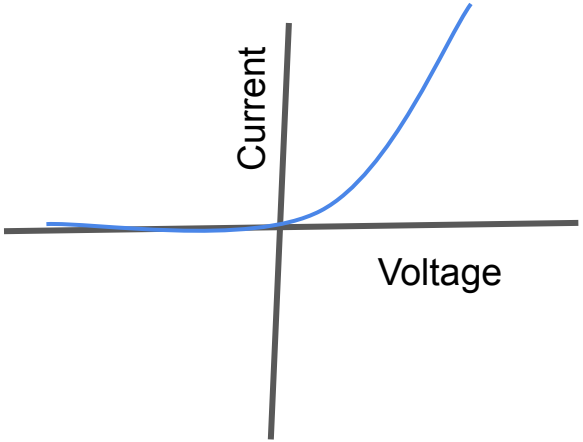
How do you measure the potential difference across a component?

Using a voltmeter, connected in parallel across the component being measured.

What is a diode?

What is a diode?

A diode is a component that only allows current to flow in one direction.



Unless stated in the question, should you assume that voltmeters have zero resistance or infinite resistance?

Unless stated in the question, should you assume that voltmeters have zero resistance or infinite resistance?

You should assume they have infinite resistance. Current takes the path of least resistance, so if the voltmeter has infinite resistance, when applied in parallel to the appliance, no current will flow through it and all the current will flow through the appliance.

Why should you assume that an ammeter has zero resistance unless stated otherwise?

Why should you assume that an ammeter has zero resistance unless stated otherwise?

This assumption means that there would be 0 potential difference across the ammeter and no energy is lost across the it. It does not affect the circuit.

What is an Light Dependent Resistor (LDR)?

What is an Light Dependent Resistor (LDR)?

A semiconductor that is sensitive to light.

As the light intensity increases its resistance decreases.

How does a thermistor work?

How does a thermistor work?

Similar to a LDR, but as the temperature increases, the resistance decreases.

How do you find the total resistance in a series circuit?

How do you find the total resistance in a series circuit?

$$R_{Total} = R_1 + R_2 + R_3 + \ldots$$

Add the resistances of each component.

If 6 cells each of voltage 5V are arranged in parallel, what is the voltage in the circuit?

If 6 cells each of voltage 5V are arranged in parallel, what is the voltage in the circuit?

5V

How does the current vary between each component of a series circuit?

How does the current vary between each component of a series circuit?

The current through all of the components is the same so the current does not vary.

Is the current in parallel components the same?

Is the current in parallel components the same?

No, each branch of a parallel circuit can have different currents through them.

In a series circuit, if two cells are connected negative to negative, would their emfs add up or cancel out?

In a series circuit, if two cells are connected negative to negative, would their emfs add up or cancel out?

They will cancel out. The total emf would be equal to:

$$\varepsilon_{total} = \varepsilon_1 - \varepsilon_2.$$

What is Kirchhoff's first law?

What is Kirchhoff's first law?

All of the current going into a junction is equal to the total current leaving the junction.

What is Kirchhoff's second law?

What is Kirchhoff's second law?

For any path (loop) of a circuit, the sum of all of the potential differences must equal the total emf of the circuit.

What is the purpose of a potential divider?

What is the purpose of a potential divider?

To provide a variable potential difference, or to provide a constant specific potential difference.

A circuit is set up with a cell providing a voltage of 12V to 2 resistors of 6Ω and 7Ω in series, what is the voltage across the 7Ω resistor?

A circuit is set up with a cell providing a voltage of 12V to 2 resistors of 6Ω and 7Ω in series, what is the voltage across the 7Ω resistor?

Total resistance = 6 + 7 = 13Ω

(7/13) x 12 = 6.5V

What is emf?

What is emf?

Electromotive force: the electrical energy transferred by a power supply per unit charge. It has the same units as pd (V).

Rearrange the equation $\mathcal{E} = I(R+r)$ into the form of $y = mx + c$

Rearrange the equation $\varepsilon = I(R+r)$ into the form of $y = mx + c$

$$\varepsilon = IR + Ir$$
$$\varepsilon = V + Ir$$

So for a graph of V against I

$$V = -rI + \varepsilon$$
$$y = mx + c$$

What is the total resistance of a parallel arrangement of 3Ω, 7Ω and 9Ω resistors?

What is the total resistance of a parallel arrangement of 3Ω,7Ω and 9Ω resistors?

$$1/R_T = ⅓ + 1/7 + 1/9$$

$$1/R_T = 37/63$$

$$R_T = 63/37 = 1.7\Omega$$