

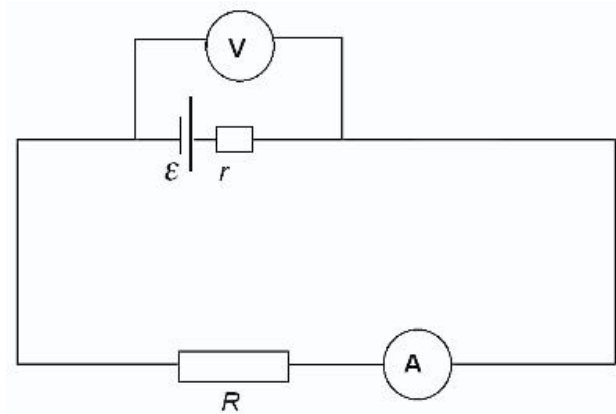
Edexcel Physics A Level

Core Practical 3

Determine the EMF and Internal Resistance of an Electrical Cell



Method 1

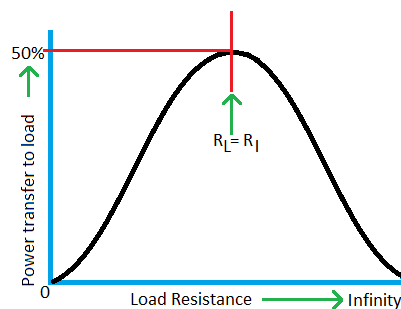


- Set up apparatus as shown in the diagram
- Measure **PD across the terminals, V_T** , using voltmeter
- Vary **current** in circuit by changing value of **load resistance, R** using **variable resistor**, measure pd (V) for several values of I
- Repeat several times and find average V_T and I
- Plot graph of V_T (y axis) and I (x axis) and draw line of best fit with equation:

$$V_T = \varepsilon - Ir$$
 - Gradient is **negative internal resistance (-r)**
 - Y intercept is EMF, ε

Method 2

- Collect the same data as in Method 1 (Terminal PD and Current)
- Find **Power dissipated at load, P**, using $P = IV$ and read the **load resistance, R**, off the variable resistor
- Plot a graph of power dissipated against load resistance (P against R):



- Power dissipated at the load resistance is a **maximum** value when:
Load resistance = Internal resistance

Safety

- low pd so no danger of shock, but variable resistor may get hot, so handle with care



Evaluation

- For small voltage/current values use **new cell** or one with a higher E.M.F.
- The terminal PD can be measured across the **terminals** of the power supply, or across the **component** (provided there is only one component)
- Keep temperature constant by opening **switch** between readings to prevent current flow in between each trial
- Check for **zero errors** on voltmeters and ammeters
- Could use a **multimeter** as it is difficult to read meters simultaneously when there are fluctuating readings on the meters

