

Electric circuits

Calculate current and potential difference, and compare simple series and parallel circuits.

Current and potential difference

Current is charge passing a point per second. Potential difference is energy transferred per unit charge. Connect an ammeter in series and a voltmeter in parallel with the component.

Series and parallel

In a series circuit the current is the same through each component. In parallel branches the potential difference is the same; branch currents add to the total current.

Formula sheet

$$I = Q / \Delta t$$

$$V = W / Q$$

$$\text{Series resistance: } R_{\text{total}} = R_1 + R_2 + \dots$$

Worked example

A charge of 24 C passes a point in 8 s. Find the current.

1. Use $I = Q / \Delta t$.
2. Substitute $Q = 24 \text{ C}$ and $\Delta t = 8 \text{ s}$.
3. $I = 24 / 8 = 3 \text{ A}$.

Try it yourself

1. A cell transfers 18 J to 6 C of charge. Find its potential difference.
2. Two series resistors are 2Ω and 5Ω . Find their combined resistance.

Check your answers

1. $V = W / Q = 18 / 6 = 3 \text{ V}$.
2. $R_{\text{total}} = 2 + 5 = 7 \Omega$.

Common mistake

A voltmeter belongs in parallel. Do not connect it as though it were an ammeter.

Source and scope

Original Pass Papers ZA revision notes; curriculum reference linked below.

Updated 2026-10-28. Selected revision topics, not an official examination paper. Check your teacher's scope.

Official DBE curriculum / textbook reference

Read online: <https://passpapers.co.za/study/revision/grade-10-physical-sciences-electric-circuits>