The Practise Ground

Class 12 Physics

Kirchhoff's Laws & Circuits

Solve any DC circuit

1

Current in = Current out

Junction rule (KCL)
Charge is conserved at every junction

2

Loop voltages add to 0

Loop rule (KVL)
Energy is conserved around any closed loop

3

$R = R_1 + R_2 + R_3$

Resistors in series
Same current through each; voltages add

4

$1/R = 1/R_1 + 1/R_2 + 1/R_3$

Resistors in parallel
Same voltage across each; currents add

V	I	R	P	E
voltage volt (V)	**current** ampere (A)	**resistance** ohm (Ω)	**power** watt (W)	**emf** volt (V)

Key ideas

Power: $P = VI = I^2R = V^2/R$.

With internal resistance r: terminal voltage $V = E - Ir$.

Quick example

6 Ω and 3 Ω in parallel across 6 V

$R = (6 \times 3) / (6 + 3) = 2\ \Omega$

$I = V / R = 6 / 2 = 3$ A

Think you've got it? Test yourself.

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