Electricity Equations Worksheet

Level: GCSE / A-Level | Difficulty: Intermediate | Topic: Electricity & Magnetism

Practice the core electricity equations with 10 problems covering Ohm's law, electrical power, charge, and energy. Full solutions included.

Equations you will need

V = IR	Ohm's law: voltage = current x resistance
P = IV	Electrical power = current x voltage
P = I^2R	Power dissipated in a resistor
Q = It	Charge = current x time
E = QV	Energy = charge x voltage
E = Pt	Energy = power x time

Symbol key

Symbol	Quantity	Unit
V	voltage / potential difference	V (volts)
I	current	A (amperes)
R	resistance	Ohm (ohms)
P	power	W
Q	charge	C (coulombs)
E	energy	J
t	time	s

Practice problems

1. A 12 V battery drives 2 A through a resistor. Find the resistance.

2. A 240 V appliance has resistance 60 Ohm. Find the current.

3. Find the power of a device drawing 3 A from a 230 V supply.

4. A 100 Ohm resistor carries 0.5 A. Find the power dissipated.

5. Find the charge flow when 2 A flows for 30 s.

6. How much energy does a 60 W bulb use in 5 minutes?

7. A current of 0.4 A flows through a 25 Ohm resistor for 10 s. Find the energy dissipated.

8. A 2 kW kettle runs for 3 minutes. Find the energy used in kJ.

9. Two resistors of 6 Ohm and 12 Ohm are connected in series across 18 V. Find the current.

10. A 9 V battery is connected to a 3 Ohm resistor. Find the current, power, and charge passed in 1 minute.

Answer key

Full worked solutions for each problem.

1. R = V/I = 12/2 = 6 Ohm
2. I = V/R = 240/60 = 4 A
3. P = IV = 3 x 230 = 690 W
4. P = I^2R = (0.25)(100) = 25 W
5. Q = It = 2 x 30 = 60 C
6. E = Pt = 60 x 300 = 18,000 J
7. V = IR = 10 V; E = VIt = 10(0.4)(10) = 40 J
8. E = Pt = 2000 x 180 = 360,000 J = 360 kJ
9. R_total = 18 Ohm; I = V/R = 18/18 = 1 A
10. I = 3 A; P = 27 W; Q = 180 C