# Current electricity revision I

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# Memory 1

- Bed
- Night
- Eat
- Rest
- Snore
- Dream
- Slumber
- Tyre
- Comfort
- Restless

# Memory 1

- Volcano
- Dinosaur
- apple
- Eskimo
- keyboard
- Revolver
- Island
- classroom
- Briefcase
- drum

# Revision

1. Learn how memory works. . .
2. Only 50 mins: reduced physics company!
3. Have some opportunity for questions

# Charge, current and potential difference

Remember, not many facts in physics, but difficult to get started without knowing these!

## Current and Voltage

| Quantity | Symbol | Unit | Equivalent to... |
|---|---|---|---|
| Current | $I$ | A | $\mathrm{C\,s^{-1}}$ |
| Voltage | $V$ | V | $\mathrm{J\,C^{-1}}$ |
| Charge | $Q$ | C | base unit |
| Resistance | $R$ | $\Omega$ | *don't know!* |

## Ohm's Law

$$I = \frac{V}{R}$$

# $I$–$V$ characteristics

ohmic conductor

semiconductor diode

filament lamp

Conclusion: Ohm's law is a special case where $I \propto V$.

# Resistivity $\rho$

$$R = \frac{\rho l}{A}$$

**Dependence of $R$ on temperature**

- metals, thermistors
- Applications, e.g. temperature sensors
- Superconductivity
- Applications, e.g. very strong electromagnets, power cables **levitation**

# Resistors in series and parallel

It is often necessary to find the total resistance of some complicated bunch of resistors in an electrical circuit. There are rules to help us with this, however.

**Resistors in series**

For resistors in series, we simply add the resistances up along the path of the current. For $N$ resistances,

$$R = R_1 + R_2 + \ldots + R_N.$$

**Resistors in parallel**

For resistors in parallel, the resistance decreases as the number of resistors increases, as the current has more ways to go.

$$\frac{1}{R} = \sum_{i=1}^{N} \frac{1}{R_i}$$

# ANY QUESTIONS?

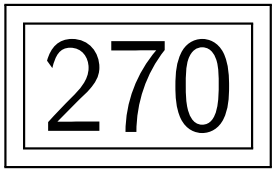
# Countdown!

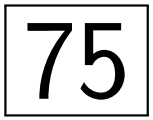
176

9 8 9 2 5 100

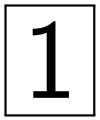
# Countdown!


# Countdown!







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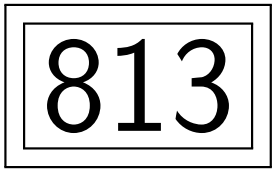


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