

**Basics of Electricity****Checklist statement**

✓

I can define electric current as the rate of flow of charge. ☐

I can define potential difference as work done per unit charge. ☐

I can apply $I = \frac{\Delta Q}{\Delta t}$, define all terms and know their standard units. ☐

I can apply $V = \frac{W}{Q}$, define all terms and know their standard units. ☐

I can define resistance. ☐

I can apply $R = \frac{V}{I}$, define all terms and know their standard units. ☐

Current–Voltage Characteristics**Checklist statement**

✓

I can describe the current–voltage characteristics of an ohmic conductor. ☐

I can describe the current–voltage characteristics of a semiconductor diode. ☐

I can describe the current–voltage characteristics of a filament lamp. ☐

I can explain Ohm’s law as a special case where current is proportional to potential difference under constant physical conditions. ☐

I can interpret current–voltage graphs where either current or potential difference is on the horizontal axis. ☐

Resistivity

Checklist statement

✓

I can apply $\rho = \frac{RA}{L}$, define all terms and know their standard units. ☐

I can describe qualitatively how temperature affects the resistance of a metal conductor. ☐

I can describe qualitatively how temperature affects the resistance of a thermistor. ☐

I know that only negative temperature coefficient (NTC) thermistors are considered. ☐

I can describe applications of thermistors, including temperature sensors and resistance–temperature graphs. ☐

I can explain superconductivity as a property of certain materials below a critical temperature. ☐

I can describe applications of superconductors, including strong magnetic fields and reduced energy loss in power transmission. ☐

I can describe a required practical to determine the resistivity of a wire. ☐

Circuits

Checklist statement

✓

I can apply the rules for resistors in series. ☐

I can apply the rules for resistors in parallel. ☐

I can apply $E = IVt$, define all terms and know their standard units. ☐

I can apply $P = IV$, define all terms and know their standard units. ☐

I can apply $P = I^2R$, define all terms and know their standard units. ☐

I can apply $P = \frac{V^2}{R}$, define all terms and know their standard units. ☐

I can explain the relationships between currents, voltages and resistances in series and parallel circuits. ☐

I can describe conservation of charge and conservation of energy in d.c. circuits. ☐

Potential Divider

Checklist statement

✓

I can explain how a potential divider is used to supply a constant or variable potential difference.

☐

I can describe the use of variable resistors, thermistors and light-dependent resistors (LDRs) in a potential divider.

☐

I can analyse potential divider circuits to predict output potential differences.

☐

I can design and construct potential divider circuits to achieve specific outcomes.

☐

Electromotive Force and Internal Resistance

Checklist statement

✓

I can define electromotive force (emf).

☐

I can define terminal potential difference.

☐

I can apply $\varepsilon = \frac{E}{Q}$, define all terms and know their standard units.

☐

I can apply $\varepsilon = I(R + r)$, define all terms and know their standard units.

☐

I can perform calculations for circuits where internal resistance is not negligible.

☐

I can describe a required practical to investigate the emf and internal resistance of a cell or battery.

☐