

## Definitions and Concepts for Edexcel Physics A Level

### Topic 3: Electric Circuits

**Conventional Current Flow:** Flow from positive to negative, used to describe the direction of current in a circuit.

**Current:** The rate of flow of charge in a circuit, measured in Amperes and has symbol  $I$ .

**Detecting Circuit:** A circuit with a potential divider with one of the resistors being a semiconductor which when an external condition changes will change its resistance and change the voltage across the other resistor in the potential divider.

**Diode:** Components that allow current through in one direction. In the correct direction, diodes have a threshold voltage (typically 0.6 V) after which current flows normally.

**Electromotive Force (EMF):** The energy supplied by a source per unit charge passing through the source, measured in volts.

**Electron Flow:** The flow of electrons in a circuit, from negative to positive.

**Internal Resistance:** The unavoidable resistance any power source will have that makes it harder for current to flow through the source. It causes energy to be dissipated in the source.

**Kirchoff's First Law:** The total current entering a junction is equal to the total current leaving it.

**Kirchoff's Second Law:** The sum of EMF in any loop of the circuit is equal to the sum of the potential differences of each component.

**Light Dependent Resistors (LDR):** When these components are illuminated with light their resistance goes down. As light intensity increases resistance decreases.

**Ohmic Conductor:** A conductor following Ohm's law where current flowing through it is directly proportional to the potential difference between each end of the conductor. This only holds if the conductor is kept at a constant temperature.

**Ohm's Law:** Electric current is proportional to potential difference and inversely proportional to resistance.

**Parallel Connection:** When two electrical components are on separate loops to one another in a circuit. Potential difference over each loop is the same, current is split between branches.



**Potential Difference:** The difference in electrical potential between two points in a circuit and the work done that is required per coulomb to move a charge from the lower potential point to the higher potential point. It is measured in Volts.

**Potential Divider:** A combination of two or more resistors in series. These result in the potential difference of the circuit being split into a specific ratio depending on the resistance of the resistors. They can be used to get a specific output voltage from the circuit.

**Power:** Rate of energy transfer in a circuit. It can be calculated as the product of the current and the potential difference between two points. Measured in Watts.

**Resistance:** A measure of how difficult it is for current to flow in a circuit or component, measured in Ohms and has symbol  $R$ .

**Resistivity:** A measure of how difficult it is for charge to travel through a material, depending on the material's cross sectional area, length and resistance. It is measured in Ohm metres and has symbol  $\rho$ .

**Semiconductors:** Materials that change their resistance depending on external conditions.

**Series Connection:** When two electrical components are on the same loop to one another in a circuit. Potential difference is split between components depending on their resistance, current is the same across all components. **Superconductor:** A material that has zero resistivity below a critical temperature. They are used for very efficient electricity transmission or to create very strong magnetic fields but require extreme cooling to reach their critical temperatures.

**Terminal Potential Difference:** The actual potential difference across the terminals of a power source. It is the source's EMF minus the voltage drop due to the source's internal resistance.

**Thermistor:** When these components are heated up their resistance goes down. As temperature increases resistance decreases.

**Variable Resistors:** A resistor that can have its resistance changed. Typically, these are used with power supplies to change the voltage of a circuit without using a transformer.

**Voltmeter:** A device used to measure the potential difference between two points on a circuit, ideally it has infinite resistance so no current passes through it.

