

Definitions and Concepts for OCR (B) Physics GCSE

Topic 3: Electric Circuits

*Definitions in **bold** are for higher tier only*

Definitions marked by '' are for separate sciences only*

Ammeter: A device connected in series with a component to measure the current that flows through it.

Ampere (Amps): The unit of current.

***Alternator:** A device that makes use of the generator effect to generate alternating current.

Charge: A property of all matter. Charges can be positive or negative.

Coulomb: The unit of charge.

Current-Carrying Wires: When current flows through a wire, a magnetic field is generated around it. The strength of the field depends on the magnitude of the current and the distance from the wire.

Diode: A component that only allows current to flow through in the forward direction. They have very large resistances in the reverse direction.

Direct Current: Current flow consisting of charges flowing in a single direction only. Batteries and cells provide direct current.

***Dynamo:** A device that makes use of the generator effect to generate direct current.

Earthing: The removal of excess charge by providing a low resistance path for electrons to flow through.

Electric Current: The rate of flow of electrical charge. Its value is the same at any position in a single closed loop. In metals, the charges that flow are electrons.

Electric Field Lines: Lines representing an electric field, that point in the direction in which a positive charge would experience an electric force. The closer they are, the stronger the field.

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Electric Field: A region in which a charge will experience a non-contact, electrostatic force. All charged objects have an electric field around them, and this field is stronger the closer you are to the charge.

Electric Motor: A current-carrying coil of wire in a magnetic field. The two sides of the coil that are perpendicular to the magnetic field experience forces in opposite directions, causing rotation.

Electromagnet: A solenoid with an iron core. The magnetism of an electromagnet can be switched on and off, and the strength changed, through varying the current in the solenoid.

Filament Lamp: A light emitting component consisting of an enclosed metal filament. Its resistance increases as the filament's temperature increases.

Fleming's Left-Hand Rule: A rule used to determine the orientation of the force (thumb), current (second finger) and magnetic field (first finger) when a current-carrying wire is placed in a magnetic field (motor effect).

Generator Effect: When there is relative motion between an electrical conductor and a magnetic field, a voltage will be induced across the ends of the conductor. A current will flow if this conductor is part of a complete circuit.

Light Dependent Resistor (LDR): A light sensitive component whose resistance decreases as its temperature increases.

Light Emitting Diode: A device that gives out light when a current flows through it. Current can only flow through it in one direction, and a minimum voltage must be applied across it before it illuminates.

Lightning: A consequence of static charge building up in the clouds. Lightning strikes are caused by the discharge of this charge.

Like Charges: When two charges of the same polarity meet, they will repel.

Loudspeaker: A device that converts variations in current into vibrations of a diaphragm to produce corresponding sound waves.

Magnetic Field Lines: Lines that show the strength and direction of a magnetic field. The lines point from North to South and their concentration represents the magnitude of the field.

Magnetic Field: The region around a magnet in which another magnet or magnetic material will experience a non-contact force.



Magnetic Materials: Iron, steel, cobalt and nickel.

Magnetic Poles: The regions of a magnet where the magnetic forces are at their strongest.

Microphone: A device that converts the pressure variations in sound into corresponding current variations.

Ohmic Conductor: A conductor whose current flow is directly proportional to the potential difference across it, when held at a constant temperature.

Ohms: The unit of resistance.

Ohm's Law: The current flowing through an Ohmic conductor at constant temperature is directly proportional to the potential difference across it.

Parallel Plates: The electric field between two charged plates is uniform. The field lines are parallel, equally spaced and point from the positive plate to the negative plate.

Parallel: Components connected in parallel have the same potential difference across each component. The total current is equal to the sum of the currents flowing through each component.

Permanent Magnet: A magnet that produces its own magnetic field.

Point Charge: The electric field around a point charge becomes weaker the further away you are. The field lines for a positive charge point radially outwards, whereas the field lines for a negative charge point radially inwards.

Potential Difference: The energy that is transferred per unit charge between two points in a circuit. It is often also called a voltage.

Power: The rate at which an appliance transfers energy. For a circuit component, it is equal to the product of the current passing through it and the potential difference across it.

Resistors in Parallel: The total resistance is less than the lowest individual resistance.

Resistors in Series: The total resistance is equal to the sum of the resistances of the individual resistors.

Series: Components connected in series have the same current passing through each component but share the total potential difference of the power supply.



Solenoid: A wire wrapped into the shape of a coil, that has a strong and uniform magnetic field inside of it. The solenoid's magnetic field strength can be increased by adding an iron core.

Sparking: The transfer of electrons between two surfaces that have an imbalance of charges. Sparking can be particularly dangerous in locations such as petrol pumps, and so the pumps must be earthed.

Static Charge: The charge caused by an imbalance of positive and negative charges in, or on, an object's surface. It is often caused by electrons being rubbed from one surface onto another.

Step-Down Transformer: A transformer that has a smaller potential difference in the secondary coil than in the primary coil. **This is a result of the secondary coil having fewer turns.**

Step-Up Transformer: A transformer that has a larger potential difference in the secondary coil than in the primary coil. **This is a result of the secondary coil having more turns.**

Tesla: The unit of magnetic flux density.

Thermistor: A temperature dependent component, whose resistance increases as its temperature decreases.

Turns Ratio: The number of turns in the primary coil of a transformer over the number of turns in the secondary coil. **This is equal to the voltage ratio for a 100% efficient transformer.**

Unlike Charges: When two charges of opposite polarities meet, they will attract.

Volt: The unit of potential difference. One volt is equal to one joule per coulomb.

Voltage Ratio: The voltage across the primary coil of a transformer over the voltage across the secondary coil.

Voltmeter: A device that is connected in parallel with a component to measure the potential difference across it.

Watt: The unit of power.

