

Definitions and Concepts for Edexcel Physics IGCSE

Topic 2: Electricity

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

Definitions marked by “” are for separate sciences only*

Alternating Current: Current flow consisting of charges that continually change direction. These oscillations usually occur at a set frequency.

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

Ampere (Amp): The unit of current.

Circuit Breaker: A safety device that cuts off the power supply if a surge of current passes through it. Circuit breakers can be reset and are quicker acting than fuses.

Conductor: A material that allows electrical charge to flow easily. Metals are particularly good conductors due to the free electrons in their structures.

Coulomb: The unit of charge.

Currents at a Junction: The sum of the currents entering a junction must always equal the sum of the currents leaving it. This is a consequence of the conservation of charge.

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.

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

Earth Wire: The green and yellow striped safety wire connected to metal casings, that prevents an appliance from becoming live.

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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.

Energy Transfers in Circuits: Electrical energy is transferred to thermal energy when current does work against a resistance. In metals this is a result of collisions between electrons and ions.

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

Fuse: A safety device consisting of a thin metal filament that melts and cuts off the power supply if there is a surge in current. Fuses are connected to the live wire.

Insulator: A material that doesn't allow electrical charge to flow.

***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.

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.

Live Wire: The brown coloured wire that carries the alternating current from the supply in a mains power supply.

Mains Electricity: An a.c supply, which in the UK has a frequency of 50Hz a value of 230V.

Neutral Wire: The blue coloured wire that completes the circuit in a mains power supply.

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

Ohm: The unit of resistance.

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

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

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.

Resistance: A measure of the opposition to current flow.

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 (voltage) of the power supply.

***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.

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

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

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

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

Watt: The unit of power.

