

## Definitions and Concepts for CAIE Physics A-level

### Topic 22: Quantum Physics

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**Absorption Spectrum:** The frequencies at which a certain element absorbs photons at a higher rate as these frequencies correspond to the spacings between energy levels in the element's atoms.

**De Broglie Hypothesis:** All particles have a wave-like nature and a particle-like nature. The wavelength of a particle is inversely proportional to the particle's momentum.

**Electronvolt:** The kinetic energy gained by one electron that is accelerated through a potential difference of 1 volt. Equal to  $1.6 \times 10^{-19}$  J.

**Electromagnetic Waves:** Waves that consist of perpendicular electric and magnetic oscillations.

**Emission Spectrum:** When a certain element's atoms de-excite they move from one energy level to another with a specific energy gap between these levels. This creates a photon of that specific energy and it is the frequencies of these photons that make up the emission spectrum.

**Intensity:** The power transferred by a wave per unit area.

**Photoelectric Effect:** When light of a high enough energy shone on a metal surface causes electrons to be emitted. The electrons are given enough kinetic energy by the photons to overcome the attractive force of the ions in the metal.

**Photon:** A packet of energy.

**Planck's Constant:** A constant relating the energy of a photon to its frequency.

**Threshold Frequency:** The minimum frequency of light needed to cause electrons to be emitted in the photoelectric effect regardless of the intensity.

**Work Function:** The minimum energy required to remove an electron from a metal's surface.

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