

Definitions and Concepts for CAIE Physics A-level

Topic 23: Nuclear Physics

Activity: The rate of decay of the radioactive nuclei in a given isotope. It is proportional to the total number of nuclei in the sample and is measured in Becquerels.

Binding Energy: The energy required to split a nucleus into its individual nucleons. The greater the binding energy per nucleon the more stable the nucleus is.

Decay Constant: The probability of a decay occurring per unit time.

Einstein's Mass-Energy Equivalence: Mass and energy are equivalent, with the energy equivalent of a given mass being equal to the product of the mass and the speed of light squared.

Half-Life ($T_{1/2}$): The time taken for half of the radioactive nuclei to decay.

Mass Defect: The difference in mass between a nucleus and the sum of the masses of its constituent nucleons.

Nuclear Fission: The splitting a nucleus, to form two smaller daughter nuclei, neutrons and energy.

Nuclear Fusion: The joining of two smaller nuclei to form a larger nucleus and to release energy.

Nucleon Number: The sum of the number of protons and neutrons in a given nucleus.

Random Nature of Decay: Radioactive decay is random - you cannot predict when a nucleus will decay or which nucleus will decay next.

