

Definitions and Concepts for CAIE Physics A-level

Topic 24: Medical Physics

Acoustic Impedance: The product of the speed of sound through a given medium, and the density of the medium.

Attenuation of X-Rays: The reduction of the intensity of X-rays when they pass through matter. This decay of intensity is exponential.

Computerised Axial Tomography Scanning: A scanning method that produces a cross section of the body by rotating a monochromatic x-ray beam around it, in combination with a series of detectors. Whilst it produces higher resolution images than ultrasound and is non-invasive, it is highly ionising and costly.

Piezoelectric Effect: An effect shown by crystals like quartz. When a potential difference is applied, the crystal will mechanically deform. Likewise, when the crystal is deformed, a potential difference is produced.

Positron Emission Tomography Scans: A scanning technique that produces cross-sectional and 3D images. It involves a radionuclide being injected into the body, which then releases gamma photons that are detected by the scanning machine.

Technetium-99m: A radionuclide commonly used as a radioactive tracer for medical purposes.

Transducer: A device that contains a piezoelectric crystal. In medical contexts, they are responsible for producing pulses of ultrasound, as well as acting as a detector for ultrasound echos.

Ultrasound: Sound waves with a frequency higher than the upper-frequency audible to the human ear (20kHz).

X-Rays: High energy, ionizing radiation that is used in both medical detection and medical treatment.

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