Definitions and Concepts for CAIE Physics A-level

Topic 17: Oscillations

Amplitude: The maximum displacement of an oscillator from its equilibrium position.

Angular Frequency: A measure of an object's angular displacement per unit time.

Critical Damping: The form of damping that reduces the displacement of an oscillating object to its equilibrium position in the quickest time possible and without further oscillation.

Damping: The dissipation of energy from an oscillating system. The consequence is that the amplitude of oscillation will decrease. Damping occurs when a force opposes the system's motion.

Free Oscillations: Oscillations that are not caused by a driver. An object will naturally oscillate at its natural frequency.

Frequency: The number of complete oscillations completed by an oscillator per unit period of time.

Forced Oscillations: Repeated up and down oscillations at the frequency of a driver. The amplitude of oscillation is small at high frequencies and large at low frequencies.

Natural Frequency: The frequency that a system naturally oscillates at when there is no driving force.

Overdamping: A type of damping where the system is damped more than required to stop the oscillations. It takes longer for the system to return to equilibrium than for critical damping.

Period: The time taken for one oscillation to occur.

Phase Difference: The difference between how far through two different cycles are.

Simple Harmonic Motion: Motion where the acceleration of an object is directly proportional, and in the opposite direction, to its displacement.

Underdamping: A type of damping where energy is gradually removed from the system and the amplitude of oscillations slowly decreases.