

Mechanics

Acceleration is the rate of change of velocity.

Principle of Conservation of Energy

Energy can neither be created nor destroyed in any process. It can only be converted from one form to another or transferred from one body to another but the total amount remains constant.

Principle of Moments

For an object in equilibrium, the sum of the total clockwise moments about a pivot is equal to the sum of the total anticlockwise moments about the same pivot.

The **centre of gravity** of an object is the point through which its whole weight appears to act for any orientation of the object.

Pressure is the average force acting normally per unit area.

Thermal Physics

Brownian motion is the continuous and random motion of suspended particles in a liquid or gas.

Temperature is a measure of the degree of hotness or coldness of a body.

Optics

Laws of reflection

- The incident ray, the reflected ray and the normal all lie in the same plane.
- The angle of incidence is equal to the angle of reflection, i.e. $i = r$.

Laws of refraction

- The incident ray, the normal and the refracted ray at the point of incidence all lie in the same plane.
- For two particular media, the ratio of the sine of the angle of incidence to the sine of the angle of refraction is a constant. i.e. $n = \sin i / \sin r$ where n is a constant.

Critical angle is the angle of incidence in the optically denser medium for which the angle of refraction in the optically less dense medium is 90° .

Total internal reflection is the phenomenon where the angle of incidence is greater than the critical angle and the ray does not leave the glass at all where it is reflected internally within the medium.

Focal length is the distance between the optical centre and the principal focus.

Waves

Transverse waves are ones in which the vibration of the particles is perpendicular to the direction of travel of the wave motion.

Longitudinal waves are ones in which the vibration of the particles is parallel to the direction of travel of the wave motion.

Amplitude of a wave is the maximum displacement of a particle of the medium from the zero position.

Wavelength is the distance between corresponding points on two successive waves.

Frequency is the number of waves produced every second by the source.

Period is the time taken for a complete wave.

Wavefront is an imaginary line on a wave that joins all points which have the same phase of vibration.

Electricity & Magnetism

An **electric field** is the region in which an electric charge experiences a force.

A **line of force** in an electric field is the path along which a free positive charge would move.

Current is the rate of flow of charge.

The **potential difference** across a component in a circuit is the work done to drive a unit charge through the component.

Electromotive force of a source is the total energy dissipated by the source in driving one coulomb of charge round a complete circuit.

Electrical resistance of a conductor is the ratio of the potential difference across the conductor to current passing through it.

Ohm's law

In a metallic conductor, the current flowing through it is directly proportional to the potential difference across its ends, provided that the physical conditions and temperature remain constant.

Magnetic field is the region around a magnet or a current where a magnetic force can be detected.