CIE IGCSE Physics Definitions (2026, 2027 and 2028 Syllabus)

Chapter 1: General Physics	
Vector	is the quantity that has both magnitude and direction.
Scalar	is the quantity that has only magnitude.
Speed	is the rate of change in distance.
Velocity	is the rate of change in displacement.
Acceleration	is the rate of change in velocity.
Free fall	is the motion of an object under the sole influence of gravity, where air resistance is ignored.
Weight	is force due to gravitational field, it is the product of mass and gravity (same as formula)
Force	is a push or a pull that can change an object's motion, shape or both.
Density	is mass over volume (same as formula).
Hooke's law	Springs extend in proportion to loads, as long as they are under their proportional limit.
Limit of proportionality	is the point and which load and extension are no longer proportional.
Elastic limit	is the point at which spring will not return to its original shape even after the load is removed.
Centripetal force	is the force acting towards the centre of a circle.
Friction	is a force that acts in a direction that is opposite to the direction of motion.
Pressure	is force over area (same as formula).
Work	is the product of force and distance moved in direction of force (same as formula).
Power	is the rate at which work is done.
Kinetic Energy	is the energy of a moving object.
Gravitational potential energy	is the energy stored in an object as the result of its height.
Elastic potential energy	is the energy stored in elastic materials when you stretch or compress the spring.
Conservation of energy	Energy cannot be made or destroyed but it can transfer from one form to other forms.
Efficiency	is the percentage of of usable energy.
Moment or turning effect	is the product of force and perpendicular distance from pivot (same as formula).
Principle of moment	is the total anti clockwise moment is equal to the total clockwise moment about the pivot.
Equilibrium	is achieved when the clockwise moment = anticlockwise moments and when the sum of all forces are equal to zero.
Centre of gravity	is the point where the resultant gravitational force on an object can be considered to act.
Impulse	is the change in momentum or the product of force and time duration of collision.
Conservation of momentum	is the change in momentum or the product of force and time duration of collision
Chapter 2: Thermal Physics	
Temperature	is related to the average kinetic energy of the molecules.
Absolute zero	is the lowest possible temperature, at which the particles have least kinetic energy.
Boyle's law	states that for a fixed mass of gas at a constant temperature, pressure and volume are inversely proportional.
Specific heat capacity	is the amount of heat required to change the temperature by 1°C or 1K for a mass of 1kg of the substance.
Conduction	is the transfer of energy through direct contact without the bulk movement of the substance itself.
Convection	is the transfer of heat through the movement of fluids (liquids or gases), where warmer, less dense fluid rises and cooler, denser fluid sinks, creating a circular current.
Radiation	is the transfer of heat through electromagnetic waves, primarily infrared radiation, and can occur through a vacuum.

Chapter 3: Waves	
Transverse wave	is the oscillation perpendicular to the direction of wave of travel.
Longitudinal wave	is the oscillation at parallel to the direction of the wave travel.
Amplitude	is the maximum displacement from the original position.
Wavelength	is the horizontal distance between two points that are in phase.
Period	is the time taken for the wave to complete a cycle or return to its original displacement.
Frequency	is the number of complete cycles in a second.
Reflection of wave	is the change of direction when a wave collides with a reflective barrier.
Refraction of wave	is the change of direction when the wave goes through a change of medium.
Diffraction of wave	is shown when a wave spreads when the wave passes through an opening or an edge.
Total internal reflection	is the complete reflection of a light ray back into its original medium, which happens when light travels from a denser to a less dense medium and the angle of incidence exceeds the critical angle.
Refractive index	is the ratio of the speeds of a wave in two different regions (same as formula).
Critical angle	is the angle of incidence in denser medium that making the refractive angle 90 degree.
Focal length	of a lens, is the distance between the principle focal point and the centre of the lens.
Principle focus	of a lens, is the single point that the all the light rays meet together
Real image	is the image that can be projected on the screen.
Virtual image	is the image that cannot projected on the screen.

Chapter 4: Electricity and Magnetism	
Current	is the rate of charge flow in a circuit.
Electric field	is a region where charges experience electric force.
Electromotive force (e.m.f.)	is the work done by a cell to drive a unit of charge around a complete circuit.
Potential difference	is the work done to transfer a unit of charge across two points of different potential.
Power	is the rate of work done or energy transferred.
Kilowatt-hour (kWh)	a unit of energy that measures the amount of electricity consumed.
Resistance	is the opposition to the flow of electric current in a circuit.
Ohm's Law	states that current is directly proportional to voltage and inversely proportional to resistance in an electrical circuit.
Thermistors	are resistors whose resistance decreases with increasing temperature.
Light-dependent resistors	are resistors whose resistance decreases with increasing light intensity.
Parallel circuit	The current from the power source is larger than the current in each branch.
Series circuit	The current at every point is the same.
Fuses	are one-time use components that break the circuit when the current exceeds a certain level.
Relays	are switch-like components that can open or close a circuit under certain conditions.
Diodes	are two-terminal electronic components that allow current to flow in only one direction.
Light-emitting diodes (LEDs)	are diodes that emit light when current flows through them.
Electromagnetic induction	is the process of generating an electromotive force (voltage) across a conductor when it is exposed to a changing magnetic field or when it moves through one
Faraday's law	states that the magnitude of the induced e.m.f. is directly proportional to the rate of change of magnetic flux through a solenoid or the rate of the magnetic flux being cut.
Lenz's Law	states that the induced current always flows in the direction that opposes the change in magnetic flux.
AC generator	is a device that converts mechanical energy into electrical energy
DC motor	is an electrical device that converts electrical energy from a direct current into kinetic (rotational) energy.
Step-up transformer	increases voltage on secondary coil relative to primary coil and reduces current
Step-down transformer	decreases voltage on secondary coil relative to primary coil and increases current.

Chapter 5: Nuclear Physics	
Isotopes	are atoms of certain elements with the same proton numbers but different nucleon numbers.
Nuclear fission	is the process of splitting an atom's nucleus into two smaller nuclei, releasing a tremendous amount of energy in the process.
Nuclear fusion	is the process where two or more light atomic nuclei combine to form a single, heavier nucleus, releasing massive amounts of energy.
Radioactive decay	refers to the spontaneous emission of radioactive particles from an unstable nucleus
Random process	of radioactive decay is the same probability of decay for each nucleus, so we don't know which nucleus will decay.
Background radiation	is the ionizing radiation present in the environment from both natural and artificial sources
Ionization	is the process where an atom or molecule gains or loses electrons to become a charged particle called an ion.
Half-life	is the time it takes for half of the unstable nuclei in a radioactive sample to decay, or the time it takes for the activity or count rate of a sample to halve.

Chapter 6: Space Physics	
Average orbital speed	of an object is how fast it moves along its orbit.
The solar system	is a gravitationally bound system consisting of the Sun (a star), eight planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune), their moons, dwarf planets, and other smaller bodies like asteroids and comets. The Sun is at the centre and contains over 99% of the system's mass, with all other objects orbiting it in elliptical paths.
The sun	is defined as a medium-sized, stable star at the centre of our solar system, composed mainly of hydrogen and helium. Its energy is generated by nuclear fusion at its core, where hydrogen nuclei fuse to form helium, releasing vast amounts of energy that are radiated as infrared, visible, and ultraviolet light.
Galaxies	is a huge collection of billions of stars, held together by gravity. Our solar system, including the Sun, is part of a spiral galaxy called the Milky Way. Galaxies also contain gas, dust, and solar systems.
The speed of light	is the speed at which light (an electromagnetic wave) travels, which is approximately 3×10^8 m/s in a vacuum.
A light year	is a unit of distance, defined as the distance light travels in a vacuum in one year which is approximately 9.5×10^{15} m.
Redshift	is an effect that happens when light from a star or a galaxy is stretched as it moves away from us. This makes the light appear more red than it really is.
Cosmic Microwave Background Radiation (CMBR)	is a type of electromagnetic radiation that fills all of space. It has a very low temperature of about -270°C. It was produced shortly after the Big Bang, when the Universe was very hot and filled with radiation. As the Universe expanded, this radiation stretched and cooled down into microwaves. CMBR is evidence for the Big Bang Theory because it shows that the Universe was once much hotter and denser than it is now.
The big bang theory	is a scientific model that explains how the Universe began and evolved. It says that about 13.8 billion years ago, all the matter and energy in the Universe was concentrated in a very small, hot and dense region. Then, a huge explosion happened, which started the expansion of the Universe. As the Universe expanded, it cooled down and formed stars, galaxies and other structures.
Hubble Constant	is a number that tells us how fast the Universe is expanding. It is equal to the ratio of the speed at which a galaxy is moving away from us to its distance from us which is approximately 2.2×10^{-18} s^{-1}.