

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

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| Chapter 1: General Physics            |                                                                                                                             |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| TERM                                  | DEFINITION                                                                                                                  |
| <b>Vector</b>                         | is the quantity that has both magnitude and direction.                                                                      |
| <b>Scalar</b>                         | is the quantity that has only magnitude.                                                                                    |
| <b>Speed</b>                          | is the rate of change in distance.                                                                                          |
| <b>Velocity</b>                       | is the rate of change in displacement.                                                                                      |
| <b>Acceleration</b>                   | is the rate of change in velocity.                                                                                          |
| <b>Free fall</b>                      | is the motion of an object under the sole influence of gravity, where air resistance is ignored.                            |
| <b>Weight</b>                         | is force due to gravitational field, it is the product of mass and gravity (same as formula)                                |
| <b>Force</b>                          | is a push or a pull that can change an object's motion, shape or both.                                                      |
| <b>Newton's first law</b>             | an object remains at rest or continues to move at constant speed in a straight line unless acted upon by a resultant force. |
| <b>Newton's second law</b>            | the resultant force acting on an object is equal to the mass of the object multiplied by its acceleration.                  |
| <b>Newton's third law</b>             | when two bodies interact, they exert equal and opposite forces on each other.                                               |
| <b>Density</b>                        | is mass over volume (same as formula).                                                                                      |
| <b>Hooke's law</b>                    | Springs extend in proportion to loads, as long as they are under their proportional limit.                                  |
| <b>Limit of proportionality</b>       | is the point and which load and extension are no longer proportional.                                                       |
| <b>Elastic limit</b>                  | is the point at which spring will not return to its original shape even after the load is removed.                          |
| <b>Centripetal force</b>              | is the force acting towards the centre of a circle.                                                                         |
| <b>Friction</b>                       | is a force that acts in a direction that is opposite to the direction of motion.                                            |
| <b>Pressure</b>                       | is force over area (same as formula).                                                                                       |
| <b>Work</b>                           | is the product of force and distance moved in direction of force (same as formula).                                         |
| <b>Power</b>                          | is the rate at which work is done.                                                                                          |
| <b>Kinetic Energy</b>                 | is the energy of a moving object.                                                                                           |
| <b>Gravitational potential energy</b> | is the energy stored in an object as the result of its height.                                                              |
| <b>Elastic potential energy</b>       | is the energy stored in elastic materials when you stretch or compress the spring.                                          |
| <b>Conservation of energy</b>         | Energy cannot be made or destroyed but it can transfer from one form to other forms.                                        |
| <b>Efficiency</b>                     | is the percentage of of usable energy.                                                                                      |
| <b>Moment or turning effect</b>       | is the product of force and perpendicular distance from pivot (same as formula).                                            |
| <b>Principle of moment</b>            | is the total anti clockwise moment is equal to the total clockwise moment about the pivot.                                  |
| <b>Equilibrium</b>                    | is achieved when the clockwise moment = anticlockwise moments and when the sum of all forces are equal to zero.             |
| <b>Centre of gravity</b>              | is the point where the resultant gravitational force on an object can be considered to act.                                 |
| <b>Impulse</b>                        | is the change in momentum or the product of force and time duration of collision.                                           |
| <b>Conservation of momentum</b>       | is the change in momentum or the product of force and time duration of collision                                            |



| Chapter 2: Thermal Physics |                                                                                                                                                                                                       |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TERM                       | DEFINITION                                                                                                                                                                                            |
| 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           |                                                                                                                                                                                                       |
| TERM                       | DEFINITION                                                                                                                                                                                            |
| 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.                                                                                                                                                     |
| Monochromatic              | is light of a single wavelength                                                                                                                                                                       |



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



| Chapter 5: Nuclear Physics                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TERM                                         | DEFINITION                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 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                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| TERM                                         | DEFINITION                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 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 travels, which is approximately $3 \times 10^8$ 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 $9.5 \times 10^{15}$ 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 $-270^\circ\text{C}$ . 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 $2.2 \times 10^{-18} \text{ s}^{-1}$ .                                                                                                                                                                                                                  |