'O' Level Physics List of Definitions

	Term	Definition
1 Measurement		
1.1	Scalar	A scalar quantity has a magnitude but no direction.
1.2	Vector	A vector quantity has a magnitude and direction.
1.3	Precision	Measure of how close a set of readings of the same physical quantity with each other
1.4	Accuracy	Measure of how close a set of readings are to the true value.
2 Kinematics		
2.1	Distance	Length of path taken.
2.2	Displacement	Net change in position of an object.
2.3	Freefall	An object is in freefall when the only force acting on it is due to gravity.
2.4	Terminal Velocity	A constant speed (with zero acceleration) at when the drag force of an object due to air resistance equals to the weight of the object such that it experiences zero net force.
3 Dynamics		
3.1	Force	A push or a pull on a body.
3.2	Newton's first law of motion	Every object will continue in its state of rest or uniform motion in a straight line unless a resultant force act on it.
3.3	Newton's second law of motion	When a resultant force acts on an object of a constant mass, the object will accelerate in the direction of the resultant force. The product of the mass m and acceleration a_{net} of the object gives the resultant force.
3.4	Newton's third law of motion	If Body A exerts a force onto Body B, Body B will exert and equal and opposite force onto Body A.
3.5	Equilibrium	Body is in equilibrium if the net force on the body is zero. (i.e., static system where no net acceleration takes place).
3.6	Normal force	A component of the contact force that is perpendicular to the surface the object is in contact with.
3.7	Friction force	A contact force that opposes or tends to oppose motion between surfaces in contact.
4 Mass, Weight, and Density		
4.1	Mass	Amount of matter in a body.
4.2	Inertia	Reluctance of the object to change its state of rest or motion, due to its mass.
4.3	Weight	Amount of force of gravity acting on an object.
4.4	Density	Mass per unit volume
5 Turning Effect of Forces		
5.1	Moment	Product of a force F and the perpendicular distance from the pivot to the line of action of the force F.
5.2	Principle of moments	When a body is in equilibrium, the sum of clockwise moments about a pivot is equal to the sum of anti-clockwise moments about the same pivot.
5.3	Centre of gravity	Is a point where the weight of an object seems to be acting on, the centre of gravity can lie outside of an object.
5.4	Stability	Measure of its ability to return to its original position after it is slightly displaced.

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6 Pressure		
6.1	Pressure	Amount of force acting per unit area.
6.2	Atmospheric pressure	Pressure at sea level (i.e., 1 atm = 101325 Pa = 760 mmHg = 76 cmHg)
7 Energy, Work, and Power		
7.1	Energy	Capacity to do work.
7.2	Principle of conservation of energy	Energy cannot be created nor destroyed, but can be converted from one form to another. Total energy in an isolated system is a constant.
7.3	Kinetic energy	Energy an object possesses when it is moving. Given as $\frac{1}{2}mv^2$.
7.4	Gravitational potential energy	Amount of work can be done by gravitational force from height h away. Given as mgh.
7.5	Mechanical energy	Mechanical energy of an object is the sum of its kinetic energy and its gravitational potential energy.
7.6	Work done	Work done by a constant force on an object is the product of force F and the distance (displacement) moved by the object in the direction of the force.
7.7	Power	Rate of work done.
8 Kinetic Model of Matter		
8.1	Brownian Motion	Random movement of microscopic particles suspended in a fluid (gas or liquid) caused by collisions with molecules of the surrounding.
8.2	Charles Law	Pressure of a gas is directly proportional to its temperature if the volume stays constant.
8.3	Boyle Law	Pressure of a gas is inversely proportional to the volume of gas if the temperature stays constant.
8.4	Guy-Lussac Law	Volume of a gas is directly proportional to its temperature if the pressure stays constant.
9 Transfer of Thermal Energy		
9.1	Conduction	Heat transfer in a medium without the movement of the medium itself.
9.2	Convection	Heat transfer in a medium by the movement of particles in it.
9.3	Radiation	Transfer of heat energy by infrared waves, one of the components of electromagnetic waves.
10 Temperature		
10.1	Temperature	Measure of degree of hotness or coldness of a body.
10.2	Thermometric property	Object is said to have thermometric property if it experiences a measurable change in its physical property which varies continuously and linearly (i.e., monotonically) with the change in temperature.
11 Thermal Properties of Matter		
11.1	Internal Energy	Particles in matter possess internal energy which is made out of kinetic energy and potential energy of the particles.
11.2	Heat capacity	Amount of heat required to raise the temperature of an object by 1 ^{o}C (or 1 K).
11.3	Specific heat capacity	Amount of heat required to raise the temperature of an object of mass 1 kg by 1 ^{o}C (or 1 K).
11.4	Latent heat	Total heat energy absorbed or released when a substance changes its physical state completely at a constant temperature.

12 General Wave Properties		
12.1	Wave	A wave is defined as a process of transferring energy from one location to another which is produced by an oscillating or vibrating motion.
12.2	Transverse wave	A transverse wave is when the particles oscillate perpendicular to the direction of propagation. (e.g., water waves, electromagnetic wave).
12.3	Longitudinal wave	A longitudinal wave is when the particles oscillate parallel to the direction of propagation. (e.g., sound wave).
12.4	Wavelength	Distance between two adjacent points of the same phase on a wave.
12.5	Amplitude	Maximum displacement of a particle from its equilibrium position in a wave.
12.6	Wavefront	An imaginary line on a wave that joins all adjacent points (of the crest or trough) that are in phase.
12.7	Period	Time taken for one complete wavelength.
12.8	Frequency	Number of complete wavelengths produced in one second.
12.9	Compression	A compression in a longitudinal wave is where there are more particles around that region than in equilibrium.
12.10	Rarefraction	A rarefraction in a longitudinal wave is where there are less particles around the region than in equilibrium.
12.11	Angle of incidence	Angle between the direction of propagation of incident wave and the normal.
12.12	Angle of reflection	Angle between the direction of propagation of reflected wave and the normal.
13 Light		
13.1	First law of reflection	The incident ray, reflected ray, and the normal lie on the same plane.
13.2	Second law of reflection	In reflection, the angle of incidence is equal to the angle of reflection.
13.3	Reflected image	Formation of image in a plane mirror is due to the reflection of light. Characteristics of reflected image: 1) Virtual: An image that cannot be captured on a screen 2) Upright 3) Laterally inverted 4) Same size as the object 5) Same distance from the mirror
13.4	Refraction	Bending of light as light passes from one optical medium to another, due to light changing speed.
13.4	First law of refraction	The incident ray, refracted ray, and the normal lie on the same plane.
13.5	Second law of refraction	For two given media, the ratio of the sine of the angle of incidence to the sine of the angle of refraction is a constant (refractive index). i.e., $n = \frac{\sin i}{\sin r}$
13.6	Refractive index	Refractive index of a medium is the ratio of the speed of light in vacuum (or air) to the speed of light in the medium.

13.7	Critical angle	Angle of incidence which gives rise to an angle of refraction of 90^o. (Only takes place when light travels from a denser medium to a less dense medium) i.e., $\sin c = \frac{1}{n}$
13.8	Total internal reflection	Total reflection of light ray at the boundary of two media when the angle of incidence in the optically denser medium exceeds the critical angle. (Occurs when an incident ray is reflected back in the same medium, no refracted ray is observed).
13.9	Lens	A transparent material to refract (or bend) the light rays as a way to form an image. It refracts light rays when they pass through it.
13.10	Principal axis	A straight line which passes through the centre of the lens at a right angle to the plane of the lens.
13.11	Principal focus	A point on the principal axis in which the incident rays travelling parallel to the principal axis converge or diverge after refraction through the lens.
13.12	Focal length	The distance between the centre of the lens and the principal focus.
13.13	Real image	An image that can be captured on the screen.
14 Electromagnetic waves		
15 Sound		
15.1	Loudness	Loudness of a sound wave depends on the amplitude of the sound wave.
15.2	Pitch	Pitch of a note is how high the note; depends on the frequency of the sound wave.
15.3	Echo	Repetition of a sound due to the reflection of sound.
15.4	Ultrasound	Sound with frequencies above the upper limit of the human range of audibility (i.e., 20 kHz).
16 Static Electricity		
16.1	Electric field	Electric field is defined as a region in which charged particles experience an electric force.
17 Current of Electricity		
17.1	Current	Rate of flow of charges. i.e., $I = \frac{Q}{t}$
17.2	Electromotive force	Electromotive force (e.m.f.) is the work done by a source in driving a unit charge around a complete circuit. i.e., $E = \frac{W}{Q}$
17.3	Potential difference	Potential difference (p.d.) across a component in a circuit is the work done to drive a unit charge through the component. i.e., $V = \frac{W}{Q}$
17.4	Resistance	Resistance of a component is the ratio of the potential difference across it to the current flowing through it. i.e., $R = \frac{V}{I}$
17.5	Ohm's law	Ohm's law states that the current passing through a metallic conductor is directly proportional to the potential difference

		across it, provided that physical conditions (such as temperature) remain constant. i.e., $V = IR$
17.6	Resistivity	Ability of a material to resist a current.
17.7	Rectification	A process by which alternating current usually from the mains supply is turned into direct current.
18 D.C. Circuits		
18.1	Potentiometer	Used to divide the output voltage in any desired ratio from the input voltage.
18.2	Transducers	Electrical devices which are able to convert energy from one form to another.
19 Practical Electricity		
19.1	Power	Rate of change of energy from one form to another or product of the potential difference and the current. i.e., $P = VI$
19.2	Circuit breaker	A safety device that can switch off the electrical supply in a circuit when large currents flow through it.
19.3	Fuse	A safety device that is added to an electrical circuit to prevent excessive current flow.
20 Magnetism		
20.1	Magnetic field	Magnetic field is the region around the magnet where magnetic substances experience a force.
20.2	Magnetic induction	Process whereby an object made of a magnetic material becomes a magnet when it is near or in contact with a magnet.
21 Electromagnetism		
21.1	Induced magnetic field	A current-carrying conductor produces a magnetic field around it
21.2	Ampere's law for wires	The magnetic field strength of a current-carrying wire increases when the current is increased.
21.3	Ampere's aw for solenoids	The magnetic field strength of a current-carrying solenoid increases when the current or the number of coils/turns is increased.
21.4	The motor effect	When a current-carrying conductor is placed in a magnetic field, the conductor experiences a force. (The direction of the force can be determined using Fleming's left-hand rule).
22 Electromagnetic Induction		
22.1	Electromagnetic induction	A process in which an electromotive force is induced in any conductor whenever there is a change in the magnetic field.
22.2	Faraday's law	Faraday's Law of electromagnetic induction states that the magnitude of the induced electromagnetic force is directly proportional to the rate of change of magnetic flux in the circuit.
22.3	Lenz's law	Lenz's Law states that the direction of the induced electromotive force, and hence the induced current in a closed circuit, is always such that its magnetic effect opposes the motion of the change producing it.
22.4	Transformers	A device that can change a high alternating voltage (at low current) to a low alternating voltage (at high current), or vice versa.

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