

MOJZA

AS Level

Physics DEFINITIONS

9702



BY TEAM MOJZA

CONTENTS

Physical Quantities & Units	-----	Pg 02
Kinematics	-----	Pg 03
Dynamics	-----	Pg 04
Forces, Density & Pressure	-----	Pg 06
Work, Energy & Power	-----	Pg 07
Deformation of Solids	-----	Pg 08
Waves	-----	Pg 09
Electricity	-----	Pg 11
D.C Circuits	-----	Pg 12
Particle Physics	-----	Pg 13

Physical Quantities and Units

Term	Definition
Derived Units	The units of quantities other than those measured in fundamental units can be obtained in terms of the fundamental units.
Homogenous Units	When each term has same base units the equation is called homogeneous
Scalar	A quantity that has magnitude and units only.
Vector	A quantity that has magnitude, direction and units.
Accuracy	It is the measure of how close a reading is to the actual value.
Precision	It is the smallest change in value that can be measured by an instrument.
Uncertainty	The range of values within which a measurement is likely to be in.
Systematic Error	An error having non-zero mean, so that its effect is not reduced when observations are averaged
Random Error	When repeated measurements of the quantity yield different results under the same conditions.

Kinematics

Term	Definition
Average Speed	The total distance travelled by an object divided by the total time taken.
Instantaneous Speed	The speed of an object measured over a very short period of time.
Displacement	The distance travelled in a particular direction; it is a vector quantity.
Velocity	An object's speed in a particular direction or the rate of change of an object's displacement.
Acceleration	The rate of change of velocity of an object.
Uniform Acceleration	When the change in velocity of an object is the same in the same time period.
Non-uniform Acceleration	When the velocity of an object changes by different amounts in the same period of time.
Free Fall	When an object accelerates due to gravity in the absence of any other forces such as air resistance.

Dynamics

Term	Definition
Inertia	A measure of how difficult it is to change the velocity of an object, or change its speed or direction. It is a measure of the mass of an object.
Weight	The force on an object caused by a gravitational field acting on its mass.
Friction	The name for a resistive force when surfaces are in contact and tending to slide over one another.
Centre of Gravity	The point where the entire weight of an object appears to act.
Resultant Force	The single force that has the same effect as all of the forces acting on an object.
Terminal Velocity	The maximum velocity reached by an object falling under gravity or accelerated by a constant force.
Drag	A force that resists the movement of a body through a fluid.
Contact Force	The force at right angles to a surface when two objects are in contact.
Upthrust	The force upwards in a liquid or gas caused by the pressure in the gas or liquid.
Newton's First Law of Motion	An object will remain at rest or in a state of uniform motion unless it is acted on by a resultant force.
Newton's Second Law of Motion	Resultant force is proportional to mass x acceleration/ Resultant force is proportional to the rate of change of momentum.
Newton's Third Law of Motion	When two bodies interact, the forces they exert on each other are equal in size and

	opposite in direction.
Linear Momentum	The linear momentum of a body is the product of its mass and velocity.
Conservation of Momentum	The sum or total momentum of the bodies in a closed system is constant provided no resultant external force acts.
Perfectly Elastic Collision	In a perfectly elastic collision, the total kinetic energy of all the bodies remains constant.
Inelastic Collision	In an inelastic collision, kinetic energy is not conserved; some is transferred to other forms of energy such as heat.



Force, Density and Pressure

Term	Definition
Resultant Force	The single force that has the same effect as all of the forces acting on an object.
Triangle of Forces	A closed triangle drawn for an object in equilibrium. The sides of the triangle represent the forces in both magnitude and direction
Equilibrium	An object in equilibrium is either at rest or travelling with a constant velocity because the resultant force on it is zero.
Centre of Gravity	The point where the entire weight of an object appears to act.
Moment of a Force	The moment of a force about a point is the product of the force and perpendicular distance from the line of action of the force to the point.
Principle of Moments	The sum of the clockwise moments about a point is equal to the sum of the anticlockwise moments about the same point provided the body is in equilibrium.
Couple	A pair of equal and opposite forces that act on an object at different points and produce rotation only
Torque	The product of one of the forces and the perpendicular distance between the forces.
Density	Density is mass per unit volume.
Pressure	The normal or perpendicular force acting per unit cross sectional area.
Archimedes Principle	The upthrust acting on a body is equal to the weight of the liquid or gas that it displaces.

Work, Energy and Power

Term	Definition
Energy	A calculated quantity that is conserved during any change; that which is transferred when a force does work.
Work Done	Work is done on a body when a force moves (displaces) the body in the direction of the force
Joule	The work done when a force of 1N moves a distance of 1m in the direction of the force.
Gravitational Potential Energy	The energy a body has due to its position in a gravitational field
Kinetic Energy	The energy a body has due to its quality of being in motion
Principle of Conservation of Energy	Energy cannot be created or destroyed. It can only be changed from one form to another
Power	It is the rate at which work is done per unit time

Deformation of Solids

Term	Definition
Compressive	It describes a force that squeezes and shortens an object.
Tensile	It is associated with tension or pulling.
Hooke's Law	Provided that the elastic limit is not exceeded, the extension of an object is proportional to the applied force.
Elastic Deformation	An object that returns to its initial length when the force is removed has deformed elastically.
Plastic Deformation	An object that does not return to its initial length when the force is removed is deformed permanently – it has deformed plastically.
Limit of Proportionality	The point beyond which extension of a spring is no longer proportional to the force.
Elastic Limit	The value of stress beyond which an object will not return to its original dimensions.
Strain	Extension per unit length
Stress	Force per unit cross-sectional area that acts at right angles to a surface.
Young's Modulus	The stress in the material divided by the strain.
Elastic Potential Energy	Energy stored in a body due to a change in its shape.

Waves

Term	Definition
Displacement	The distance of a point on the wave from its undisturbed position or equilibrium position.
Amplitude	The maximum displacement of a wave.
Wavelength	The distance between two adjacent points on a wave oscillating in step with each other.
Frequency	The number of oscillations per unit time of a point in a wave.
Longitudinal Wave	A wave in which the particles of the medium oscillate along the direction in which the wave travels.
Transverse Wave	A wave in which the particles of the medium oscillate at right angles to the direction in which the wave travels.
Compression	The point in a sound wave at which the air pressure is at maximum.
Rarefaction	A region in a sound wave where the air pressure is less than its mean value.
Phase Difference	The fraction of a cycle between two oscillating particles, expressed in either degrees or radians.
Intensity	It is the rate of energy transmitted (power) per unit area at right angles to the wave velocity.
Doppler Effect	The change in frequency or wavelength of a wave observed when the source of the wave is moving towards or away from the observer (or the observer is moving relative to the source).

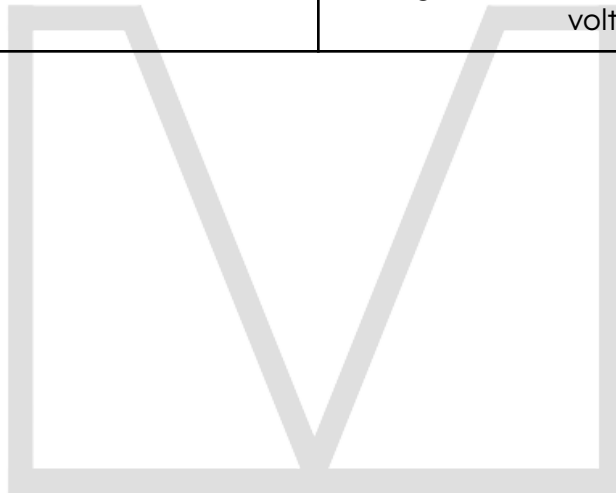
Electromagnetic Wave	A transverse wave travelling through space as vibrations of electric and magnetic fields.
Plane Polarised	Describes a transverse wave with oscillation in just one plane.
Principle of Superposition	When two or more waves meet at a point, the resultant displacement is the sum of the displacements of the individual waves
Diffraction	The spreading of a wave when it passes through a gap or past the edge of an object.
Interference	The superposition of two or more waves from coherent sources.
Constructive Interference	When two waves reinforce to give increased amplitude at a point in space.
Destructive Interference	When two waves cancel to give reduced (or zero) amplitude at a point in space.
Coherent sources	Two sources with exactly the same frequency and have zero or constant phase difference.
Path Difference	The extra distance travelled by one of the waves compared with the other.
Coherence	Describes two waves emitted from two sources that have a constant phase difference.
Stationary Wave	A stable wave pattern produced from the superposition of two progressive waves of the same frequency and travelling in opposite directions.
Node	A point on a stationary wave with zero amplitude
Antinode	A point on a stationary wave with maximum amplitude.

Electricity

Term	Definition
Conventional current	The conventional direction of an electric current is the direction in which the positive charge carriers would move.
Coulomb	One coulomb is defined as the amount of charge which passes through a given cross section of a wire 1s when a constant current of 1 Ampere flows in the wire.
Potential difference	P.d between any two points in a circuit is a measure of electrical energy transferred, or the work done, by each coulomb of charge as it moves from one point to the other. Energy transferred to the component per unit charge.
Volt	The P.d between two points such that the energy transferred from electrical to other forms is 1 Joule per coulomb electrical charge passing between two points.
Electrical Power	Rate of work done or rate of energy conversion.
Resistance	Resistance of conductor is defined as a ratio of potential difference 'v' across the conductor to the current in it. Resistance controls the size of current in a circuit. A higher resistance means a smaller current and a low resistance means a higher current.
Ohm's law	current flowing in a metallic conductor is proportional to the p.d across it, provided that the physical conditions such as temp are kept constant.

D.C Circuits

Term	Definition
EMF	The chemical, mechanical or other forms of energy that are converted into electrical energy that are converted into electrical energy when a unit charge passes through the source.
Internal resistance	All power supplies have some resistance between their terminals, called internal resistance.
Potential dividers	A potential divider produces an output voltage that is the fraction of the supply voltage.



Particle physics

Term	Definition
Nucleon	Name given to either a proton or a neutron in the nucleus.
Isotopes	Atoms of the same element which have same no of protons but diff number of neutrons.
B- particles	Radioactive nuclei that decay by B decay and may emit a negative electron or a positive electron which is known as an antielectron.
Electron volt	Work done by an electron when accelerated through the potential difference of 1V.
Leptons	Particles such as electrons, neutrinos and antineutrinos. These are particles that are unaffected by strong nuclear force. They are affected by weak interaction.
Hadrons	Particles such as protons and neutrons. These are all particles that are affected by strong nuclear force. Made up of quarks.
Quark model	Fundamental particles made up of six flavours. Quarks have charges that are less than the fundamental charge 'e'. However, quarks are never found outside a hadron. These quarks combine so that the resulting hadron will have a charge of 'e' or multiple of 'e'.



A Note from Mojza

These notes for Physics (9702) have been prepared by Team Mojza, covering the content for AS Level 2022-24 syllabus. The content of these notes has been prepared with utmost care. We apologise for any issues overlooked; factual, grammatical or otherwise. We hope that you benefit from these and find them useful towards achieving your goals for your Cambridge examinations.

If you find any issues within these notes or have any feedback, please contact us at support@mojza.org.

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