CATHOLIC JUNIOR COLLEGE

9749 H2 PHYSICS

DEFINITION LIST

Measurements
Forces
Dynamics
Kinematics
Work, Energy and Power
Motion in a Circle
Gravitational Field
Oscillations
Waves
Superposition
Thermal Physics
Electric Field
Current of Electricity / D.C. Circuits
Alternating Current
Electromagnetism and Electromagnetic Induction
Quantum Physics
Nuclear Physics

Measurements

	Random Error:	is an error which gives a scatter of readings about an average value. It has an equal chance of being positive or negative and can be reduced by averaging.
	Systematic Error:	is a constant deviation of readings in one direction. All measurements will be too high or too low by a certain amount. It can be reduced by correct laboratory practice.
	Precision (of a set of readings):	is the degree of closeness of the readings with one another. It is associated with small random error.
	Precision (of an instrument)	a term used to describe the level of uncertainty in an instrument's scale. High precision instruments have small scale divisions.
	Accuracy (of a set of readings):	is the degree of closeness of the average value of the readings to the true value. It is associated with small systematic error.
	Accuracy (of an instrument):	is the closeness of a reading on an instrument to the true value of the quantity being measured. An accurate instrument will give readings close to the true values.
N22/II/Q2ai[1]	Vector Quantity:	is a quantity having both magnitude and direction.
	Scalar Quantity:	is a quantity that has magnitude only, not direction.

Kinematics

	Distance:	is the total length of the actual path travelled by an object in motion. It is a scalar quantity.
	Displacement:	is the straight line distance of an object or a point, in a specified direction, from some reference point. The specified direction is directed from the reference point to that object's position or that point. Displacement is a vector quantity.
	Speed:	is the rate of change of distance with respect to time.
	Velocity:	is the rate of change of displacement with respect to time.
N15/III/6ai [1]	Acceleration:	is the rate of change of velocity with respect to time.

Dynamics

	Newton's First Law of Motion:	A body stays at rest or continues to move at constant velocity unless a resultant force acts on it.
N10/II/1a [1]	Newton's Second Law of Motion:	the rate of change of momentum of a body is directly proportional to the net force acting on it, and, the direction of momentum change is in the direction of the net force.
	Newton's Third Law of Motion:	Whenever a force acts on a body, an equal but oppositely directed force of the same kind acts on another body.
	Characteristic of Action-Reaction Pair:	The action-reaction pair forces • are of the same nature • are of equal magnitude • act along the same line but opposite directions • act on different bodies
N12/III/6ai [1]	Linear Momentum:	is the product of the mass of an object and its velocity.
N10/III/6a [2]	Force:	is the rate of change of momentum of an object which is free to move, and acts in the direction of the change in momentum.
	The newton	is the SI unit of force. One newton is that force required to give a mass of 1 kilogram an acceleration of 1 metre per second squared in the direction of the force.
	Moment of a Force:	Moment of a force about any point is the turning effect of a force which is equal to the product of the force and the perpendicular distance from that point to the *line of action* of the force.
	Couple:	consists of two forces of equal magnitude but acting in opposite directions whose lines of action are parallel but separate.
	Torque of a Couple:	is the turning effect of the couple. For two equal but opposite parallel forces, each of magnitude F, with their lines of action separated by a perpendicular distance d, the magnitude of the turning effect of the couple is the product of F and d.
N18/II/1a[1]	Principle of Moments:	states that for a body to be in equilibrium, the sum of clockwise moments about any pivot must be equal to the sum of anticlockwise moments about that same pivot.
	Equilibrium:	An object which, under the action of a number of forces, remains at rest or moving with a constant velocity and if in rotation is rotating at constant angular velocity is said to be in equilibrium.
N19/II/1a [2]		

N15/III/Q1a [2]	Two conditions for equilibrium:	1. The algebraic vector sum of the forces acting on the object in any direction must be zero. 2. The algebraic vector sum of the moments of the forces in the object about any point must be zero.
	Mass:	is a measure of a body's resistance to change in velocity.
	Density:	is the mass per unit volume of a substance
	Weight:	is the force acting on a mass due to a gravitational field.
	Apparent Weight:	is the normal contact force experienced by an object in contact with a surface.
	Weightlessness:	the absence of normal contact force acting on an object.
N13/II/2a [1]	Impulse:	is the product of the *average* force acting on an object and the duration of time for which the force acts.
N12/III/6bi [2]	Principle of Conservation of Linear Momentum:	The total linear momentum of a system will remain constant if no net external force acts on it.
	Isolated system:	a system which has no external force and no external torque acting on it, and, has no transfer of mass in and out of it.
	Head-on collision:	the velocities of the colliding bodies are collinear both before and after impact.
	Elastic collision:	a collision in which the total kinetic energy of the colliding bodies is conserved before and after the collision. Consequence of system in elastic collision is that the Relative velocity of separation is equal to the relative velocity of approach.
	Inelastic collision:	a collision in which the total kinetic energy of the colliding bodies is not conserved before and after the collision.
	Perfectly inelastic collision:	a collision in which the total kinetic energy of the colliding bodies is not conserved before and after the collision, and, the colliding bodies stick together after the collision.

Forces

	Friction:	is a contact force that opposes the *relative* motion between two bodies in contact, or, *tends to* oppose one body from moving *relative* to the other.

N18/II/2a[1]	Hooke's Law:	states that force is proportional to its extension, provided the limit of proportionality has not been exceeded.
	Spring Constant (also known as 'elastic constant'):	is the constant of proportionality between force and extension for a sample of material that has not been stretched to such an extent that it has exceeded the elastic limit.
	Upthrust:	is the net upward force exerted by a fluid on a body as a result of the body being immersed (either partially or totally) in the fluid.
	Archimedes' Principle:	states that when an object is totally or partially immersed in a fluid, it experiences an upward force (upthrust) equal to the weight of fluid displaced.
	Principle of Flotation:	an object floats in a fluid when it displaces a weight of fluid equal to its own weight.
	Centre of Gravity (CG):	is the point at which the whole weight of a body may be thought to act.

Work, Energy and Power

N10/III/6bii	Work:	is the product of the average force acting on an object and the displacement moved in the direction of the force.
	Energy:	is the stored ability to do work.
	The joule:	is the SI unit of energy or work done. One joule of work is done when a force of one newton moves its point of application by one metre in the direction of the force.
	Principle of Conservation of Energy:	Energy cannot be created or destroyed, but it can be converted (transferred) from one form to another.
	Kinetic Energy:	is the energy of a mass due to its motion.
	Power:	is the rate of doing work with respect to time (or work done per unit time) or the rate of transfer of energy with respect to time.
	The watt:	is the SI unit for power. One watt is defined as the rate of transfer of energy of one joule per second.

Motion in a Circle

N14/III/2ai [2]	The radian:	is the unit for the measurement of angle. One radian is that angle subtended at the centre of a circle by an arc equal in length to the radius.
	Angular Displacement:	is the angle through which an object turns in a specified direction about a specified axis.
	Angular Speed	is the rate of change with time of the angular direction of the line joining an object to the axis about which it is rotating.
	Angular Velocity:	is the rate of change with time of the angular direction of the line joining an object to the axis about which it is rotating, in a given direction.
	Centripetal Acceleration	the acceleration, directed towards the centre of a circle, of an object moving along the arc of the circle
	Period (of a circular motion):	is the time taken for an object to turn through an angle of 2π radians.
	Frequency (of a circular motion):	is the number of complete revolutions (or cycles) per unit time.

Gravitational Field

	Newton's Law of Gravitation:	states that the mutual force of attraction between two point masses is directly proportional to the product of their masses and inversely proportional to the square of their separation.
N20/III/9ai [2] N14/III/6ai [2] N12/III/7ai [1] N10/III/3ai [1]	Field of Force: (applicable to all types of field, ie. gravitational field, electric field, or magnetic field)	the region in space where an object possessing a certain property experiences a force. It can be mapped with lines of the force or with lines of potential.
N18/III/2a[2] N17/III/3a [2]	Gravitational Field:	the region in space where a mass experiences a gravitational force.
	Gravitational Field Strength:	The gravitational field strength at a point in a gravitational field is the gravitational force per unit mass acting on a <u>small</u> mass placed at that point.
N20/II/2a [1] N14/II/5a [1] N13/III/1a [1]	Gravitational Potential:	The gravitational potential at a point is the work done per unit mass by an external agent in bringing a <u>point</u> mass from infinity to that point.
	Gravitational Potential Energy:	The gravitational potential energy of a mass at a point is the work done by an external agent on the mass in moving it from infinity to that point.

	Geostationary Orbit:	It is an orbit in which the orbiting object remains stationary relative to the viewer/observer on the Earth.
	Conditions for Geostationary Orbit:	• Centre of the Earth coincides with the centre of orbit of the object/satellite, and, axis of rotation of the Earth coincides with the axis of orbit of the object/satellite. [OR The orbit of the object/satellite lies in the equatorial plane.] • The object/satellite orbits from West to East. • The period of one orbit of the object/satellite is 24 hours.

Oscillations

	Periodic motion:	is one which repeats itself in equal time intervals.
	Oscillation (or Oscillatory motion):	is a periodic motion where the particle moves back and forth over the same path about a fixed equilibrium point.
	Period (of a vibrating/oscillating system):	is the time taken to complete one oscillation in a vibrating/oscillating system.
	Frequency (of vibration/oscillation):	The number of oscillations completed per unit time.
N14/III/2aii [1]	Angular Frequency:	Angular frequency ω is a measurement related to the frequency f of a sinusoidal motion by the relation $\omega = 2\pi f$.
N18/III/9ai[2] N16/III/7aii [2] N15/III/8ai [2]	Simple Harmonic Motion:	is an oscillatory motion in which the body's acceleration is directly proportional to its displacement from its fixed equilibrium position, and, is always in opposite direction to this displacement (i.e. acceleration is always directed *towards* the equilibrium position).
	Free oscillation:	Oscillation in the absence of external dissipative forces.
	Damped oscillations:	Oscillations in which the amplitude of oscillations diminishes with time as a result of dissipative forces that reduce the total energy of the oscillations.
	Damping:	is the process in which the amplitude of oscillations diminishes with time as a result of dissipative forces that reduce the total energy of the oscillations.

Degree of damping:	The degree of damping determines the form of the decay of the amplitude of vibration of an oscillating body.
Light damping:	The object undergoes a number of complete oscillations with the amplitude of vibration decreasing exponentially with time. The greater the amount of damping, the greater the rate of decay of amplitude.
Critical damping:	The displacement from equilibrium position is reduced to zero (i.e. the system, when displaced and released, returns to its equilibrium position) in the minimum time possible without any oscillation occurring.
Heavy damping:	The displacement reduces exponentially with time. There are no oscillations and the time for the displacement to decrease by a certain fraction is longer than for critical damping. This time increases as the degree of damping increases.
Forced Oscillations:	Oscillations in which a periodic driving force is applied on a system to cause it to oscillate at the frequency at which the periodic force is applied.
Forced frequency of vibration (also called impressed frequency):	The frequency at which a body is made to vibrate by imposing a periodic force on it.
Resonance:	is a phenomenon the occurs when the frequency at which an object is being made to vibrate (the forced or driving frequency of vibration) is equal to its natural frequency of vibration. The amplitude of vibration is a maximum at this frequency.

Waves

N10/III/7a [1]	Progressive Wave:	is a wave in which energy is carried from one point to another by means of vibrations/oscillations within the wave.
N19/II/2ai [2] N10/III/7a [2]	Transverse Wave:	is a wave in which the oscillations/vibrations in the wave are perpendicular to the direction of transfer of the energy of the wave.
N15/III/8bi [2]	Longitudinal Wave:	is a wave in which the oscillations/vibrations in the wave are parallel to the direction of transfer of energy of the wave.
	Amplitude:	is the maximum displacement of an oscillation from its equilibrium position.
	Wavelength:	the shortest distance between two points on a progressive wave which are vibrating in phase.
	Period (context of a wave):	Is the time taken for a point in a wave to undergo one complete oscillation. It is also the time taken for a wave to travel a distance of one wavelength.
	Frequency (context of a wave):	is the number of complete cycles a point in a wave undergoes per unit time.
N15/III/8bi [1]	Speed (of a wave):	is the distance travelled by a wave profile per unit time.
N10/II/3aii [1]	Phase Difference:	is a measure of how much one wave is out of step with another. It is the fraction of a cycle between two points in a wave or between identical points of two waves.
	Intensity (of a wave):	is the wave energy incident per unit time per unit area normal to the direction of travel of the wave.
N19/II/2aii [2] N17/II/3a [2]	(Plane) Polarization:	a phenomenon where the oscillations in a transverse wave are confined to one <u>direction</u> only, the <u>direction</u> being at right angles to the direction of propagation of the wave. In contrast, In an *unpolarised* transverse wave, oscillations in the wave can occur in an infinite number of <u>directions</u>, those <u>directions</u> being at right angles to the direction of propagation of the wave.

Superposition

N10/III/7ei [3] N14/III/4a [2]	Principle of Superposition:	When two or more waves of the same nature meet at a point, the resultant displacement is the vector sum of the individual displacements due to each wave at that point.
	Interference:	is the phenomenon where two or more waves of the same type (nature) superpose to produce a resultant wave.

N22/II/5a,b[4]	Stationary Wave (or Standing Wave):	is a wave in which vibrational energy is stored, rather than transmitted as in a progressive wave. It is the resultant wave produced as a result of the repeated interference of two progressive waves of the same type, of equal speed, frequency and amplitude, and, travelling in opposite directions along the same line.
N22/III/7a[1] N19/III/8aii [1] N13/III/8bi [2] N12/III/4ai [1] N10/II/1aiii [1]	Coherence / Coherent:	Two waves are said to be coherent when the phase difference between the two waves remains constant and does not vary with time. Two wave *sources* are coherent if they *produce waves* that have a *constant* phase difference.)
N21/III/5a [2] N20/II/4a [1] N18/II/3a [1] N10/II/1ai [1]	Diffraction:	is the spreading of waves as they pass through an opening or around an obstacle into the geometrical shadow regions.
	Path Difference:	is the *difference* between the *distances travelled* by two progressive waves, measured from their sources to the point where they meet.
N19/III/8bii [2] N17/III/5bi [2]	Rayleigh Criterion	states that for the patterns to be just distinguishable, the central maximum of one image must lie at the same position as the first minimum of the other image.
N20/II/4b [2]	Two conditions for observable two-source interference fringes	1. The two sources are coherent. 2. The two sources gives out monochromatic wave of a single wavelength.

Thermal Physics

	Temperature:	is a base quantity in the SI system. It is a measure of the degree of hotness of an object. It does not measure the amount of thermal energy in an object. It does indicate in which direction thermal energy will flow unaided.
N17/III/8ai+ii[3]	Thermal Equilibrium:	it is the condition when there are no net heat transfer between two bodies. This occurs when the two bodies have the same temperature.
	Absolute scale of temperature (or 'thermodynamic scale of	is a temperature scale based on the theoretical efficiency of a perfectly reversible heat engine and is not dependent on the way the physical property of a substance changes with temperature.

	temperature' or 'Kelvin scale of temperature'):	
N10/II/5ai [1]	Absolute Zero on temperature scale:	is the temperature at which any object has minimum internal energy; it is the zero of the thermodynamic scale of temperature.
	Triple point:	is the single temperature at which the solid, liquid and vapour states of a substance co-exist in equilibrium.
	Triple point of water:	is the single temperature at which ice, water, and water vapour co-exist in equilibrium.
	The kelvin:	is the fraction 1/273.16 of the difference in temperature between the absolute zero and the triple point of water.
	Heat Capacity (or 'thermal capacity'):	is a value numerically equal to the quantity of heat required to raise the temperature of the whole body by one kelvin.
N15/III/7bi [2]	Specific Heat Capacity:	is a value numerically equal to the quantity of heat required to raise the temperature of unit mass of the substance by one kelvin.
	Latent Heat of Fusion:	is a value that is numerically equal to the thermal energy transferred when the whole body of a substance changes state from solid to liquid, or from liquid to solid, without any change of temperature.
N10/III/1a [2]	Latent Heat of Vaporisation:	is a value that is numerically equal to the thermal energy transferred when the whole body of a substance changes state from liquid to vapour, or from vapour to liquid, without any change of temperature.
	Latent Heat:	is a value that is numerically equal to the thermal energy transferred when the whole body of a substance changes state, without any change of temperature.
	Specific Latent Heat:	is a value that is numerically equal to the thermal energy transferred when unit mass of a substance changes state, without any change of temperature.
	Specific Latent Heat of Fusion:	is a value that is numerically equal to the thermal energy transferred when unit mass of a substance changes state from solid to liquid, or from liquid to solid, without any change of temperature.
	Specific Latent Heat of Vaporisation:	is a value that is numerically equal to the thermal energy transferred when unit mass of a substance changes state from liquid to vapour, or from vapour to liquid, without any change of temperature.
	The mole:	is a unit of measurement of amount of substance. One mole of any substance contains a number of molecules or atoms equal to the Avogadro constant (the number of atoms in 0.012 kg of carbon-12 isotope).

N18/III/8bi[2]	Ideal Gas:	is a gas that obeys the gas laws or the ideal gas law, pV = nRT, at all values of volume (V), pressure (p) and temperature (T).
	Assumptions of an Ideal Gas:	• The volume/size of the gas molecules is negligible compared to the volume/size of the container. • The gas molecules experience no interatomic or intermolecular forces of attraction, hence experiences no random potential energy. • The gas molecules are in continuous random motion, travelling in straight line unless colliding with one another or with the walls of the container. • The collisions of the gas molecules with one another or with the walls of their container are perfectly elastic. • In such a gas, all the internal energy is in the form of kinetic energy and so the average kinetic energy of the gas molecules is directly proportional to its thermodynamic temperature.
N22/II/4bi[1]	Assumptions of the kinetic theory of gases:	• All gases consist of a very large number of atoms/molecules. (This allows us to use statistical analysis of their behaviour.) • Atoms/Molecules move randomly. ('random' means that any atom/molecule can move in any direction with equal probability. Distribution of molecular speeds is wide and does not change.) • Atoms/Molecules behave as if they are hard, perfectly elastic, identical spheres. • There are no forces between atoms/molecules (i.e. no interatomic/intermolecular forces), except when they are colliding with each other or with the walls of the container. • The total volume (not the volume of a single atom/molecule) of the atoms/molecules is negligible compared with the volume of the container. • The duration of a collision is negligible compared with the time between collisions.
N13/II/4a [1] N18/III/8ai[2] N21/III/3a[2]	Internal Energy:	Internal energy of a system is the sum of the random kinetic and potential energies of the individual atoms and molecules of the system. The random kinetic energy is due to the random motion of the atoms or molecules of the system and the potential energy is due to intermolecular forces of interaction between the atoms or molecules of the system.

		*Internal energy of an *ideal gas* comprise of only the kinetic energy due to the random motion of the gas atoms/molecules. The potential energy due to intermolecular forces is assumed to be zero.*
N14/III/3a [2] N15/III/7di [2]	First Law of Thermodynamics:	A statement of the law of conservation of energy. It states that for a closed system, the increase in internal energy of the system is equal to the sum of the thermal energy supplied to the system and external work done on the system. Increase in internal energy = thermal energy supplied to the system + external work done on the system
	Root mean square speed:	is the square root of the mean, or average, value of the molecular speed squared.

Electric Field

	Coulomb's Law of Electrostatic Force:	states that the magnitude of the electrostatic force between two point charges is directly proportional to the product of the charges and inversely proportional to the square of their separation.
	Electric Field:	is the region of space where an electrostatic force acts on a stationary charge.
N22/III/8ai[1] N12/III/7aii [2]	Electric Field Strength:	Electric field strength at a point in an electric field is the force per unit positive charge acting on a stationary test charge placed at that point.
	Electric Potential Energy:	The electric potential energy of a charge placed at a point in an electric field is the work done by an external agent on the charge in moving the charge from infinity to that point.
N19/II/3a [1] N16/II/4bii [1]	Electric Potential:	The electric potential at a point in an electric field is the work done per unit positive charge by an external agent in moving a point charge from infinity to that point.
	Electric potential difference (in an electric field):	The potential difference between two points in an electric field is numerically equal to the work done per unit positive charge by an external agent against the electric force when moving a point charge from one point to the other.

Current of Electricity/D.C. Circuits

	(Electric) Current:	is the rate of flow of charged particles, which may be positively or negatively charged with respect to time, through a cross-sectional area.

	(Electric) Charge:	The electric charge ΔQ passing a point in a circuit is the product of the electric current I in the circuit and the interval of time Δt during which the electric current is passing that point, $\Delta Q = I \Delta t$.
	The coulomb:	is the SI unit for charge. One coulomb is that charge flowing per second past a point in a circuit which the current is one ampere.
	Drift speed:	is the <u>average</u> speed at which charge carriers move through a conductor when there is an electric current in the conductor.
	Potential difference (p.d.) (in a circuit):	The potential difference between two points in a circuit is the amount of energy per unit charge transferred from electrical energy to some other form of energy when charge passes through those two points.
N19/II/5a [1]	Electromotive Force (e.m.f.):	is the energy transferred per unit charge from some other form of energy into electrical energy when charge is moved round a complete circuit.
	The volt:	is the SI unit of potential difference and of electromotive force. It is defined as joule per coulomb. If question specifically asked in terms of p.d. or e.m.f.:
	The volt (p.d.):	One volt of potential difference between two points is one joule of electricity is converted into other forms of energy per coulomb of charge passing between those two points.
	The volt (e.m.f.):	One volt of e.m.f. of a source is one joule of some other form of energy converted into electrical energy per coulomb of charge that the source drives round a complete circuit.
N14/III/7ai [1]	(Electrical) Resistance:	is the ratio of the potential difference across the component to the current through it.

N14/III/7aii [2]	Resistivity:	is a relationship between the dimensions of a specimen of a material and its resistance at constant temperature. For a sample of length *L*, with a uniform cross-sectional area *A* and resistance *R*, the resistivity *ρ* is $$\rho = \frac{RA}{L}$$ Distinguishing resistance and resistivity: Resistivity is a *property* of a material ➢ does not depend on 'dimensions of' component or device ➢ depends on 'material' from which it is made and 'temperature of the material'. Resistance depends on its ➢ material (affects ρ), and ➢ temperature (affects ρ), and ➢ dimensions (affects L and A).
N16/II/1a [1]	The ohm:	is the SI unit for resistance. The **ohm** is the SI unit of resistance. **One *ohm*** is the resistance of a conductor across which a potential difference of **one volt** produces a current of **one ampere**. "
	Ohm's Law:	For a conductor at constant temperature, the current in the conductor is directly proportional to the potential difference across it.

Alternating Current

	Alternating Current:	is the current which direction of flow of charge carriers reverses periodically with time. It is restricted to a sinusoidal variation of current with time.
	Root Mean Square:	the effective value of a continuously varying quantity, obtained from many samples taken at regular intervals during a cycle.
N19/III/7a [2] N18/III/5a [2] N17/III/9a [2]	Root Mean Square current (or voltage) (By reference to heating effect):	the value of steady direct current (or voltage) that dissipates energy at the same rate as the alternating current (or voltage) in a given resistance.
	Peak Voltage (current):	the maximum value of the voltage (current) in a varying power supply.
	Rectification:	is the means by which alternating current is converted into direct current

Electromagnetism and Electromagnetic Induction

	Magnetic field:	A region of space around a magnet pole, current-carrying conductor, or moving charge in which any other magnet pole, current-carrying conductor, or moving charge located in it will experience a force.
N21/III/8a [3] N20/II/6a [1] N18/III/4ai[3]	Magnetic Flux Density:	The magnetic flux density at a point is the force per unit current per unit length experienced by a straight current-carrying conductor placed at right angle to a uniform magnetic field.
N15/III/4a [3]	The tesla:	is the SI unit for magnetic flux density. One tesla is the magnetic flux density at a point in a magnetic field if a straight conductor carrying a current of one ampere placed at right angle to a uniform magnetic field experiences a force per unit length of one newton per metre.
N10/II/4a [1]	Magnetic Flux:	is the product of the magnetic flux density and the area normal to the field through which the field is passing.
	The weber:	is the SI unit for magnetic flux. One weber is the magnetic flux that cuts through a surface with area of one square metre when placed inside a magnetic field of flux density of one tesla, with the surface perpendicular to the field.
N18/III/4aii[2]	Magnetic Flux Linkage:	Magnetic flux linkage through a coil is the product of the magnetic flux passing through the coil and the number of turns on the coil.
N20/III/6a [2] N19/III/6bi [2] N17/III/9ci1 [2] N13/III/4a [1] N12/II/5a [1]	Faraday's Law:	The magnitude of the electromotive force (e.m.f.) induced in a conductor is directly proportional to the rate of change of magnetic flux linkage of the conductor.
	Lenz's Law:	The direction of the induced electromotive force (e.m.f.) is such that it produces effects to oppose the change causing it.

Quantum Physics

N13/II/6a [1]	Photoelectric Effect:	is the ejection of an electron from a metal surface when the surface is irradiated with electromagnetic radiation of a high enough frequency.
	Work Function Energy:	is the minimum energy required to eject an electron from a metal surface in the photoelectric effect.
	Stopping Potential:	is the minimum value of the retarding potential difference required to prevent any photoelectron (not even those with maximum kinetic energy) from reaching the collector.

N20/II/7a [2] N19/III/8ai [2] N18/III/6a [2] N16/III/8a [2] N15/III/5a [1]	Photon:	is a quantum of electromagnetic energy.
N18/II/4a[2]	Threshold Frequency:	is the minimum frequency of electromagnetic radiation incident on a metal surface required for photoelectric effect to take place, that is, to eject electrons from that surface.

Nuclear Physics

	Nuclide:	is a particular species (type) of nucleus that is specified by its proton number and neutron number.
	Isotopes:	Two or more types of nuclei of the same element, having the same number of protons but different number of neutrons in their nuclei.
	The electronvolt (eV):	It is a non-SI unit for energy equal to the energy gained by an electron when it is accelerated through a potential difference of one volt.
	Mass Defect:	is the difference between the mass of a nucleus and the mass of its constituent particles taken separately.
N20/III/7ai [2]	Binding Energy (of a nucleus):	is the work that would have to be done to separate a nucleus into its constituent protons and neutrons. It is also the energy released if a nucleus is formed from its constituent separate protons and neutrons.
	Binding Energy per Nucleon:	is the binding energy of a nucleus divided by the number of nucleons in the nucleus. *Stability of a nuclide α binding energy per nucleon of the nuclide*
N19/III/9a [1]	Nuclear Fission:	is the splitting of a nucleus of high nucleon number into smaller nuclei of approximately equal mass, often along with the emission of neutrons, resulting in decrease in total mass and release of energy.
N19/III/9a [1]	Nuclear Fusion:	is the formation of a larger nucleus from two nuclei of low nucleon number, often with the emission of another lighter particle, resulting in decrease in total mass and release of energy.
	Chain Reaction, nuclear:	A series of similar reactions in which one of the products of a reaction causes further reactions to occur.

	Radioactive:	A radioactive nuclide is an unstable nucleus that undergoes spontaneous and random disintegration to transmute into a more stable nucleus, with the emission of an alpha-particle or a beta-particle, and usually accompanied by the emission of a gamma ray photon.
N19/III/9a [2] N14/III/8ai [2]	Radioactivity (or Radioactive decay):	is the spontaneous and random disintegration of an unstable nucleus into a more stable one with the emission of an alpha-particle or a beta-particle, and usually accompanied by the emission of a gamma ray photon.
N18/III/7ai+ii[2] N14/III/8aii+iii [1] N12/III/8ai+ii [3]	Nature of Decay - Spontaneous and Random:	Spontaneous: It occurs without external stimuli and the rate of decay is unaffected by environmental factors such as temperature and pressure. Random: It is impossible to predict which nucleus will decay next, and when it will decay, even though any nucleus has a constant probability of decay per unit time.
	Penetrating ability (or power):	the ability of radiation to pass through materials.
	Ionization:	is the process whereby neutral atoms lose electrons to become charged particles or ions.
	Ionizing ability:	is the ability of radiation to remove electrons from other atoms in its path to form positive ions.
	Count Rate:	is the rate at which emissions from a radioactive source are detected.
	Activity (of a radioactive source):	number of nuclei disintegrating (or decaying) per unit time.
	The becquerel (Bq):	It is the SI unit for activity. One becquerel of activity of a radioactive source is one nuclear disintegration per second.
	Radioactive Decay Law:	The rate of disintegration (or activity) of a radioactive sample at any instant in time is directly proportional to the number of undecayed, radioactive nuclei present at that time.
	(Radioactive) Decay Constant:	is the probability of decay per unit time of a nucleus.

N22/II/6a[1]	Half Life:	The half-life of a radioactive nuclide is the time taken for half the nuclei in a sample of the nuclide* to decay, based on the average time taken in a sample with a large number of radioactive nuclei. OR The half-life of a radioactive nuclide is the time taken for the activity of a sample of the nuclide* to decrease to half its initial value, based on the average time taken in a sample with a large number of radioactive nuclei. *indicates for that particular radioactive isotope, hence is an important keyword which cannot be replaced.

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