PHYSICS LAWS

NEWTON'S LAWS OF MOTION:-

First law:-

"A body continues its state or uniform motion in a straight line provided no net force on it."

Second law:-

"When the net force acts on the body, it produces acceleration in the body in the direction of the net force. The magnitude of this ~~force~~ acceleration is directly propotional to the net force acting on the body and inversely proportional to its mass."

Third law:-

"To every action there is always an equal but opposite reaction."

Law of conservation of momentum:-

"The momentum of an isolated system of two or more than two interacting bodies remains constant."

Principal of moments:-

"The body is balanced if the sum of clockwise moments acting on the body is equal to the sum of anticlockwise moments acting on it."

Law of Gravitation:-

"Every body in the universe attracts every other body with a force which is directly proportional to the product of their masses and inversely proportional to the square of the distance between them."

Pascal's law:-

"Pressure applied at any point of a liquid enclosed in a container, is transmitted without loss to all other parts of the liquid"

Principal of floatation:-

"A floating object displaces a fluid having weight equal to the weight of the object"

Hook's law:-

"The strain produced in a body by the stress applied to it is directly proportional to the stress with in the elastic limit of a body"

Law of equilibrium:-

"A body is said to be in complete equilibrium, when several forces and torques are acting together on it"

Stoke's law:-

"The viscous drag force on a sperical object is expressed mathematically by a formula, $F_D = 6\pi\eta rv$, is termed as stoke's law."

Equation of continuity:-

"The product of the cross-sectional area and the speed of the fluid at any point along the pipe is constant."

Bernoulli's equation:-

"Equation relates the pressure, flow speed, and height for flow of an ideal fluid".

ie; $P + \frac{1}{2}\rho v^2 + \rho gh = \text{constant}$.

Torricelli's Theorem:-

"Speed of efflux is equal to the speed gained by the fluid while falling through height under the action of gravity."

Doppler effect:-

"The apparent change in the frequency of sound, caused by relative motion of either the source of sound or listner or both, is called doppler effect."

Bragg's law:-

"To find the wavelength of x-rays beam by a crystall, Bragg's law is used". ie; $2d\sin\theta = m\lambda$

Hyegen's Principal :-

The first part of the Huygen's Principal states that;

"Every point of a wavefront may be considered as a source of secondary spherical wavelet, which spread out in forward direction with the speed equal to the speed of propagation of the wave".

while the second part states that;

"The new position of the wave front after time $t + \Delta t$ can be found by drawing a plane tangential to all the secondary wavelets".

First Law of Thermodynamics :-

"This law states that every thermodynamic system possesses state variable (u) called internal energy".

Second law of Thermodynamics :-

The second law of thermodynamics can be stated in the form of two different statements :-

Lord Kelvin statement :-

"It is impossible to constrict a heat engine, operating continuously in a cycle, which takes heat from a heat source at higher temperature and performs an equivalent amount of work without rejecting any heat to a heat sink at low temperature".

Rudolf clausius statement:-

"It is impossible to cause heat to flow from a cold body to a hot body without the expenditure of work."

Coulomb's law:-

"The magnitude of the force between two point charges is directly proportional to the product of the magnitude of the charges and inversely proportional to the square of distance between them".

Gauss's law:-

"The net electric flux through a closed surface is equal to the total charge enclosed by a surface divided by the permittivity of free space".

OHM'S LAW:-

"The magnitude of a current in a conductor is proportional to the applied voltage as long as the temperature is kept constant".

Kirchoff's current law:-

"The algebraic sum of all the currents meeting at a junction in an electric field is zero, ie; $\sum I = 0$".

Kirchoff's voltage law:-

"In any closed electrical circuit, the algebraic sum of all the electromotive force(emf), and voltage drops in a resistor is equal to zero ie; $\sum Emf + \sum V = 0$".

Ampere's Circuital law:-

"For any closed loop, the sum of the length elements multiplied by the components of magnetic field parallel to each element is proportional to the current enclosed by the path." ie; $\sum B \cdot \Delta l = \mu_0 I$ -

Faraday's law:-

"Emf is directly proportional to the number of turns of the coil and the change in magnetic flux in time Δt." ie; $Emf = \frac{N \Delta \Phi}{\Delta t}$ -

Lenz's law:-

"The polarity of the induced emf is such that it tends to produce a current which ~~posses~~ opposes the change in magnetic flux that produced it."

Maxwell equations:-

"James clerk maxwell unified Gauss's law, faraday's law and ampere's law into set of equations known as maxwell's equations."

"These equations predict the existence of eletromagnetic waves and that such waves are radiated by accelerating charges-"

Young's modulus:-

"Young's modulus is defined as the ratio of tensile stress to tensile strain".

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Shear of Rigidity modulus:-

"It is the ratio of shear stress to shear strain".

Bulk modulus:-

"It is the ratio of volume stress to volume strain".

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Energy band Theory:-

"It is the theoretical model which describes the State of electrons in solid materials".

Principal of relativity:-

"The laws of physics are same in all inertial reference frames".

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Principal of constancy of the speed of light:-

"The speed of light in vaccume is same ie; 3×10^8 m/s in all inertial references frames, regardless of the velocity of the observer or the velocity of the source emitting the light".

Wein's displacement law:-

"with the increase in temperature, the peak of the distribution shifts toward shorter wavelength". ie; $\lambda_{max} T$ = constant

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Stephen-Boltsmann Law:-

"The area under curve represents the energy radiated per second per square meter over all wavelengths under all temperatures- This area is directly proportional to the fourth power of absolute temperature." ie; $E = \sigma T^4$ -

Plank's Theory:-

According to plank's theory;

(i)

"The vibrating molecules of the black body cavity which emitted these radiations were having only discrete amount of energy E_n, ie; $E_n = nhf$"

(ii)

"Atoms or molecules emitt or absorb radiation when jump from one quantum state to another." ie; $E = hf$ -

Photoelectric effect:-

"when light hits the metal surface, electrons are emitted, the phenomenon is called photoelectric effect and the electrons emitted are called photo-electrons" -

Compton's effect:-

"The scattering of high frequency photon strikes a stationary electron the frequency of photon is decreased after collision. This phenomenon is reffered to as Compton's effect."

Wave duality Theory :-

" wave partical duality is a theory that proposes that all matter exhibits the properties of not only particles, but also waves , which transfer energy" -

The Uncertainity Principal :-

"The more precisely the position is determined, the less precisely the momentum is known in this instant, and vice versa." ie; $\Delta x \cdot \Delta P_x \approx h$