

General Awareness Notes - Applied and Basic Physics - Part I

- ✓ Sound waves are longitudinal waves.
- ✓ Sound waves cannot travel through vacuum.
- ✓ Acoustic is the subject dealing with the study of sound.
- ✓ Velocity of Sound is extreme in solid.
- ✓ The velocity of sound in air increases with increase in temperature.
- ✓ The velocity of sound in air is proportional to the square root of the absolute temperature.
- ✓ The sound of high pitch: Shrill
- ✓ The sound of low pitch: Sharp
- ✓ Hertz is the unit of frequency.
- ✓ Vibration of a string is a transverse motion.
- ✓ Stethoscope is based upon the principle of multiple reflection.
- ✓ Doppler effect describes the relationship between the pitch of sound and distance from the source of sound.
- ✓ Doppler effect: Describes to find binary stars,
- ✓ Sound signal is recorded as light signal on a cinema film.
- ✓ When sound waves enter from air into water they bend away from the normal.
- ✓ Light travels faster than sound.
- ✓ Whispering gallery; Gol Gumbaz.
- ✓ Uses of echoes: (1) Bats fly in the dark. (2) Detect the submarines under water.
- ✓ Echo: We hear original and then reflected sound.
- ✓ The obstacle should be at least 16.5 mts.
- ✓ The time interval between sound production and its echo is $1/10$ of a second.
- ✓ Vibration of a string is transverse.
- ✓ Microphones convert sound into electric energy.
- ✓ Loud Speaker converts electric energy into mechanical energy and mechanical energy into sound energy.
- ✓ A sound of single frequency is called tone.
- ✓ Mach number: The ratio of the velocity of the body to the velocity of sound.
- ✓ Expression for simple harmonic motion: $a \sin(\omega t - \phi)$.
- ✓ The waves produced by the Sonometer is transverse stationary and polarized.
- ✓ Lissajous figures are very useful in comparing frequencies.
- ✓ The velocity of sound in gas is the square root of the adiabatic elasticity medium.
- ✓ The velocity of sound in air decrease with increase in pressure.
- ✓ The quality of tone depends upon the present.
- ✓ The frequencies of two vibrating systems equal it is called resonance.
- ✓ The velocity of sound in air is 332 meters/sec. 0°C when the air is dry.
- ✓ Ultra sonics are detected by the thermal detector.
- ✓ Ultra sonic waves have frequencies higher than 20,000 Cycles per Sec.
- ✓ Infra sonic waves have the frequencies less than 20hz,
- ✓ A spherical liquid drop has a convex surface.
- ✓ Surface Tension: Soap bubble.
- ✓ The pressure inside a bubble is inversely proportional to its radius.

- ✓ Quincke's drop method is used for measuring surface tension and angle of contact for mercury in contact with glass.
- ✓ Cream separator: Centripetal force.
- ✓ Blotting paper: Capillary action.
- ✓ Adhesion: Force of attraction between unlike molecules.
- ✓ Cohesion: Force of attraction between like molecules.
- ✓ Rocket: Conservation of momentum.
- ✓ Hygrometer: Instrument for measuring relative humidity.
- ✓ Tensimeter: Device for measuring vapour pressure.
- ✓ A falling in barometer: Storm.
- ✓ Ballory are filled with hydrogen.
- ✓ Sublimation: Vapourisation of a solid without first becoming a liquid.
- ✓ In pressure cooker the water boils at more than 100°C.
- ✓ Condensation: the change of vapour into liquid.
- ✓ Heat from the sun reaches the earth by way of radiation.
- ✓ Dry ice is solid carbondioxide.
- ✓ Pyrometer is used for measuring higher temp.
- ✓ When ice melts in a glass of water, the level of water in glass remains the same.
- ✓ If a ship enters into sea from the lake the level of the ship rises.
- ✓ S.I unit of heat is joule; in C.G.S system it is calorie.
- ✓ Hope's experiment proves the density of water is maximum at 4°C.
- ✓ The S.I unit of temperature is Kelvin.
- ✓ Thermostat used to maintain a constant temperature.
- ✓ Absolute zero: -273°C.
- ✓ Absolute zero: -460°F
- ✓ At -40° the Fahrenheit and Centigrade Scales are equal.
- ✓ At 574.25°F the Fahrenheit and Kelvin are equal.
- ✓ The temperature of human body is 36.9°C (fever:39°C).
- ✓ Latent heat of fusion of ice=336 x 10³ J/kg.
- ✓ Regelation means refreezing.
- ✓ Thermometric scales: $F = \frac{9}{5} C + 32 = 1.8C + 32$, $C = \frac{5}{9} (F - 32) = 0.56 F - 18$
- ✓ Laws of Reflection : (i) The angle of incidence is equal to the angle of reflection.
(ii) The incident ray, reflected ray and normal to the surface lie in the same plane.

Parallel Mirrors:

- ✓ (i) The No of images formed when an object is kept in between two plane mirror is infinite,
- ✓ (ii) 3 images are formed when the two mirrors are inclined and the angle between the two mirror is 90° (5 images when the angle is 60°, 7 images when the angle is 45°, 11 images when the angle is 30°)
- ✓ (iii) The number of images formed (1) when the two mirrors are inclined is equal to $\frac{360}{\theta} - 1$ where θ is the angle between the mirrors

- ✓ (iv) The number of images formed in Kaleidoscope is 5 (angle between the mirror is 60°).
- ✓ (v) Kaleidoscope and periscope are based on the principle of multiple reflection.
- ✓ Short Sight –Myopia : Eye ball too long, Focal length too small, Objects nearer are Clearly seen, Focus in front of retina, Rectified with Concave lens
- ✓ Long Sight – Hyper Metropia : Eye ball too short, Focal length too long, Objects farer are Clearly seen, Focus behind the retina, Rectified with Convex lens
- ✓ Infrared rays are discussed by William Herschell,
- ✓ Wave length between 4×10^{-3} m and 7.5×10^7 m.
- ✓ Heated zirconium and heated tungsten carbide emits infra-red.
- ✓ Infrared: Used in the treatment of Rheumatic arthritis, Used in burglar alarms, Used in Photography (dew), The remote control (TV, VCR) sends commands in the form of infrared rays.
- ✓ Ultra-violet rays are discovered by Ritter.
- ✓ Wave length between 3900×10^{-10} m and 130×10^{-10} m.
- ✓ Source-Sun and Moon: Used in Forensic science lab, Ultra-violet radiations helps for the preparation of vitamin D, Used in the treatment of bone diseases and tumors. Used for sterilizing the air in operation theatres and laboratories.
- ✓ Laser: Light amplification by stimulated emissions of Radiation.
- ✓ The laser light is coherent monochromatic and extremely intense.
- ✓ The laser beam does not diverge.
- ✓ Light is a form of Energy.
- ✓ Light particles are known as photons.
- ✓ Light waves are electromagnetic.
- ✓ Velocity of the light: 3×10^8 m/sec.
- ✓ Corpuscle theory of light: Sir Issac Newton.
- ✓ Sky is blue due to Blue light is scattered the most by small particles of atmosphere.
- ✓ Bats fly in the dark: Ultra sonics.
- ✓ Velocity of light: Foucault's rotating mirror method.
- ✓ Energy of photons: $E = h\nu$ where 'h' is the Planck's constant ($h = 6.625 \times 10^{-34}$ joules/sec) and ν is the frequency of electromagnetic radiation.
- ✓ Rainbow formed due to: Dispersion.
- ✓ If a green colour leaf is seen in red light it will appear as black.
- ✓ Light travels fast in quarts.
- ✓ If a disc which has the pure spectral colours painted on it in proper proportion is rotated rapidly, it produces, white light.
- ✓ The distance between the projector and the screen, in a cinema theatre is increased by 1% the intensity of illumination is decreased by 2%.