

BASIC PHYSICS KNOWLEDGE

1km= 10³ m or 1kg=10³g
1mm=10⁻³m or 1mg=10⁻³g

Quantity & Units:

Speed	meter/sec
Acceleration	meter/sec ²
Resistance	ohm
Charge	coulomb C
Pressure	Pascal
Force	Newton
Torque	Newton/meter ²
Area	Meter ²
Volume	cubic meter
Current	Ampere
Power	watt
Momentum	Newton. Second

1. **Scalar Quantities:**

Those physical quantities which are measured only by their magnitude, called scalar quantities e.g. 25 liter petrol.

2. **Vector Quantities:**

Those physical quantities which are measured not only for their magnitude but their direction as well for their complete description, called vector quantities

3. **Speed:**

The distance covered by a body per unit time, called speed.

4. **Velocity:**

The distance covered by a body per unit time but in a specific direction, called velocity.

5. **Mass:**

The quantity of matter present in a body, called mass.

6. **Weight:**

Weight is the force with which the earth attracts the body towards its center, called weight.

$$W=mg$$

7. Ammeter:

A device which is used to measure the current, called ammeter.

8. Voltmeter:

A device which is used to measure the voltage or potential difference v , called voltmeter

9. Machine:

A device which helps us to do work more conveniently, called machine.

10. kinds of Machines:

Lever, pulley, wheel & axels, inclined plane, screw etc.

11. Barometer:

A device which is used to measure the atmospheric pressure, called barometer.

12. Newton first law of motion / Inertia:

Every object continues its state of rest or in uniform motion in a straight line unless it is acted upon by some external force, called Inertia.

13. Newton 3rd law:

For every action there is always an equal but opposite reaction, called Newton 3rd law.

14. Efficiency:

Efficiency = $\frac{\text{output of the machine}}{\text{input of the machine}}$

15. Torque:

Turning effect of force is called torque

$$\text{Torque} = \text{Force} * \text{moment arm}$$

16. Atomic No:

The total number of protons & electrons in the nucleus of an atom, called atomic no.

17. Atomic Mass:

The total number of protons & neutrons in the nucleus of an atom, called atomic mass.

18. Friction:

That force which resists the motion of a body, called friction.

- 1. Without friction between our legs and ground we will not be able to move on.*
- 2. Due to friction heat is produced and causes burning.*

19. Momentum:

It is the product of mass and velocity, momentum will be increased with the increased of mass of the moving body as well momentum will be increased with the increase in velocity of the body.

$$P=Mv \quad \text{Newton. Second (Unit)}$$

20. Law of conservation of Momentum:

*The momentum of an isolated system remains constant
“Isolated system means a system where no external force exerted”*

21. Newton 2nd law of Motion:

When a force acts on a body it produces acceleration in its own direction, which is directly proportional to the force and inversely proportionally to the mass of the body i.e.

$$F=ma$$

22. Distance:

The change of position of a body, called distance.

23. Displacement:

The change of position of a body but in a particular direction, called displacement.

24. Radar:

Radar is used for the purpose of locating and identifying the objects, which can't be seen by eyes or telescope. It is used for military purpose, for air traffic control, for weather observation as well for storm warning.

25. Center of gravity:

Center of gravity is the point where the whole weight of the body appears to act.

26. Matter:

Matter is made up of small particles, called molecules. Molecules are made up of one or two atoms. Matter exists in three state i.e. solid, liquid & gas. Temperature and pressure change the state of matter.

27. Law of Universal Gravitation:

Every object in the universe attracts every other object with some force that is called law of universal gravitation.

28. Types of Equilibrium:

Stable Equilibrium: A Moving car or Book lying on a table.

Unstable Equilibrium: A pencil is standing on a table for a moment

Neutral Equilibrium. When center of gravity is below the point of suspension

29. Audible Frequency:

A frequency of sound waves that can be detected by human ear easily, called audible frequency. The average range of audible frequency is 20 HZ to 20000 HZ.

30. Evaporation:

Changing of liquid into vapour without being boiling, called evaporation. Drying cloth is the best example of it.

31. Frequency:

The number of vibrations in one second, called frequency.

$$F = 1 / T$$

32. Time period:

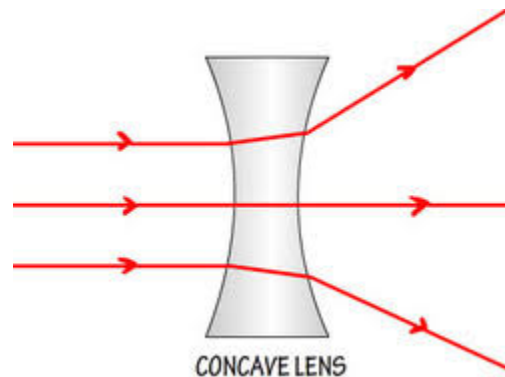
Time required completing one vibration or one complete trip, called time period.

33. Concave lens:

It is thinner at the center and thicker at the edges. It diverges the beam of light.

Uses: head light of automobiles, microscope, searching lights as well medical check-up for air, nose etc khy liye bhi used hota hai.

BECAUSE IT GIVES REAL AND VIRTUAL VIEW

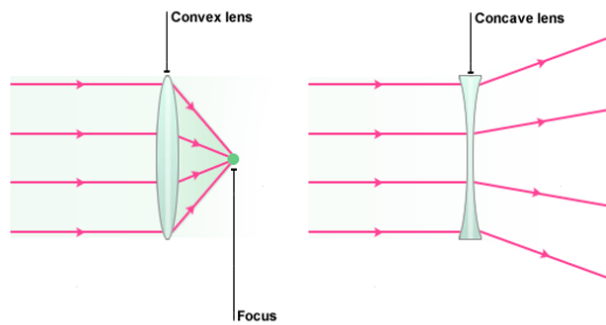


34. Convex lens:

It is thicker at the center and thinner at the edges. It converges the beam of light.

Uses: Narrow turning, security purpose, to see the lower part of vehicles

BECAUSE IT GIVES REAR VIEW



35. $E=MC^2$

According to this mass can be converted in energy and energy can be converted in mass, it is explained by Einstein.



36. Current:

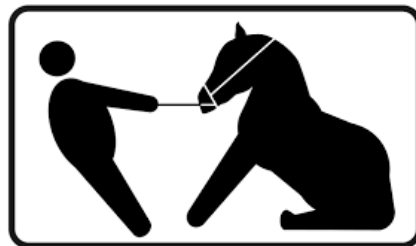
The flow of charges in a conductor is called current.

37. Conductor:

The substance which transfer heat and electricity, called conductor.

38. Resistance:

The substances which opposes the flow of charges, called resistance



39. Nuclear-Fission;

Nuclear fission is the process in which a heavy nucleus spilt up into two smaller fragments with an evolution of huge amount of energy, called nuclear fission.

40. Nuclear Fusion:

Nuclear fusion is the process in which two light nuclei fused to form up a bigger nucleus with an evolution of huge amount of energy, called nuclear fusion.

41. Ohm's law:

The current passing through a conductor is directly proportional to the potential difference V applied across the terminal of the conductor provided temperature and other physical conditions remain constant.

Ohm's Law

$$I = \frac{V}{R}$$

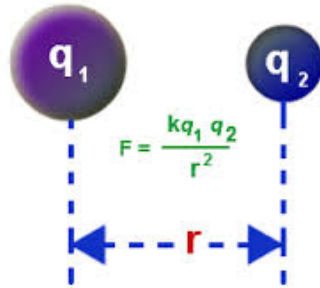
Electric current = Voltage / Resistance

42. Capacitor:

A device which is used for storing electric current called Capacitor.

43. Coulomb's Law:

An electrostatic attractive or repulsive force between two point charges is directly proportional to the product of the magnitude of the charges and inversely proportional to the square of the distance between them.



44. Pressure:

Pressure is the force per unit area. Pressure has a direct relation with force and has inverse relation with area.

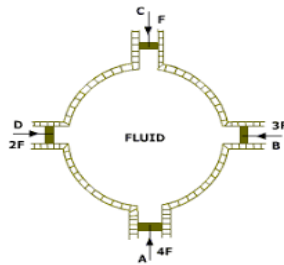
$$P = f / A$$

45. Barometer:

Barometer is a device which is used for measuring atmospheric pressure.

46. Pascal Law:

The pressure applied to any place to an enclosed fluid is transmitted equally and undimensionally to every portion of the fluid.



47. Buoyancy:

Buoyancy is the force with which a liquid pushes an object upward, when it is lowered in liquid..

What Is Buoyancy Force

- When a body is immersed in fluid, an upward force is exerted by the fluid on the body.
- This upward force is equal to the weight of the fluid displaced by the body and is called the force of buoyancy.



48. Hook's law:

Under the elastic limit stress is directly proportional to strain.

$$\text{Stress} * \text{strain}$$

49. Archimedes principal:

When an object is immersed in liquid, an up thrust acts upon it which is equal to the weight of the liquid displaced by the object.

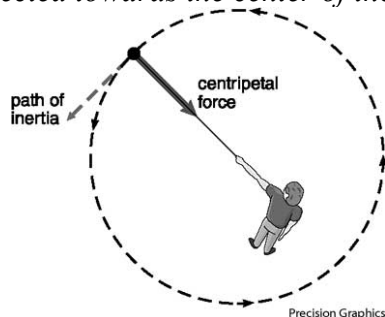
50. Speed of light & Speed of Sound:

Speed of sound in air at O C is 330 m/s

*Speed of light is $3 * 10^8$ m/s*

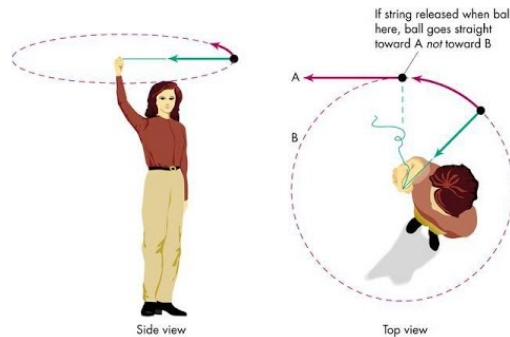
51. Centripetal Force:

The force which is responsible to keep the body moving in a circular path and it is directed towards the center of the circular path is called centripetal force.



52. Centrifugal Force:

The force which is responsible to keep the body moving in a circular path and it is directed away from the center of the circular path.



53. Mechanical advantage:

It is a ratio between load and effort.

$$M.A = \text{Load} / \text{Effort}$$

54. Mechanical Advantage of Lever:

Mechanical advantage of lever can be increased by increasing the effort arm as compared to weight arm.

55. Transfer of heat:

There are three processes by which heat energy is transferred from one place to another. 1 conduction 2 radiation 3 convection

Conduction: In this mode heat energy is transferred from atom to atom or molecule to molecule with out the movement of substances or mass from one position to another.

Convection: In this mode heat energy is transferred from one place to another place by means of movement of atom or molecules.

Radiation: In this mode no medium, is required as in convection and radiation. When these radiations fall on the object they transfer energy to the body.



56. Echo:

The sound heard after reflecting from the surface is called Echo.



57. Wavelength:

It is a horizontal distance covered by a wave in one complete cycle.

58. Amplitude:

It is a maximum vertical distance covered by a wave from its normal.

59. Ultrasonic and subsonic:


Waves having the frequency above the audible range, called ultrasonic and waves having frequency below the audible range, called subsonic.

Properties of Sound

- Ultrasonic
 - Sound frequencies above 20,000 Hz

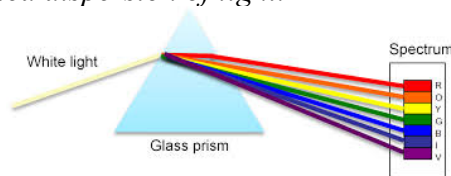



- Infrasonic/Subsonic
 - Sound frequencies below 20 Hz
 - [Elephant's Subsonic Sounds](#)



60. Dispersion of light:

When a light falls on a prism, the light splits up into seven colors. This phenomenon is called dispersion of light.



61. Refraction of light:

When a light ray is traveling from one medium to another medium and changes its path, this phenomenon is called refraction of light

A) When a ray of light traveling from a rarer medium to a denser medium it will bend toward the normal.

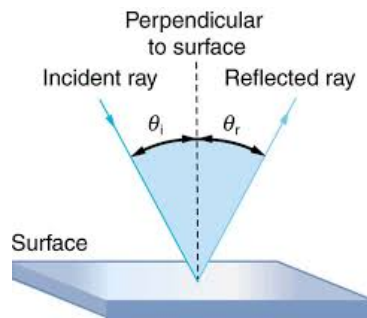
B) When a rays of light traveling from denser medium to rarer medium it will bend away from the normal..

62. Law of Reflection:

The reflection of lighth occurs in two laws according to Muslim scientist Ibn-al-haitham.

A) *The angle of incidence is equal to the angel of reflection.*

B) *The incident ray,, reflected ray and normal lie in the same plane*



63. Doppler Effect:

It is the apparent change in frequency of wave to the observer moving relative to it source.

63. Reflection of light:

Bouncing back of a light ray after hitting any surface is known as reflection