

Laws

and

Principles

Step: 1

1. Law of gravitation:

Every object in the universe attracts every other object with a force that is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centres.

2. Pascal's law:

When a force is applied in an enclosed liquid, the pressure generated is transmitted perpendicularly throughout the liquid in all directions.

3. Law of floatation:

An object will float in the fluid if the weight of the fluid displaced by the object is equal to the weight of the object.

4. Mendel's law of heredity

i. Law of dominance

When two different forms (alleles) of the genes are present in the organisms due to crossing, the dominant characteristics will be expressed and the recessive characteristics will be hidden.

ii. Law of Segregation :

The dominant and recessive alleles of the hybrids separate during the gamete formation in such a way that each gamete receives only one character at a time.

iii. Law of independent assortment:

5. Faraday's Laws of Electromagnetic Induction

i. First law

Whenever there is a change in magnetic flux, emf is always induced in the linked conductor.

ii. Second law

The magnitude of the induced emf is directly proportional to the rate of change of magnetic flux.

iii. Third law

The induced emf will last as long as there is a change in magnetic flux linked with the circuit.

6. Hubble's law

The velocity at which the galaxies are moving apart from each other is directly proportional to the distance between them.

7. Mendeleev's periodic law

The physical and chemical properties of elements are a periodic function of their atomic weights.

8. Modern periodic law

The physical and chemical properties of the elements are a periodic function of their atomic numbers.

9. Aufbau principle

The filling of electrons always occurs from the sub-shells of lower energy levels to the sub-shells of higher energy levels.

10. Principle of Laboratory Preparation of Carbon dioxide

Carbon dioxide gas can be made in the laboratory by reacting calcium carbonate with dilute hydrochloric acid.

Word equation:

Calcium carbonate + Hydrochloric acid $\rightarrow$ Calcium chloride + Water + Carbon dioxide

Balanced equation:



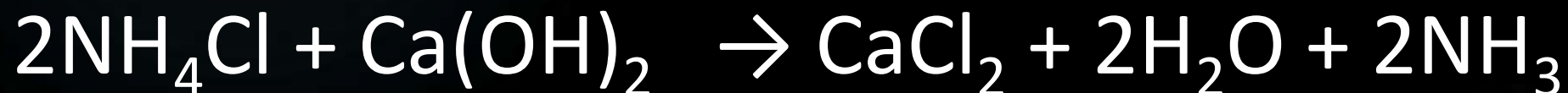
11. Principle of Laboratory Preparation of Ammonia

Ammonia gas can be made in the laboratory by heating a mixture of ammonium chloride and calcium hydroxide.

Word equation :

Ammonium chloride + Calcium hydroxide $\rightarrow$ Calcium chloride +
Water + Ammonia

Balanced equation :



12. Laws of Refraction (Snell's Law)

- i) The incident ray, the normal, and the refracted ray all lie in the same plane at the point of incident.
- ii) For a given pair of media, the ratio of the sine of the angle of incidence (i) to the sine of the angle of refraction (r) is a constant.

Step: 2

13. The principle of a hydraulic machine

A large force is developed on a larger piston when a small effort is applied to the smaller piston.

14. Principle of a liquid in glass thermometer

Matter expands on heating and contracts on cooling.

15. Principle of calorimetry

The heat lost by a hotter body is equal to the heat gained by a cooler body, provided no heat is lost to the surroundings.

16. The principle of digital thermometer

Fluctuations in the resistance of the thermistor due to heat depends on the temperature of the object.

17. Principle of the radiation thermometer

The intensity of the infrared radiation emitted by a hotter object is higher than a colder object.

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18. The working principle of the solenoid is the magnetic effect of current.
 19. An electric motor is based on the principle of motor effect.
 20. Bicycle dynamo and generator are based on electromagnetic induction.
 21. The transformer is based on mutual induction.



22. Control of International Trade of Endangered Wild Fauna and Flora Act 2073

It prohibits poaching and smuggling of endangered species.

23. Environment Conservation Act 2076:

The Nepal government, local government, province administration and private sectors should plan and implement activities to reduce climate change and adapt to climate change.

24. The Pesticide Management Act 2076

The organic, vegetation, biological and chemical materials that are used to protect plants, agricultural products, forest, forest products, living beings, livestock, human health, storage, packaging and construction works from any harmful diseases, insects, mites, nematode, weed, grass and rodents are called pesticides.

25. Principle of homogeneity

An equation is unit-wise correct if the units of the various terms on the right-hand side and the left-hand side of the equation are the same.



Full forms

1. DNA : Deoxyribonucleic acid
2. RNA : Ribonucleic acid
3. IVF : In-vitro fertilization
4. IUPAC : International Union of Pure and Applied Chemistry
5. BHT : Butylated hydroxytoluene
6. DDT : Dichlorodiphenyltrichloroethane
7. BHC : Benzene Hexachloride
8. PCI : Percutaneous Coronary Intervention
9. DAC : Digital to Analogue Converter
10. ADC : Analogue to Digital Converter
11. AI : Artificial insemination

- 12. AC : Alternating current
- 13. DC : Direct current
- 14. LASIK : Laser-Assisted in Situ Keratomileusis
- 15. TIR : Total internal reflection
- 16. SLR : Single Lens Reflector
- 17. LPG : Liquefied Petroleum Gas
- 18. emf : Electromotive force
- 19. pd : potential difference

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- 20. RBC : Red blood cells
 - 21. WBC : White blood cells
 - 22. BHA : Butylated hydroxyanisole
 - 23. Bit : Binary digit
 - 24. KB : kilobyte
 - 25. MB : Megabyte
 - 26. GB : Gigabyte
 - 27. TB : Terabyte
 - 28. ICT : Information and Communication Technology
 - 29. m-RNA : Messenger-RNA
 - 30. t-RNA : Transfer-RNA



Formula

$$1. \quad F = \frac{Gm_1m_2}{d^2}$$

$$2. \quad g = \frac{GM}{R^2}$$

$$3. \quad \frac{g}{g'} = \left(\frac{R+h}{R}\right)^2$$

$$4. \quad F = \frac{GMm}{d^2}$$

$$5. \quad h = ut + \frac{1}{2}gt^2$$

$$6. \quad \frac{F_1}{A_1} = \frac{F_2}{A_2}$$

$$7. \quad \frac{\text{Primary turns}}{\text{Secondary turns}} = \frac{\text{Primary voltage}}{\text{Secondary voltage}} \quad \therefore \frac{N_p}{N_s} = \frac{V_p}{V_s}$$

$$8. \quad W = mg$$

$$9. \quad F = \frac{GMm}{R^2}$$

$$10. \quad g = \frac{GM}{(R+h)^2}$$

$$11. \quad g = \frac{GM'}{(R-h)^2}$$

$$12. \quad \frac{W}{W'} = \left(\frac{R+h}{R} \right)^2$$

$$13. \quad \frac{g}{g'} = \frac{W}{W'} = \left(\frac{d'}{d} \right)^2$$

$$14. \quad v = u + at$$

$$15. \quad v^2 = u^2 + 2as$$

$$16. \quad s = ut + \frac{1}{2}at^2$$

$$17. \quad s = \frac{u+v}{2} \times t$$

$$18. \quad v = u + gt$$

$$19. \quad v^2 = u^2 + 2gh$$

$$20. \quad h = \frac{u+v}{2} \times t$$

$$21. \quad h = ut + \frac{1}{2}gt^2$$

$$22. P = \frac{F}{A}$$

$$23. P_1 = P_2$$

$$24. \text{Upthrust} = \text{weight of displaced liquid}$$

$$25. \text{Upthrust} = mg = Vdg$$

$$26. \text{Upthrust} = \text{Actual weight} - \text{Unreal weight}$$

$$27. Q = m.s.dt$$

$$28. Q = m.s.(t_2 - t_1)$$

$$29. s = \frac{Q}{m(t_2 - t_1)}$$

$$30. \text{Upthrust of water} = \text{Weight of object in the air} - \text{Weight of object in water}$$

$$31. \text{Weight of the floating object} = \text{Weight of the liquid displaced}$$

$$= \text{Upthrust acting on the object}$$

32. Refractive index (μ) = $\frac{\sin i}{\sin r}$

33. Refractive index (μ) = $\frac{\text{Velocity of light in vacuum (c) or in air}}{\text{Velocity of light in medium (v)}}$

34. Power of the lens (P) = $\frac{1}{\text{Focal length in meter (f)}}$

35. $v = Hd$

36. Electrical resistance = $\frac{\text{Voltage (V)}}{\text{Current (I)}}$, Voltage = $\frac{\text{Work (W)}}{\text{Charge (Q)}}$

Charge (Q) = Current (I) X time (t)

37. Area of rectangle, Density, Velocity, Volume of cuboid, Acceleration,
Force, Pressure, Work, Power, Moment, Frequency, etc.