

## 12 TH STANDARD USES, LAWS, PROPERTIES

### 1. State coulomb's law in electrostatics.

- The electrostatic force is directly proportional to the product of the magnitude of the two point charges and is inversely proportional to the square of the distance between them.  $F \propto \frac{q_1 q_2}{r^2}$

### 2. State gauss law in electrostatics.

- The total electric flux through a closed surface  $\phi_E = \frac{Q}{\epsilon_0}$ . Here Q is the net charge enclosed by the surface.

### 3. List the properties of electric field lines.

- i. They start from positive charge and end at negative charge.
- ii. The electric field vector at a point in space is tangential to the electric field line at that point.
- iii. The electric field lines are denser in a region where the electric field has larger magnitude and less dense in region where the electric field has smaller magnitude.
- iv. No two electric field lines intersect each other.
- v. The number of electric field line is directly proportional to the magnitude of the charge.

### 4. Give the applications and disadvantage of capacitors

#### Applications of capacitors

- i. Flash capacitors are used in digital camera.
- ii. It is used in heart defibrillator to retrieve the normal heart function during cardiac arrest.
- iii. Capacitors are used in the ignition system of automobile engines to eliminate sparking
- iv. Capacitors are used to reduce power fluctuations in power supplies and to increase the efficiency power transmission.

#### Disadvantage of capacitors

1. Even after the battery or power supply is removed, the capacitor stores charges and energy for some time. It causes unwanted electric shock.

### 5. Give the microscopic form of ohm's law.

- i. Current density is directly proportional to the applied electric field.
- ii.  $\vec{J} = \sigma \vec{E}$  here  $\vec{J}$  – current density  $\sigma$  - Conductivity  $\vec{E}$  – Electric field

### 6. Give the macroscopic form of ohm's law.

- i. The macroscopic form ohm's law is  $V = IR$
- ii. Here 'V' potential difference, 'Current and 'R' - Resistance

### 7. Kirchhoff's first rule (current rule or junction rule)

- i. It states that the algebraic sum of the currents at any junction of a circuit is zero(i.e)  $\sum I = 0$

### 8. State Kirchhoff's second rule (voltage rule (or) loop rule).

- i. It states that in a closed circuit the algebraic sum of the products of the current and resistance of each part of the circuit is equal to the total emf included in the circuit.  $\sum I R = \sum \epsilon$

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9. State joule's heating law.

- ❖ Heat liberated by Joule's heating effect  $H = I^2 R t$
- ❖ The heat developed in an electrical circuit due to the flow of current varies directly to
  - (i) The square of the current ( $H \propto I^2$ )
  - (ii) The resistance of the circuit ( $H \propto R$ )
  - (iii) The time of flow ( $H \propto t$ )

10. What is Seebach effect?

- ❖ In a closed circuit consisting of two dissimilar metals, when the junctions are maintained at different temperatures an emf (potential difference) is developed. This phenomenon is called Seebach effect.

11. What is Thomson effect?

- ❖ If two points in a conductor are at different temperatures the density of electrons at these points will differ and as a result the potential difference is created between these two points.
- ❖ Hence heat is evolved or absorbed throughout the conductor. This is called Thomson effect.

12. What is Peltier effect?

- ❖ When an electric current is passed through a circuit of a thermocouple, heat is evolved at one junction and absorbed at the other junction. This is known as Peltier effect.

13. State the applications of Seebach effect.

- ❖ Seebach effect is used in thermos electric generators. These generators are used in power plants to convert waste heat into electricity.
- ❖ It is used in automobiles as automotive thermoelectric generators for increasing fuel efficiency.
- ❖ It is used in thermocouples and thermopiles to measure the temperature difference between the two objects.

14. State coulomb's inverse law of magnetism.

- ❖ The force of attraction or repulsion between two magnetic poles is  
Directly proportional to the product of their pole strengths  
Inversely proportional to the square of the distance between them.
- ❖  $\vec{F} = k \frac{q_{m_A} q_{m_B}}{r^2} \hat{r}$

15. State tangent law.

- ❖ When a magnetic needle or magnet is freely suspended in two mutually perpendicular uniform magnetic fields, it will come to rest in the direction of the resultant of the two fields.
- ❖  $B = B_H \tan \theta$

16. What is Meissner effect?

- ❖ The expulsion of magnetic flux from a dia magnetic material during its transition to the super conducting state.

17. Define curie's law.

- ❖ Magnetic susceptibility of paramagnetic material decreases with increase in temperature.
- ❖  $\chi_m \propto \frac{1}{T}$ . This relation is called Curie's law.

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### 18. State right hand thumb rule.

- ❖ If we hold the current carrying conductor in our right hand.
- ❖ The thumb points the direction of current flow
- ❖ The fingers encircling the conductor point the direction of the magnetic field lines produced.

### 19. State Maxwell's right hand cork screw rule.

- ❖ If we rotate a right handed screw using a screw driver.
- ❖ The direction of current is same as the direction in which screw advances.
- ❖ The direction of rotation of the screw gives the direction of the magnetic field.

### 20. What are the limitations of cyclotron?

- ❖ The speed of the ion is limited
- ❖ Electron cannot be accelerated.
- ❖ Uncharged particles cannot be accelerated.

### 21. State Fleming's Left Hand rule.

- ❖ Stretch out forefinger, the middle finger and the thumb of the left hand such that they are in three mutually perpendicular directions.
- ❖ Forefinger – direction of magnetic field
- ❖ Middle finger – direction of the electric current
- ❖ Thumb – direction of the force experienced by the conductor

### 22. Give properties of magnetic field lines

- ❖ Magnetic field lines are continuous closed curves.
- ❖ The direction of magnetic field lines is from North pole to South pole outside the magnet and South pole to North pole inside the magnet.
- ❖ The direction of magnetic field at any point on the curve is known by drawing tangent to the magnetic field lines at that point.
- ❖ Magnetic field lines never intersect each other.
- ❖ The magnetic field is strong where magnetic field lines are crowded and weak where magnetic field lines are separated.

### 23. List the properties of dia, para, ferro magnetic materials

	dia magnetic materials	para magnetic materials	ferro magnetic materials
1	Magnetic susceptibility is negative.	Magnetic susceptibility is positive and small.	Magnetic susceptibility is positive and large.
2	Relative permeability is slightly less than unity.	Relative permeability is greater than unity.	Relative permeability is very large.
3	The magnetic field lines are repelled or expelled by it when placed in a magnetic field.	The magnetic field lines are attracted into the paramagnetic materials when placed in a magnetic field.	The magnetic field lines are strongly attracted into the ferromagnetic materials when placed in a magnetic field.
4	Susceptibility is temperature independent.	Susceptibility is inversely proportional to temperature.	Susceptibility is inversely proportional to temperature.
5	Examples : bismuth, Copper and Water	Example : Aluminium , Platinum, Chromium	Example : Iron, Cobalt and Nickel.

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### 24. State Biot Savat law.

According to Biot savart law, the magnitude of magnetic field  $\vec{dB}$  is

- i. Directly as the strength of the current ( $I$ )
- ii. Directly as the magnitude of the length of the element ( $\vec{dl}$ )
- iii. Directly as the sine of the angle ( $\theta$ ) between  $\vec{dl}$  and  $\hat{r}$
- iv. Inversely as the square of the (i.e)  $dB = \frac{\mu_0 I dl \sin \theta}{4\pi r^2}$
- v. In a vector form,  $\vec{dB} = \frac{\mu_0 I dl \times \hat{r}}{4\pi r^2}$

### 25. Write faraday's laws of electromagnetic induction?

- ❖ First law : Whenever magnetic flux linked with a closed circuit changes, an emf is induced in the circuit.
- ❖ Second law : The magnitude of induced emf in a closed circuit is equal to the time rate of change of magnetic flux linked with the circuit. (i.e)  $\mathcal{E} = \frac{d\phi_B}{dt}$

### 26. State Len's law

- ❖ The direction of the induced current always opposes the cause responsible for its production. (i.e)  $\mathcal{E} = - \frac{d\phi_B}{dt}$

### 27. State Fleming's right hand rule.

- ❖ Stretch out forefinger, the thumb and the middle finger of the right hand such that they are in three mutually perpendicular directions.
- ❖ Forefinger – direction of magnetic field
- ❖ Thumb – direction of the motion of the conductor
- ❖ Middle finger – direction of the induced current

### 28. Mention the ways of producing induced emf.

- i. By changing the magnetic field ( $B$ )
- ii. By changing the area ( $A$ ) of the coil and
- iii. By changing the relative orientation ( $\theta$ ) of the coil with magnetic field

### 29. What are the advantage of three phase ac generator?

Three phase AC generator has

- i. Higher power output.
- ii. Smaller in size.
- iii. Transmission system is cheaper.

### 30. Mention the various energy losses in a transformer. How it is minimized?

S.NO.	Name of losses	Source of losses	Method to minimize
1	Iron loss (i) Hysteresis loss	Transformer core is magnetized and demagnetized repeatedly.	Using steel of high silicon content in making transformer core.
	(ii) Eddy loss	Alternating magnetic flux in the core induces eddy currents in it.	Using very thin laminations of transformer core.
2	Copper loss	When an electric current flows through windings, some amount of energy is dissipated due to Joule heating.	Using wires of larger diameter.

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3	Flux leakage	The magnetic lines of primary coil are not completely linked with secondary coil.	Winding coils one over the other.
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### 31. What are advantages and disadvantages of ac over dc?

#### Advantages

- i. The generation of AC is cheaper than that of DC.
- ii. The transmission losses are small compared to DC transmission.
- iii. AC can easily be converted into DC with the help of rectifiers.

#### Disadvantages

- i. Alternating voltages cannot be used for certain applications.
- ii. At high voltages, it is more dangerous to work with AC and DC.

### 32. What are Fraunhofer lines?

- ❖ The dark lines in the solar spectrum are known as Fraunhofer lines.

### 33. What down the integral form of modified Amper's circuital law.

- ❖ Maxwell modified Ampere's law as  $\oint \vec{E} d\vec{l} = \mu_0 I = \mu_0 (i_c + i_d)$
- ❖ Here  $I = i_c + i_d$  Where  $I$  Total current  $i_c$  conduction current  $i_d$  Displacement current

### 34. Write notes on gauss's law in magnetism.

- ❖  $\oint \vec{B} d\vec{A} = 0$
- ❖ The surface integral of magnetic field over a closed surface is zero
- ❖ This equation implies that the magnetic lines of force form a continuous closed path. It means that no isolated magnetic monopole exists in nature.

### 35. Write notes on ampere-Maxwell law.

- ❖  $\oint \vec{B} d\vec{l} = \mu_0 i_c + \mu_0 \epsilon_0 \frac{d}{dt} \oint_s \vec{E} d\vec{A}$
- ❖ This law relates the magnetic field around any closed path to the conduction current and displacement current through that path.

### 36. What are the uses of (i) IR radiation (ii) microwaves and (iii) UV radiation.

- ❖ IR radiation
  - i. It is used to provide electrical energy to satellites.
  - ii. It is used to produce dehydrated fruits.
- ❖ Microwaves
  - i. It is in microwave oven for cooking.
  - ii. It is used in very long distance wireless communication through satellites.
- ❖ UV radiation.
  - i. It is used in the study of molecular structure
  - ii. It is used to destroy bacteria and sterilizing the surgical instruments.

### 37. Write any three applications of eddy currents.

#### Eddy current brake :

- ❖ Strong electromagnets are fixed just above the rails. To stop the train, electromagnets are switched on.
- ❖ The magnetic field of these magnets induces eddy currents in the rails which oppose or resist the movement of the train.

#### Eddy current testing

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- ❖ Find defects like surface cracks, air bubbles present in a specimen. A coil of insulated wire is given an alternating electric current.
- ❖ When this coil is brought near the test surface, eddy current is induced in the test surface defects causes the change in phase and amplitude of the eddy current.
- ❖ Electromagnetic damping:
- ❖ The armature of the galvanometer coil is wound on a soft iron cylinder.
- ❖ Relative motion between the soft iron cylinder and the radial magnetic field induces eddy current in the cylinder. The damping force due to eddy current brings the armature to rest immediately.

### 38. State Huygen's principle?

- Each point on the wavefront behaves as the source of secondary wavelets spreading out in all directions with the speed of the wave. These are called as secondary wavelets.
- The envelope to all these wavelets gives the position and shape of the new wavefront at a later time.

### 39. State Malus's law.

- ❖ When a beam plane polarized light of intensity  $I_0$  is incident on an analyser, the intensity of light transmitted from the analyser varies directly as the square of the cosine of the angle between the transmission axes of polarizer and analyser.  $I = I_0 \cos^2 \theta$

### 40. State Brewster's law.

- ❖ The tangent of the polarizing angle for a transparent medium is equal to its refractive index.  $n = \tan i_p$

### 41. Write uses of polaroids.

Polaroids are

- i. Used in goggles and cameras to avoid glare of light.
- ii. Used to take 3D pictures. Example: Holography.
- iii. Used to improve contrast in old oil painting.
- iv. Used in optical stress analysis.
- v. Used as window glasses to control the intensity of incoming light.
- vi. Used in liquid crystal display.

### 42. Write the characteristics of photons

- i. Each photon will have energy  $E = h\nu$
- ii. The energy of a photon is determined by the frequency of the radiation.
- iii. The photons travel with the speed of light.
- iv. They are unaffected by electric and magnetic fields.
- v. When a photon interacts with matter, the total energy and angular momentum are conserved.

### 43. Give the application of photocells

- i. It is used as switches and sensors.
- ii. Automatic lights that turn on when it gets dark use photocells.
- iii. They are used for reproduction of sound in motion pictures.
- iv. Street lights that switch on and off according to whether it is night or day.
- v. They are used as timers to measure the speeds of athletes during a race.



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- vi. They are used to measure the intensity of the given light in photography.
- 44. Explain the applications of x-rays.**
- It is used to detect fractures, foreign bodies in Medical diagnosis.
  - It is used to cure malignant tumours.
  - It is used to check for flaws in welded joints, tennis balls.
  - It is used for detection of contraband goods in custom.
  - It is used to study the structure of the crystalline materials.
- 45. State the laws of photoelectric effect.**
- For a given frequency of incident light, the number of photoelectrons emitted is directly proportional to the intensity of incident light.
  - Maximum kinetic energy of the photo electrons is independent of intensity of the incident light.
  - Maximum kinetic energy of the photo electrons is directly proportional to the frequency of incident light.
  - For a given surface, the emission of photoelectrons takes place only if the frequency of incident light is greater than a certain minimum frequency called threshold frequency.
  - There is no time lag between incidence of light and ejection of photoelectrons.
- 46. What are the properties of neutrino?**
- It has zero charge.
  - It has an antiparticle called anti neutrino.
  - It has very small mass.
  - It interacts weakly with matter.
- 47. What are the properties of nuclear force?**
- The strongest force in nature.
  - Very short range of force.
  - It is an attractive force.
  - Nuclear force is same for (n-n),(p-p),(p-n)
  - It doesn't act on electrons.
- 48. What are the properties of cathode rays?**
- Possess energy and momentum.
  - Travel in a straight line.
  - Can be deflected by both electric and magnetic fields.
  - They produce heat when they fall on matter.
  - They affect photographic plates.
  - They produce fluorescence.
  - They produce X-rays when they fall on material of high atomic weight.
  - Ionize the gas through which they pass.
- 49. Write down the properties of neutron.**
- They are stable inside the nucleus.
  - Outside the nucleus it decays with a half life of 13 minutes.
  - They are neutral in charge.

Types	Kinetic energy
Slow neutron	0 to 1000 eV
Fast neutron	0.5 MeV to 10 MeV
Thermal neutron	0.025 eV (in thermal equilibrium)

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### 50. State the postulates of Bohr atom model

- i. The centripetal force for the electron is given by coulomb force.
- ii. The angular momentum of electron  $L = \frac{nh}{2\pi}$
- iii. Electron can jump from one orbit to other by absorbing or emitting a photon.

### 51. Drawback of Rutherford atom model.

- i. The model fails to explain the distribution of electron around the nucleus and also the stability of the atom.
- ii. Accelerated charges emit electromagnetic radiations. Due to this, it undergoes spiral motion and fall into the nucleus.
- iii. According to this model, radiation from the atom must be continuous spectra, but experiments shows that it emits line spectra.

### 52. Give the uses of Zenor diode.

- i. As voltage regulators
- ii. In calibrating voltages
- iii. In providing fixed reference voltage for biasing.
- iv. In protecting any gadget against damage from excessive voltage.

### 53. Give the Barkhausen conditions for sustained oscillations.

- i. Feedback should be positive.
- ii. The loop phase shift must be  $0^\circ$  or integral multiples of  $2\pi$ .
- iii. The loop gain must be *unity*  $|A\beta| = 1$

### 54. Give the applications of oscillators.

- i. To generate periodic sinusoidal or non sinusoidal wave forms.
- ii. To generate RF carriers and audio tones.
- iii. To generate clock signal in digital circuits.
- iv. As sweep circuits in TV sets and CRO.

### 55. What are the types of propagation?

- i. Ground wave propagation.
- ii. Sky wave propagation
- iii. Space wave propagation

### 56. Write the advantages and limitation of amplitude modulation(AM)

#### Advantages

- i. Easy transmission and reception.
- ii. Lesser bandwidth requirements.
- iii. Low cost.

#### limitation of AM

- i. Noise level is high.
- ii. Low efficiency.
- iii. Small operating range.

### 57. Write the advantages and limitations of frequency modulation(FM)

#### Advantages

- i. There is a large decrease in noise.
- ii. The operating range is quite larger.
- iii. The transmission efficiency is very high.



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- iv. FM radio has better quality compared to AM radio.

limitation of AM :

- i. FM requires a much wider channel.
- ii. FM transmitters and receivers are more complex and costly.
- iii. In FM reception, less area is covered compared to AM.

**58. List the applications of radar**

- i. In military, it is used for locating and detecting the targets.
- ii. It is used in navigation systems such as ship borne surface search, air search and missile guidance systems.
- iii. It is used in meteorological observations.
- iv. It is employed to locate and rescue people in emergency situations.

**59. Write merits and demerits of fiber optic communication.**

- i. Fiber cables are very thin and weigh less than copper cables
- ii. This system has much larger bandwidth.
- iii. This system is immune to electrical interferences.
- iv. Fiber optic cables are cheaper than copper cables.

**60. Give the applications of satellite communication.**

Applications :

- I. Weather satellites:
- II. Communication satellites
- III. Navigation satellites

**61. Give the application of LED**

- i. Indicator lamps in scientific equipments.
- ii. Seven-segment displays.
- iii. Traffic signal, emergency vehicle lighting etc.
- iv. Remote control of television, air conditioner etc.

**62. Give the application of photodiode**

- i. Alarm system
- ii. Count items on a conveyor belt.
- iii. Photoconductors.
- iv. Compact disc player, smoke detectors
- v. Medical applications such as detectors for computed tomography etc.

**63. Give the application of solar cell**

- i. Calculators, watches, toys, portable power supplies etc
- ii. Satellites and space applications.
- iii. Solar panels are used for commercial production of electricity.

**64. State De Morgan's theorem**

- i. The complement of the sum of two logical inputs is equal to the product of its complements.  $\overline{A + B} = \overline{A} \cdot \overline{B}$
- ii. The complement of the product of two logical inputs is equal to the sum of its complements.  $\overline{AB} = \overline{A} + \overline{B}$

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### 65. Write the merits of fiber optic Communication

- i. Fiber cables are very thin and weigh less than copper cables.
- ii. This system has much larger bandwidth hence its information carrying capacity is larger.
- iii. It is immune to electrical interferences.
- iv. It is cheaper than copper cables.

### 66. Mention advantages and disadvantages of Robotics

#### Advantages of Robotics :

- i. The robots are much cheaper than humans
- ii. Robots never get tired like humans
- iii. Stronger and faster than humans.
- iv. In warfare, robots can save human lives.

#### Disadvantages of Robotics :

- i. Robots have no sense of emotions or conscience.
- ii. They lack empathy.
- iii. Unemployment problem will increase.
- iv. Humans cannot be replaced by robots in decision making.

### 67. Distinguish between Coulomb force and Gravitational force.

S.no	coulomb force	Gravitational force
1	It acts between two charges.	It acts between two masses.
2	It can be attractive or repulsive.	It is always attractive.
3	It is always greater in magnitude.	It is always lesser in magnitude
4	It depends on the nature of the medium.	It is independent of the medium.

### 68. Distinguish between drift velocity and mobility.

S.no	drift velocity	mobility.
1	The average velocity acquired by the electrons inside the conductor when it is subjected to an electric field.	The magnitude of the drift velocity per unit electric field.
2	Its unit is $\text{m s}^{-1}$	Its unit is $\text{m}^2\text{V}^{-1}\text{s}^{-1}$

### 69. Distinguish step-up and step -down transformer

S.no	step-up transformer	step -down transformer
1	Increases potential difference.	Decreases potential difference.
2	Decreases current.	Increases current
3	Number of turns in secondary is high.	Number of turns in secondary is low
4	Voltage transformation ratio (K) is greater than 1.	Voltage transformation ratio (K) is lesser than 1

**12 TH STANDARD USES, LAWS, PROPERTIES****70. Distinguish between Mirage and Looming**

S.no	Mirage	Looming
1	In hot places, air near the ground is hotter than air at a height.	In cold places, air near the ground is colder than air at a height.
2	Refractive index of air increases with height.	Refractive index of air decreases with height.
2	Due to total internal reflection, observer feels as if the object is getting reflected by wet surface beneath the object.	Due to total internal reflection, inverted image is formed little above the surface.

**71. Distinguish between Law of reflection and refraction.**

S.no	Laws of reflection	Laws of refraction (Snell's law)
1	The incident ray, reflected ray and normal to the reflecting surface are all coplanar.	The incident ray, refracted ray and normal to the refracting surface are all coplanar.
2	Angle of incidence = Angle of reflection $i = r$	$n_1 \sin i = n_2 \sin r$

**72. Distinguish between interference and diffraction.**

S.no	interference	diffraction.
1	Equally spaced bright and dark fringes	Central bright is double the size of other fringes.
2	Equal intensity for all bright fringes.	Intensity falls rapidly.
3	Large number of fringes are obtained.	Less number of fringes are obtained.

**73. Distinguish between Fresnel and Fraunhofer diffraction.**

S.no	Fresnel diffraction.	Fraunhofer diffraction.
1	Spherical (or) cylindrical wave front undergoes diffraction.	Plane wave front undergoes diffraction
2	Light wave is from a source at finite distance	Light wave is from a source at infinity
3	Convex lenses are not used	Convex lenses are used
4	Difficult to observe and analyse	Easy to observe and analyse

**74. Distinguish intrinsic semiconductor and extrinsic semiconductor.**

S.no	intrinsic semiconductor	extrinsic semiconductor
1	Pure form of semiconductor without impurity. Eg. Pure Si and Pure Ge	Impurity add semiconductor
2	The number of electrons in the conduction band is equal to the number of holes in the valence band	The number of electrons in the conduction band is not equal to the number of holes in the valence band
3	Electrical conductivity is less.	Electrical conductivity is high.

**75. Distinguish between donor and acceptor impurities.**

S.no	Donor impurities.	acceptor impurities.
1	Pentavalent (Group V) impurity atom.	Trivalent (Group III) impurity atoms.
2	Donate electrons to the conduction band	Accept electrons from the neighbouring atoms.
3	Eg : Phosphorous, Arsenic, Antimony	Eg : Boron , Aluminium , Gallium

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**76. Distinguish between Zener breakdown, Avalanche breakdown.**

S.no	Zener breakdown	Avalanche breakdown
1	Heavily doped p-n junction	Lightly doped p-n junction.
2	Narrow depletion region.	Wide depletion region
3	It occurs due to strong electric field	It occurs due to thermally generated minority charge carriers.

**77. Distinguish between polar and non – polar molecules.**

S.no	POLAR MOLECULES	NON- POLAR MOLECULES
1	A polar molecules is one in which the centers of the positive and the negative charges are separated even in the absence of an electric field.	A Non-polar molecules is one in which the centers of the positive and the negative charges coincide.
2	They have a permanent dipole moment.	They have no permanent dipole moment.
3	Examples : $N_2O, H_2O, HCl, NH_3$	Examples : $O_2, H_2, CO_2$

**78. What is corona discharge or action at points?**

Leakage of electric charges from the sharp edge of the charged conductor is called corona discharge.

**79. Why is it safer to be inside a car than standing under a tree during lightning?**

1. The metal body of the car provides electrostatic shielding, since the electric field inside is zero.
2. During lightning the electric discharge passes through the body of the car.

**80. Why nichrome is used as heating element in electric heaters?**

- i. high specific resistance
- ii. High melting point
- iii. It can be heated to very high temperature without Oxidation.

**81. How the current sensitivity of a Galvanometer can be increased?**

- i. By increasing the number of turns (N)
- ii. By increasing the magnetic induction(B)
- iii. By increasing the area of the coil (A)
- iv. By decreasing the couple per unit twist of the suspension wire.

**82. What is the conditions for total internal reflection.**

- i. Light must travel from denser to rarer medium.
- ii. Angle of incidence in the denser medium must be greater than critical angle. ( $i > i_c$ )

**83. What are the conditions for obtaining clear and broad interference fringes?**

**84. What is an electric dipole? Define electric dipole moment?**

- ❖ Two equal and opposite charges separated by a small distance constitute an electric dipole. (e.g) water, ammonia
- ❖ The magnitude of the electric dipole moment is equal to the product of the magnitude of one of the charges and the distance between them.  $|\vec{P}| = q \cdot 2a$

**85. Define Q factor**

- ❖ It is defined as the ratio of voltage across L or C at resonance to the applied voltage.
- ❖ Q factor =  $\frac{\text{Voltage across L or C at resonance}}{\text{Applied voltage}}$

**12 TH STANDARD USES, LAWS, PROPERTIES****86. Define electrostatic shielding.**

- The electric field inside the charged spherical shell is zero.
- A sensitive electrical instrument which is to be protected from external electrical disturbance is kept inside the cavity of a charged conductor. This is called electrostatic shielding.(e.g) Faraday cage.

**87. Define electric flux. Give its unit.**

- The number of electric field lines crossing a given area kept normal to the electric field lines is called electric flux
- Its unit is  $\text{Nm}^2\text{C}^{-1}$

**88. What is rectification?**

- The process of converting AC into DC (alternating current into direct current)

**89. Define work function.**

- The minimum energy needed for an electron to escape from the metal surface is called work function of that metal. unit is eV.

**90. Define stopping potential.**

- The negative or retarding potential given to collecting electrode which is just sufficient to stop the most energetic photoelectrons emitted and make the photocurrent zero is called stopping potential or cut-off potential.

**BEST OF LUCK****THE ROOTS OF EDUCATION ARE BITTER,  
BUT THE FRUIT IS SWEET**