

Class-12 : Test 1 (Electrostatics)

- 1.-What do you mean by the term electric flux ? write its unit and dimension. An electric dipole of dipole moment $20 \times 10^{-6} \text{ Cm}$ is enclosed by a closed surface what is the net flux coming out of the surface?
- 2- define the term electric dipole moment . Is it a scalar or vector quantity? If a dipole is placed in an external electric field $E=2.0 \times 10^5 \text{ N/C}$, the magnitude of each charge of the dipole is 2 C and separated by distance 10 cm , find the work done required to move the dipole from stable to unstable equilibrium .
- 3-What is electric line of force ? Draw the electric line of force b/w two charges q_1 and q_2 separated by some distance and $q_1 > q_2$. Why electric field lines always comes out normally from a conducting surface ?
- 4- State Gauss's theorem in electrostatics. Using this theorem , prove that no electric field intensity exists inside a hollow charged conducting sphere.
- 5-Two point electric charges of value q and $2q$ are kept at distance d apart from each other in air. A third charge Q is kept along the same line in such a way that the net force acting on q and $2q$ is zero . calculate the position of charge Q in terms of q and d .
- 6- state and prove Gauss's theorem , a long charged cylinder of charged density λ is surrounded by hollow co-axial conducting cylinder . What is the electric field in the space b/w the two cylinders?
- 7- A hollow charged conductor has a tiny hole cut into its surface . show that the electric field in the hole is $\sigma/2\epsilon_0$ in the outward normal direction , where σ is the surface charge density near the hole .
- 8- Using the Gauss's theorem derive the expression for electric field at a point due to long straight charged conductor of charge density λ .
- 9- two charged spherical conductors of radii a and b are connected to each other by a wire . What is the ratio of electric fields at the surface of the two spheres . use the result obtained to explain why charge density on the pointed ends of a conductor is higher than its flatter portion?
- 10-A uniform electric field $E=E_x \text{ N/C}$ towards positive X-axis for $x>0$, and $-E_x \text{ N/C}$ towards negative X-axis for $x<0$. A right circular cylinder of length $l \text{ cm}$ and radius $r \text{ cm}$ has its centre at the origin and its axis along the x-axis . Find the net outward flux , using Gauss's law , write the expression for the net charge within the cylinder.