PHYSICS CLASS XII
CHAPTER – 1 ELECTROSTATICS

Q.1. Define electric dipole moment. Write its SI units.

Ans. Electric dipole moment is equal to product of magnitude of either charge and distance between them. Its SI unit is C-m.

Q.2. In which orientation, a dipole placed in a uniform field is in (i) stable (ii) unstable equilibrium ?

Ans. If θ is angle between $\vec{p}$ and $\vec{E}$, then $\theta = 0^{\circ}$ for stable equilibrium, $\theta = 180°$ for unstable equilibrium.

Q.3. Name any four vector fields.

Ans. Electric field, magnetic field, gravitational field and flow field (of a liquid) are vector fields.

Q.4. How does a free electron at rest move in an electric field ?

Ans. A free electron at rest will move in a direction opposite to electric field.

Q.5. Four charges of same magnitude and same sign are placed at a corners of a square, of each side 0-1 m. What is electric field intensity at the centre of the square?

Ans. Electric field intensity at the centre of the square will be zero.

Q.6. Force experienced by an electron in an electric field $\vec{E}$ is F newton. What will be the force experienced by a proton in the same field? Take mass of proton 1836 times the mass of an electron.

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Ans. The proton will experienced the same force, F newton, but in the opposite direction.

Q.7. What is the use of the concept of electric field intensity ?

Ans. It enables us to find force on any charge in the field, i.e.,

$$\vec{F} = q\vec{E}$$

Q.8. Why no two electric lines of force can intersect each other ?

Ans. This is because of the point of intersection, we can draw two tangents to the two lines of force. This would mean two directions of electric field intensity at the point of intersection, which is not possible.

Q.9. Why do we obtain a neutral point in the space between two like charges ?

Ans. This is because net electric field intensity at this point is zero, the intensities due to two charges being equal and opposite.

Q.10. What does $(q_1 + q_2) = 0$ signify ?

Ans. $q_1 + q_2 = 0, q_1 = -q_2$. Such a system of point charges is called an electric dipole. It is a pair of equal and opposite point charges separated by a small distance.

Q.11. An electric dipole is placed at rest in a uniform electric field, and released. How will it move ?

Ans. A torque will develop and align the electric dipole in the direction of the electric field. If the dipole is not aligned already. The dipole shall not move as net force on the dipole is zero.

Q.12. Define the term electric dipole moment. Is it scalar or vector ?

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Ans. Electric dipole moment (p) is the product of either charge (±q) and the distance (2 a) between the charges., i.e., p = q(2 a). It is a vector quantity, directed from – q to + q.

Q.13. Define electric field at a point.

Ans. Electric field intensity at a point is the force experienced by unit positive charge held at that point. Its direction is along which the unit positive charge would move, if free to do so.

Q.14.

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