WS-1/CLASS-12/PHYSICS

Unit-1

ELECTRIC CHARGES AND FIELDS

1.Two charges of equal magnitudes kept at a distance r exert a force F on each other. If the charges are halved and distance between them is doubled, then the new force acting on each charge is

(a) $\frac{F}{8}$ (b) $\frac{F}{4}$

(c) $4F$ (d) $\frac{F}{16}$

2.The electric field inside a spherical shell of uniform surface charge density is
(a) zero.
(b) constant, less than zero.
(c) directly proportional to the distance from the centre.
(d) none of the these

3.An electric dipole with dipole moment 4×10^{-9} C m is aligned at 30° with the direction of a uniform electric field of magnitude 5×10^{4} NC–1 . Calculate the magnitude of the torque acting on the dipole.

4.A hollow conducting sphere of radius 8cm is given a charge 16μC.What is the electric field intensity i) at the centre of the sphere ii) on the outer surface of the sphere and iii) at a distance of 16cm from the centre of the sphere?

5. Is the force acting between two point charges q1 and q2 kept at some distance apart in air attractive or repulsive when i) q1 q2 > 0 ii) q1 q2 < 0 ?

6. If the distance between two equal point charges is doubled and their individual charges are also doubled ,what would happen to the force between them ?

7. Do the electrostatic field lines form closed loops?

8. A hollow metal sphere of radius 5cm is charged such that the potential on its is 10V. What is the electric field at the centre of the sphere.

9.Two concentric metallic spherical shells of radii R and 2R are given charges Q_1 and Q_2 respectively. The surface charge densities on the outer surface charge densities on the outer surfaces of the shells are equal. Determine the ratio $Q_1 : Q_2$.

10.An infinitely long positively charged straight wire has a linear charge density λcm^{-1}.An electron is revolving around the wire as its centre with constant velocity in a circular plane perpendicular to the wire. Deduce the expression for its kinetic energy.Plot a graph of the kinetic energy as a function of charge density λ