CLASS-12-PHYSICS WORKSHEET -1

CHAPTER-1

ELECRTIC CHARGES AND FIELDS

1. An infinite line charge produces a field of 9 x 104   N/C at a distance of 2cm. Calculate the linear charge density.

2. Four point charges qA = 2 µC, qB = –5 µC, qC = 2 µC, and qD = –5 µC are located at the corners of a square ABCD of side 10 cm. What is the force on a charge of 1 µC placed at the centre of the square?

3. Three small identical conducting spheres have charges –3 × 10^{-12} C, 8 × 1010^{-12} C and 4 × 1010^{-12} C respectively. They are brought in contact and then separated. Calculate (i) charge on each sphere after separation (ii) number of electrons in excess or deficit on each sphere after separation .

4. A point charge +q is placed at the origin. A second point charge +9q is placed at (d,0,0) in Cartesian coordinate system. The point in between them where the electric field vanishes is:

5. 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?

6. Four charges of -2q, q, -q and 2q are at the corners of a square ABCD ,of side 20cm, find the magnitude and the direction of the electric field at the centre of the square. Take q = 5 mc

7. A point charge causes an electric flux of -1.0 × 10^3 Nm^2 C^{-1} to pass through a spherical Gaussian surface of 10.0 cm radius centred on the charge.
(a) If the radius of the Gaussian surface were doubled, how much flux would pass through the surface?
(b) What is the value of the point charge?

8. A conducting sphere of radius 10 cm has an unknown charge. If the electric field 20 cm from the centre of the sphere is 1.5 × 10^3 N C^{-1} and points radially inward. What is the net charge on the sphere?

9. An oil drop of 12 excess electrons is held stationary under a constant electric field of 2.55 × 10^4 N C^{-1} in Millikan's oil drop experiment. The density of the oil is 1.26 g cm^{-3}. Estimate the radius of the drop.
(g = 9.81 m s^{-2}; e= 1.6 × 10^{-19} C)

10. (a) Two insulated charged copper spheres A and B have their centres separated by a distance of 50 cm. What is the mutual force of electrostatic repulsion if the charge on each is 6.5 × 10^{-7} C ? The radii of A and B are negligible compared to the distance of separation.
(b) What is the force of repulsion if each sphere is charged double the above amount, and the distance between them is halved?