

Sri Pratyangira Institute

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Class - 12th

Electric Charges and Fields

DPP – 02

Topics:

- Coulomb's Law of electric force
- Dielectric constant/Relative Permittivity

1. Obtain the dimensional formula of ϵ_0 .
2. Find the ratio of the Electric and Gravitation forces b/w the two electrons when they are 1 mm apart.
3. In a medium the force of attraction between two point electric charges, distance d apart is F . What distance apart should these be kept in the same medium so that the force between them becomes $3F$?
4. Two point charges placed at a distance r in air exert a force F on each other. At what distance will these charges experience the same force F in a medium of dielectric constant κ ? **[PMT AP 90]**
5. Two identical metallic spheres A and B , each carrying a charge q , repel each other with a force F . A third metallic sphere C of the same size, but uncharged, is successively made to touch the spheres A and B , and then removed away. What is the force of repulsion between A and B ?
6. A small brass sphere having a positive charge of 1.7×10^{-8} C is made to touch another sphere of the same radius having a negative charge of 3.0×10^{-9} C. Find the force between them when they are separated by a distance of 20 cm. What will be the force between them when they are immersed in an oil of dielectric constant 3?
7. The sum of two point charges is $7\mu\text{C}$. They repel each other with a force of 1 N when kept 30 cm apart in free space. Calculate the value of each charge.
8. A charge Q is to be divided on two objects. What should be the values of the charges on the two objects so that the force between the objects can be maximum?
9. Two point charges $+9e$ and $+e$ are kept at a distance a from each other. Where should we place a third charge q on the line joining the two charges so that it may be in equilibrium?
10. Two particles, each having a mass of 5 g and charge 1.0×10^{-7} C, stay in limiting equilibrium on a horizontal table with a separation of 10 cm between them. The coefficient of friction between each particle and the table is the same. Find μ .