

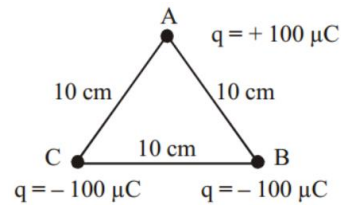
LAKSHYA (JEE)

Electric Charges and Field

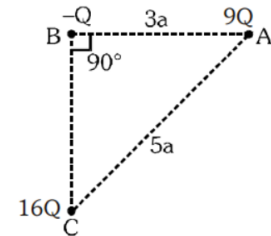
DPP-02

- Two identical metal spheres carry charges of $+q$ and $-2q$ respectively. When the spheres are separated by a large distance r , the force between them is F . Now the spheres are allowed to touch and then moved back to the same separation. Find the new force of repulsion between them.
- The electrostatic force of repulsion between two positive ions carrying equal charges is 4×10^{-9} N, when their separation is 5 \AA . How many electrons are missing from each?
- Two identical particles each of mass M and charge Q are placed a certain distance apart. If they are in equilibrium under mutual gravitational and electric force then calculate the order of Q/M in SI units.
- The force between two point charges is 100 N in air. Calculate the force if the distance between them is increased by 50% .
- Two neutral insulating small spheres are rubbed against each other and are then kept 4 m apart. If they attract each other with a force of 3.6 N, then
 - calculate the charge on each sphere, and
 - calculate the number of electrons transferred from one sphere to the other during rubbing.
- Two equal point charges $Q = +\sqrt{2}\mu\text{C}$ are placed at each of the two opposite corners of a square and equal point charges q at each of the other two corners. What must be the value of q so that the resultant force on Q is zero?
- In the given figure three point charges are situated at the corners of an equilateral

triangle of side 10 cm. Calculate the resultant force on the charge at B . What is its direction?

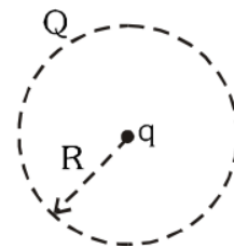


- Two positively charged particles, each of mass 1.7×10^{-27} kg and carrying a charge of 1.6×10^{-19} C are placed at a distance d apart. If each experiences a repulsive force equal to its weight, find the value of d .
- ABC is a right angled triangle. Calculate the magnitude of force on charge $-Q$.



- Charge Q of mass m revolves around a point charge q due to electrostatic attraction. Show that its period of revolution is given by

$$T^2 = \frac{16\pi^3 \epsilon_0 m R^3}{Qq}$$



ANSWERS

1. $F/8$
2. 2
3. 10^{-10}
4. 44.4 N
5. (i) 8×10^{-5} (ii) 5×10^{14}
6. $q = -\frac{1}{2} \mu\text{C}$
7. $F_{\text{net}} = 9 \times 10^3 \text{N}$ along to \overline{CA}
8. $d = 0.118 \text{ m}$
9. $F = \frac{kQ^2}{a^2} \sqrt{2}$



Note - If you have any query/issue

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