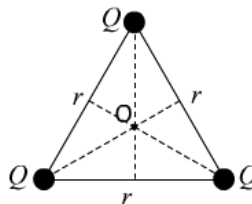
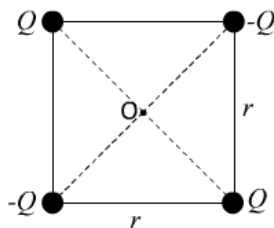


Coulomb's law and electric field

- Two charges Q_1 and Q_2 are separated by a fixed distance. If the charges are such that $Q_1 Q_2 < 0$ then choose the correct statement(s) from the following
 - Force between them should be attractive
 - Force between them should be repulsive
 - Force between them may be attractive
 - Force between them may be repulsive
- Two insulated small copper spheres A and B of identical dimensions have charges $2\mu\text{C}$ and $-6\mu\text{C}$ respectively. A third identical uncharged sphere is brought in contact first with A and then with B and then removed. Final charges on the spheres are _____
- Two point charges separated by a distance r attract each other with a force F . If the charges are doubled and the medium between them is replaced with a material of relative permittivity 4 then force between the charges would be _____
- Two insulated small copper spheres of identical dimensions having charges Q and nQ are separated by a certain distance (much larger when compared to the radius of the spheres). If they are brought in contact and then separated by the same distance again then the force of interaction between them choose the correct statement(s) from the following
 - Increases by a factor of $16/7$ if n is $+7$
 - Decreases by a factor of 16 if n is $+7$
 - Increases by a factor of $5/4$ if n is -5
 - Decreases by a factor of $4/5$ if n is -5
- In the figure given below, force acting on any one of the charges is _____

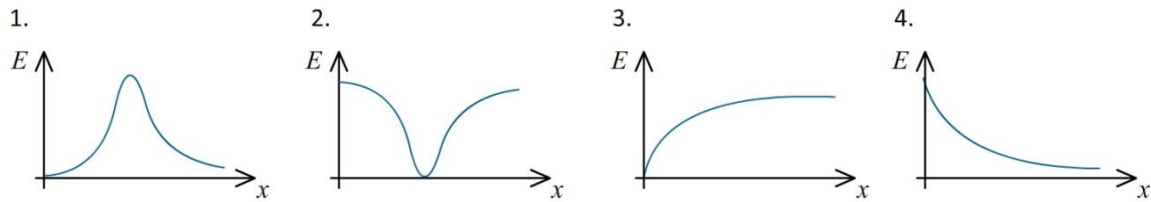
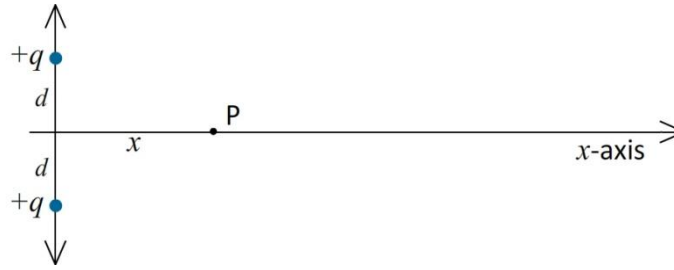


- In the figure given below, force acting on any one of the charges is _____



Electric charges and Fields

7. For the given charge distribution plot of electric field intensity as a function of x is (like point charges long the y axis)



8. Electric field intensity at the centre of a uniformly charged ring of radius 1m carrying of linear charge density $2\mu\text{C m}^{-1}$ is _____
9. Two point charges $4Q$ and Q are separated by a distance of 1m in air. Locate the point at which net electric field intensity is zero is at a distance of _____ from the larger charge
10. Two point charges of 50nC and -50nC are placed at a distance of 20cm from each other in air. Electric field intensity at the midpoint of the line joining the charges is _____

Answers

Electric charges and Fields

1. Option 1
2. $Q_A = 1\mu\text{C}$, $Q_B = -2.5\mu\text{C}$ and $Q_C = -2.5\mu\text{C}$
3. $16 F$
4. Options 1 and 4
5. $\frac{\sqrt{3}}{4\pi\epsilon_0} \left(\frac{Q^2}{r^2} \right)$
6. $\frac{1}{4\pi\epsilon_0} \frac{Q^2}{r^2} \left(\sqrt{2} - \frac{1}{2} \right)$ away from the centre
7. Graph 1
8. zero
9. $2/3 \text{ m}$
10. $9 \times 10^4 \text{ NC}^{-1}$