

Two charges 10C and 50C are separated by r units. What is the force acting on them? Please explain

Solution

This force (F) acting simultaneously on point charges (q_1) and (q_2), is given by

$$|\mathbf{F}| = k_e \frac{|q_1 q_2|}{r^2}$$

In our case

$$F = k_e \frac{10C \cdot 50C}{r^2} = 500 \frac{k}{r^2}$$

k_e is a proportionality constant.

$$\begin{aligned} k_e &= \frac{1}{4\pi\epsilon_0} = \frac{c^2 \mu_0}{4\pi} = c^2 \cdot 10^{-7} \text{H m}^{-1} \\ &= 8.987\ 551\ 787\ 368\ 176\ 4 \cdot 10^9 \text{N m}^2 \text{C}^{-2} \end{aligned}$$