Answer on Question # 74026, Physics -Electric Circuits:

Question: What is the magnitude of the force a +16μC charge exerts on a +3.3 mC charge 45 cm away?

Solution: According to Coulomb's law,

$$F = \frac{1}{4\pi\varepsilon_0}\frac{q_1 q_2}{r^2} \quad \text{.....(1)}$$

q_1 = 16 μC = 16×10^{-6} C

q_2 = 3.3 mC = 3.3×10^{-3} C

r = 45 cm = 0.45 m

ε_0 = permittivity in free space

$\frac{1}{4\pi\varepsilon_0}$ = 9×10^9 meter/Farad

Now put these values in equation (1), we get,

$F = \frac{9 \times 10^9 \times 16 \times 10^{-6} \times 3.3 \times 10^{-3}}{(0.45)^2}$ = 2346.67 N (upto two decimal place)

Answer: Magnitude of the force is 2346.67 Newton.