Answer on Question #63106-Physics-Electromagnetism

Find the potential at r1=40cm and r2=10cm from a charge Q=2 x 10^-4 and also the potential difference between these two points.

Solution

The potential at distance r is

$$V(r) = k\frac{Q}{r}$$

$$V_1 = k\frac{Q}{r_1} = (9 \cdot 10^9)\frac{(2 \cdot 10^{-4})}{0.4} = 4.5 \cdot 10^6 V$$

$$V_2 = k\frac{Q}{r_2} = (9 \cdot 10^9)\frac{(2 \cdot 10^{-4})}{0.1} = 18 \cdot 10^6 V$$

The potential difference between these two points is

$$V_2 - V_1 = 18 \cdot 10^6 - 4.5 \cdot 10^6 = 13.5 \cdot 10^6\ V.$$