Answer on Question #62975-Physics-Electromagnetism
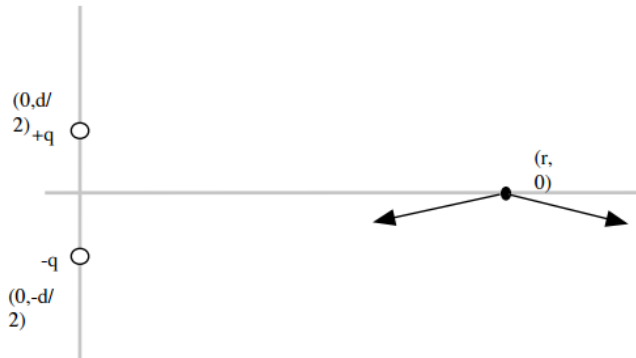
Electric dipole has opposite charge q 20 c distance 2.5 cm what is the magnitude of the electric field produced by point at distance 4cm

Solution

The dipole moment is

$$p = qd.$$

The magnitude of the electric field produced by point at distance r is

$$E = \frac{1}{4\pi\varepsilon_0}\frac{p}{r^3\left(1+\left(\frac{d}{2r}\right)^2\right)^{\frac{3}{2}}} = \frac{1}{4\pi(8.85\cdot10^{-12})}\frac{(20)(0.025)}{(0.04)^3\left(1+\left(\frac{0.025}{2(0.04)}\right)^2\right)^{\frac{3}{2}}} = 6.1\cdot10^{13}\frac{V}{m}.$$

Answer: $6.1 \cdot 10^{13}\frac{V}{m}$.