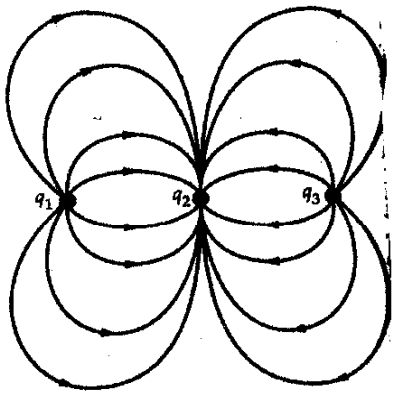
Department of Natural Sciences
Clayton College & State University

January 22, 2002

Physics 1112 – Quiz 2

Name SOLUTION

1. The electric field lines surrounding three charges are shown below. The center charge q_2 is -10.0 μC.



   a. What are the signs of q_1 and q_3?

   q_1 is positive
   q_3 is positive

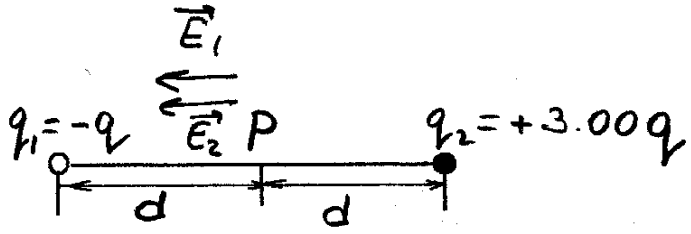
   b. Find q_1.

   $q_1 = 5.00\,\mu C$

   c. Find q_3. $q_3 = 5.00\,\mu C$

NUMBER OF EFL ENTERING OR LEAVING THE CHARGE IS PROPORTIONAL TO ITS MAGNITUDE.

2. Given that q = +12.0 μC and d = 16.0 cm, find the direction and magnitude of the net electric field at point P.



$$E_1 = k_e \frac{q_1}{d^2} = 8.99\times10^{+9}\,\frac{N m^2}{C^2}\cdot\frac{12.0\times10^{-6}\,C}{(0.16\,m)^2}$$

$$= 4214\times10^3\,N/C$$

$$= 0.4\times10^7\,N/C$$

$$E_2 = k_e \frac{q^2}{d^2} = 8.99\times10^9\,\frac{N m^2}{C^2}\cdot\frac{36.0\times10^{-6}\,C}{(0.16\,m)^2} = 12642\times10^3\,N/C$$

$$= 1.26\times10^7\,N/C$$

$$E_{TOT} = E_1 + E_2 = 1.69\times10^7\,N/C$$

WEST