Answer on Question #72572, Physics / Electric Circuits

A +2.00-nC point charge is at the origin, and a second -5.00-nC point charge is on the x-axis at x = 0.8m. A) Find the electric field (magnitude and direction) at each of the following points on the x axis. i) x-2.00m; ii) x=1.2m iii) x= -0.2m. b) Find the net electric force that the two charges would exert on an electron placed at each point in part a).

Answer:

A)$\vec{E} = \vec{E}_1 + \vec{E}_2$

$E_i = \frac{kq_1}{r_{1i}^2} - \frac{kq_2}{r_{2i}^2} = 9 * 10^9 * \left(2 * \frac{10^{-9}}{2^2} - 5 * \frac{10^{-9}}{1.2^2}\right) = -26.75 \frac{N}{C}$

$E_{ii} = \frac{kq_1}{r_{1ii}^2} - \frac{kq_2}{r_{2ii}^2} = 9 * 10^9 * \left(2 * \frac{10^{-9}}{1.2^2} - 5 * \frac{10^{-9}}{0.4^2}\right) = -268.75 \frac{N}{C}$

$E_{iii} = -\frac{kq_1}{r_{1iii}^2} + \frac{kq_2}{r_{2iii}^2} = 9 * 10^9 * \left(-2 * \frac{10^{-9}}{0.2^2} + 5 * \frac{10^{-9}}{1^2}\right) = -405 \frac{N}{C}$

Minus sign indicated that electric field is directed in negative OX direction

B)

$F_i = qE_i = 1.6 * 10^{-19} * 26.75 = 42.8 * 10^{-19} N$

$F_{ii} = qE_{ii} = 1.6 * 10^{-19} * 268.75 = 42.8 * 10^{-19} N$

$F_{iii} = qE_{iii} = 1.6 * 10^{-19} * 405 = 648 * 10^{-19} N$