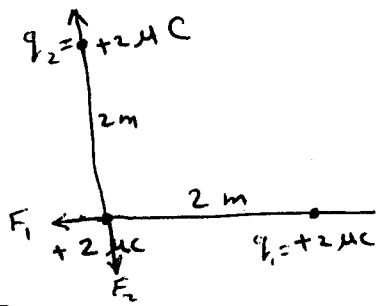
Phys102 (~~Sec # 42~~) Quiz # 6 (Ch.21&22)

Name: Key ID #

1- A 2.0 μC charge is ~~placed~~ at the origin. An identical charge is placed 2.0 m from the origin on the x-axis, and a third identical charge is placed 2 m from the origin on the y-axis. Calculate the magnitude of the force on the charge at the origin. (Ans: 1.3*10**(-2) N)



$$|F_1| = K\frac{q_1^2}{r^2} = 9\times10^9\ \frac{(2\times10^{-6})^2}{4} = 9\times10^{-3}\ N$$

$$|F_2| = 9\times10^{-3}\ N$$

$$|F_{net}| = \sqrt{F_1^2 + F_2^2} = \sqrt{1.6\times10^{-4}} = \boxed{1.3\times10^{-2}\ N}$$

2- An electron, traveling with initial velocity 10^5 i m/s, enters a region of a uniform electric field given by E = $4.0*10^3$ i N/C. Determine the time it takes for the electron to come to rest momentarily.

$$v_i = 10^5\ \frac{m}{s}$$

$$v_f = 0$$

$$a = \frac{F}{m_e} = \frac{qE}{m_e} = \frac{1.6\times10^{-19}\times4\times10^3}{9.11\times10^{-31}} = 7\times10^{14}\ \frac{m}{s^2}$$

use $v_f = v_i + at$ ($v_f = 0$)

$$t = \frac{v_i}{a} = \frac{1\times10^5}{7\times10^{14}} = \boxed{1.4\times10^{-10}}\ s.$$