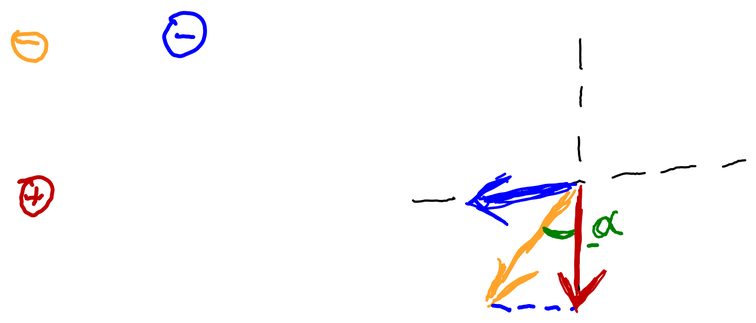

$q_1 = 5.14\times10^{-9}\,C$

$q_2 = 6\times10^{-9}\,C$

$q_3 = -3\times10^{-9}\,C$

$r_{12} = 0.325\,m$

$r_{13} = 0.1\,m$

$$F_x = 8.99\times10^{9}\,\frac{(5.14\times10^{-9})(6\times10^{-9})}{0.325^2}$$

$$F_x = 2.62\times10^{-6}$$

$$F_y = 8.99\times10^{9}\,\frac{(5.14\times10^{-9})(-3\times10^{-9})}{0.100^2}$$

$$F_y = -1.39\times10^{-5}$$

$$\alpha = \tan^{-1}\left(\frac{1.39\times10^{5}}{2.62\times10^{6}}\right)$$

$$\alpha = 79.33$$

$$\theta = 169.33$$

$$F_T = \sqrt{(2.62\times10^{-6})^2 + (-1.39\times10^{-5})^2}$$

$$F_T = 1.36\times10^{-5}$$

Q1)

$$k = 8.99\times10^{9}\,\frac{(1.6\times10^{-19})^2}{(0.0115)(2.37\times10^{-4})^3} =$$

Q5)

$$\phi_e = 2.3\times10^{4}\cdot 6\cdot 3\cdot\cos(23.9) =$$ ✓

Q11)

a) $\dfrac{(1.6\times10^{-19})(590)}{1.67\times10^{-27}} = 5.69e10$ ✓

b) $\dfrac{1.5e6}{5.65e10} = 2.65e{-5}$ ✓

c) $\Delta x = v_i t + \frac{1}{2}at^2 = \frac{1}{2}(5.65e10)(2.65e{-5})^2 = 19.8$ ✓

d) $k = \frac{1}{2}mv^2 = \frac{1}{2}(1.67e{-27})(1.5e6)^2 =$

(Q2)

$$F_x = -F_6 = -(8.99\times10^9)\frac{(6\times10^{-9})(5.14\times10^{-9})}{(0.325)^2} = -2.62e\text{-}6$$

$$F_y = -F_3 = -(8.99\times10^9)\frac{(3\times10^{-9})(5.14\times10^{-9})}{(0.100)^2} = -1.39e\text{-}5$$

$$\tan^{-1}\left(\frac{1.39e\text{-}5}{2.62e\text{-}6}\right) = 79.324$$

$$\sqrt{(2.62e\text{-}6)^2 + (1.39e\text{-}5)^2} = 1.41e\text{-}5$$