

Physics 102Rec
Quiz # 5
Chapter 23

Name: Key Id#: _____ Sect#: _____

A charge of $-4.0 \mu\text{C}$ is located at the origin, and a charge of $-5.0 \mu\text{C}$ is located along the y-axis at $y = 2.0 \text{ m}$.

- (a) At what point, other than infinity, along the y-axis is the electric field zero?
(b) What is the value of the net electric force on an electron located at the position found in part (a)?

a) The point should be between the two charges, a distance y from charge q_1 .

If $E_{\text{net}} = 0 \Rightarrow E_1 = E_2$

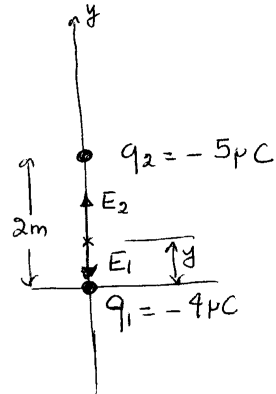
$$\frac{k|q_1|}{y^2} = \frac{k|q_2|}{(2-y)^2}$$

$$\frac{4}{y^2} = \frac{5}{(2-y)^2} \Rightarrow 4(2-y)^2 = 5y^2$$

$$2(2-y) = y\sqrt{5}$$

$$4 - 2y = \sqrt{5}y \Rightarrow y(\sqrt{5} + 2) = 4$$

$$\boxed{y = 0.94 \text{ m}}$$



b) $\vec{F} = e \vec{E}_{\text{net}}$ but $\vec{E}_{\text{net}} = 0$
 $\Rightarrow \boxed{\vec{F} = 0}$