

Physics 102Rec
Quiz#5
Chapter 22

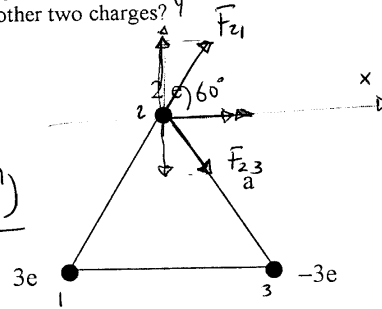
Name: Key Id#: _____ Sect#: _____

Three point charges, $2e$, $-3e$, and $3e$ (where e is the magnitude of the charge on the electron) are located at the vertices of an equilateral triangle of side $a = 5$ cm. Determine the electric force on the charge $2e$ due to the other two charges?

$$F_{21} = \frac{k |q_1| |q_2|}{r^2}$$

$$= \frac{9 \times 10^9 (3 \times 1.6 \times 10^{-19}) (2 \times 1.6 \times 10^{-19})}{(0.05)^2}$$

$$= 5.5 \times 10^{-25} \text{ N}$$



$$F_{23} = \frac{k |q_3| |q_2|}{r^2} = \frac{9 \times 10^9 (3 \times 1.6 \times 10^{-19}) (2 \times 1.6 \times 10^{-19})}{(0.05)^2}$$

$$= 5.5 \times 10^{-25} \text{ N}$$

For the net force: So $F_{21} = F_{23}$ (magnitude)

$$F_x = F_{21} \cos 60^\circ + F_{23} \cos 60^\circ = 2 F_{21} \cos 60^\circ = \underline{\underline{5.5 \times 10^{-25} \text{ N}}}$$

$$F_y = F_{21} \sin 60^\circ - F_{23} \sin 60^\circ = \underline{\underline{0}}$$

$$\vec{F}_{\text{net}} = 5.5 \times 10^{-25} \hat{i} + 0 \hat{j} \text{ (N)}$$

magnitude = $5.5 \times 10^{-25} \text{ N}$

direction: positive x-axis.