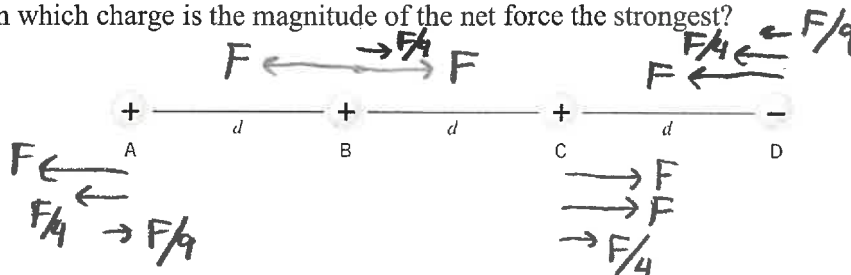


Quiz #10: Electric Fields and Forces

Problem 1 (2 points)

Four point charges have equal magnitudes. Three are positive and one is negative, as shown in the figure below. They are fixed in place on the same straight line, and adjacent charges are equally separated by a distance d . On which charge is the magnitude of the net force the strongest?

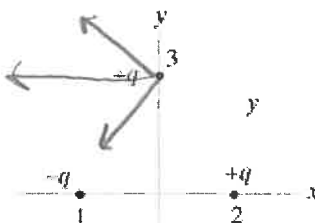


C

- a) A
- b) B
- c) C
- d) D

Problem 2 (2 points)

Two particles have equal magnitude but opposite sign, are placed along the x -axis at equal distances from the origin as shown in the figure below. The direction of the net force on particle 3 is directed



B

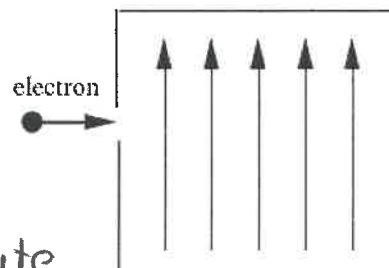
- a) in the $+x$ -direction.
- b) in the $-x$ -direction.
- c) in the $+y$ -direction.
- d) in the $-y$ -direction.
- e) along another direction.

Problem 3 (2 points)

An electron traveling horizontally enters a region where a uniform electric field is directed upward. What is the direction of the force exerted on the electron once it has entered the field?

D

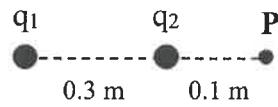
- a) to the left
- b) to the right
- c) upward
- d) downward
- e) out of the page, toward the reader



-charges feel a force in the opposite direction as the electric field

Problem 4 (4 points)

Two point charges are fixed in place along a straight line as shown in the figure below, with $q_1 = +8.00\mu\text{C}$ and $q_2 = -4.00\mu\text{C}$.



$$q_e = -1.60 \times 10^{-19} \text{ C}$$

$$F = k|q_1||q_2|/r^2$$

What is the magnitude and direction of the net force on an electron placed at point P?

force from $q_1 \rightarrow F = \frac{(8.99 \times 10^9 \text{ Nm}^2/\text{C}^2)(8.00 \times 10^{-6} \text{ C})(1.60 \times 10^{-19} \text{ C})}{(0.40 \text{ m})^2}$

$\vec{F} = 7.19 \times 10^{-14} \text{ N}$ to the left

force from $q_2 \rightarrow F = \frac{(8.99 \times 10^9 \text{ Nm}^2/\text{C}^2)(4.00 \times 10^{-6} \text{ C})(1.60 \times 10^{-19} \text{ C})}{(0.10 \text{ m})^2}$

$\vec{F} = 5.75 \times 10^{-13} \text{ N}$ to the right

$\Sigma \vec{F} = (5.75 \times 10^{-13} \text{ N}) - (7.19 \times 10^{-14} \text{ N})$

$\Sigma \vec{F} = 5.04 \times 10^{-13} \text{ N}$ to the right