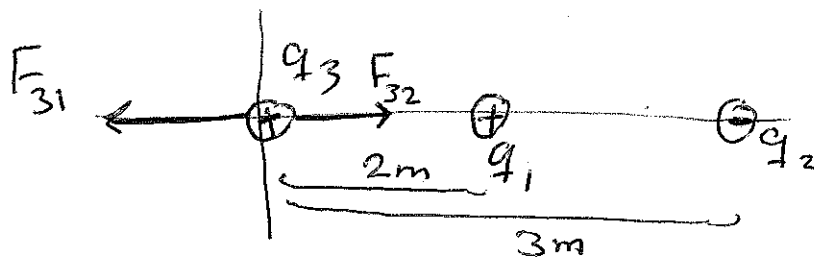


PHYS132-QUIZ1

Multiple Choice

Identify the choice that best completes the statement or answers the question.

1. A point charge  $Q$  is placed on the  $x$  axis at  $x = 2.0$  m. A second point charge,  $-Q$ , is placed at  $x = 3.0$  m. If  $Q = 40 \mu\text{C}$ , what is the magnitude of the electrostatic force on a  $30 \mu\text{C}$  charge placed at the origin?
- a. 7.2 N
  - b. 3.9 N
  - c. 1.5 N
  - d. 14 N
  - e. 8.1 N



$$q_1 = +40 \mu\text{C} \text{ at } x_1 = 2\text{ m}$$

$$q_2 = -40 \mu\text{C} \text{ at } x_2 = 3\text{ m}$$

$$q_3 = +30 \mu\text{C} \text{ at } x_3 = 0$$

find  $\vec{F}_3$  ?

$$\vec{F}_{31} = k \frac{q_1 q_3}{(x_{13})^2} = \frac{9 \times 10^9 \times 40 \times 10^{-6} \times 30 \times 10^{-6}}{(2)^2} (-\hat{i})$$

$$\vec{F}_{31} = -2.7 \hat{i} \text{ N}$$

$$\vec{F}_{32} = k \frac{q_2 q_3}{(x_{23})^2} = \frac{9 \times 10^9 \times 40 \times 10^{-6} \times 30 \times 10^{-6}}{(3)^2} (+\hat{i})$$

$$\vec{F}_{32} = 1.2 \hat{i} \text{ N}$$

$$\vec{F}_3 = \vec{F}_{31} + \vec{F}_{32}$$

$$\vec{F}_3 = -1.5 \hat{i} \text{ N}$$

$$F_3 = 1.5 \text{ N (magnitude)}$$