

Physics 112
Quiz #4
September 8, 2000

Name: _____

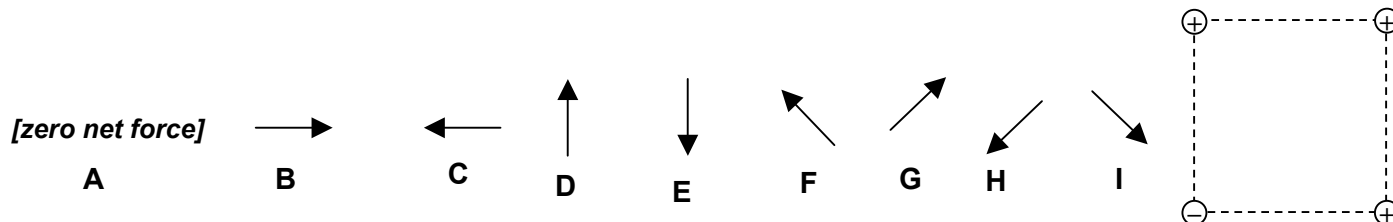
$$e = 1.60 \times 10^{-19} \text{ C}$$

$$\text{mass of proton} = 1.7 \times 10^{-27} \text{ kg}$$

$$G = 6.7 \times 10^{-11} \text{ N m}^2/\text{kg}^2$$

$$k = 9 \times 10^9 \text{ N m}^2/\text{C}^2$$

1. Three positive charges and a negative charge, all of *equal magnitude*, are placed at the corners of a square as shown. Which choice most closely represents the *net force* on a *positive* charge placed at the *center* of the square?



2. An electron is located at $(-1 \text{ m}, 0 \text{ m})$ and two electrons are located at $(+1 \text{ m}, 0 \text{ m})$. A 2-C charge is located at the origin. What is the magnitude of the *net electrical force* experienced by the charge at the origin?

- A. 0 N
- B. $0.36 \times 10^{-9} \text{ N}$
- C. $0.72 \times 10^{-9} \text{ N}$
- D. $1.08 \times 10^{-9} \text{ N}$
- E. $1.44 \times 10^{-9} \text{ N}$
- F. $2.88 \times 10^{-9} \text{ N}$
- G. $4.32 \times 10^{-9} \text{ N}$

3. Two positive point charges Q and $2Q$ are separated by a distance R . [No other charges are present, and there is no external electric field.] If the charge Q experiences a force of magnitude 12 N when the separation is R , what is the magnitude of the force *on the charge $2Q$* when the separation is $2R$?

- A. 1 N
- B. 2 N
- C. 3 N
- D. 4 N
- E. 6 N
- F. 8 N
- G. 9 N
- H. 12 N
- I. 18 N
- J. 24 N

4. A proton is located 40 centimeters from an electron. What is the magnitude of the electrical force that the electron exerts on the proton? *No partial credit. Your answer must be within 10% of the correct answer to receive credit. Units missing or incorrect: -1 point.*

Answer: _____