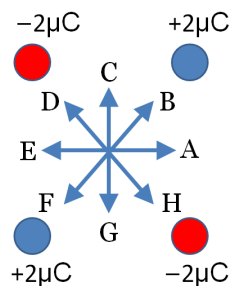
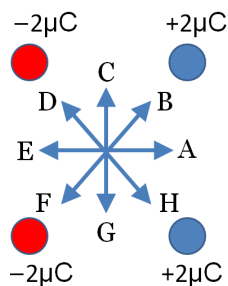


Physics 1214, Homework #1 (due 8/29)

Multiple choice questions

M1 Four charges are located at the corners of a square as shown below. What is the direction of electric field in the center of the square? Write the letter of the arrow parallel to the field direction or 0 if you believe that the field is zero.



(1) Field direction: _____

(2) Field direction: _____

M2 Two charges of opposite sign are separated by a distance of 1 cm. If the distance between the charges is increased to 2 cm, the force between the charges

- A. increases by a factor of 4
- B. increases by a factor of 2
- C. does not change
- D. decreases by a factor of 2
- E. decreases by a factor of 4

Problems

- P1 Calculate the magnitude of the force between two $9\ \mu\text{C}$ charges $3\ \text{cm}$ apart.
- P2 Three positive particles of charges $1\ \mu\text{C}$, $2\ \mu\text{C}$, and $3\ \mu\text{C}$, are located at the corners of an equilateral triangle of side $1\ \text{cm}$. Calculate the magnitude and direction of the net force on each particle.
- P3 Two positive charges are separated by a distance of $12\ \text{cm}$. At a point on the line joining them, at a distance of $3\ \text{cm}$ from the first charge, the electric field is zero. If the first charge has a magnitude of $2\ \mu\text{C}$, what is the magnitude of the second charge?
- P4 Consider a system of two positive electric charges $1\ \mu\text{C}$ and $4\ \mu\text{C}$ placed at a distance of $10\ \text{cm}$. Where one has to place a probe charge such that the net force acting on it is zero?