

Physics 1214, Homework #2 (due 9/5)

Multiple choice questions

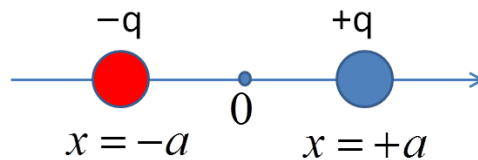
M1 Two opposite charges $-q$ and $+q$ are located at equal distances from the origin $x = 0$ as shown below.

(a) The projection of the electric field onto the x axis at origin is

- [A] negative [B] positive [C] zero

(b) Assuming that potentials of point charges are zero at infinite distance, the potential of the two charges at origin is

- [A] negative [B] positive [C] zero



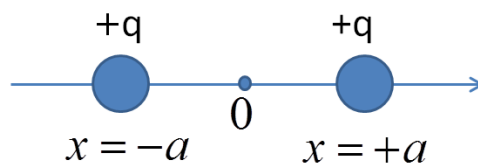
M2 Two like charges ($+q$ each) are located at equal distances from the origin $x = 0$ as shown below.

(a) The projection of the electric field onto the x axis at origin is

- [A] negative [B] positive [C] zero

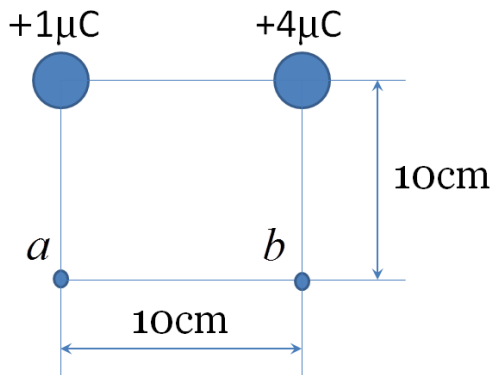
(b) Assuming that potentials of point charges are zero at infinite distance, the potential of the two charges at origin is

- [A] negative [B] positive [C] zero



Problems

- P1 How much work does the electric field do in moving a $2 \mu\text{C}$ charge from a point with a potential of $+20 \text{ V}$ to a point with a potential of -20 V ?
- P2 Four positive particles of charges $1 \mu\text{C}$, $2 \mu\text{C}$, $3 \mu\text{C}$, and $4 \mu\text{C}$, are located at the corners of a square of side 1 cm . Calculate the potential in the center of the square, taking $V = 0$ at a great distance.
- P3 Consider a system of two positive electric charges $1 \mu\text{C}$ and $4 \mu\text{C}$ placed at a distance of 10 cm as shown below. What is the potential difference between points a and b ?



- P4 (a) Find the capacitance of a parallel-plate capacitor made of two $5 \text{ cm} \times 5 \text{ cm}$ square plates separated by 1 mm .
- (b) If 50 V is applied to this capacitor, how much energy is stored?