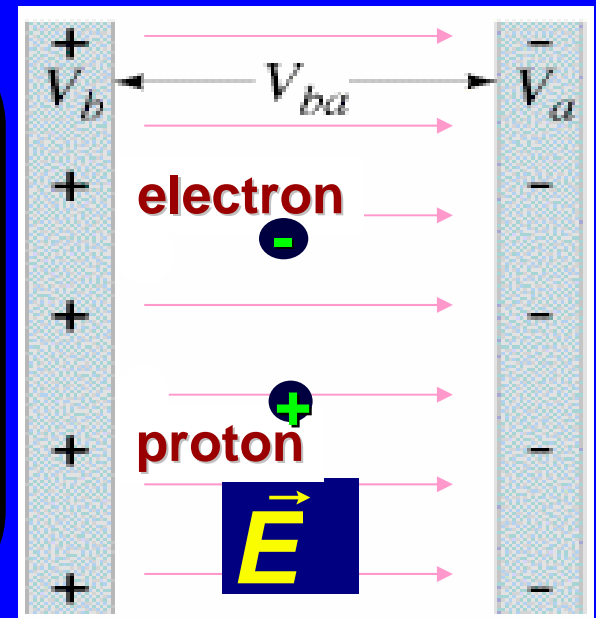


ConcepTest 23.1c Electric Potential Energy III

A **proton** and an **electron** are in a constant electric field created by oppositely charged plates. You release the **proton** from the **positive** side and the **electron** from the **negative** side. When it strikes the opposite plate, which one has more KE?

- 1) proton
- 2) electron
- 3) both acquire the same KE
- 4) neither – there is no change of KE
- 5) they both acquire the same KE but with opposite signs

Since $PE = qV$ and the proton and electron have the **same charge in magnitude**, they both have the **same electric potential energy** initially. Because energy is conserved, they both must have the **same kinetic energy** after they reach the opposite plate.



ConceptTest 23.4 Hollywood Square

Four point charges are arranged at the corners of a square. Find the **electric field E** and the **potential V** at the **center of the square**.

1) $E = 0$ $V = 0$

2) $E = 0$ $V \neq 0$

3) $E \neq 0$ $V \neq 0$

4) $E \neq 0$ $V = 0$

5) $E = V$ regardless of the value

The **potential is zero**: the scalar contributions from the two positive charges cancel the two minus charges.

However, the contributions from the electric field add up as vectors, and they do not cancel (so **it is non-zero**).

Follow-up: What is the direction of the electric field at the center?

