

5. Two metal plates are held at a potential difference of 40 volts, in a vacuum. A proton is released near the positive plate, and moves toward the negative plate under the influence of the electric field. A proton's mass is 1.67×10^{-27} kg.

(A) Just before the proton hits the other plate, what is its kinetic energy? Express it either in Joules or electron volts. (Remember the work-energy principle.)

(B) What is the velocity of the proton just before it hits the negative plate?

6. Two uncharged metal balls, X and Y , stand on glass rods. A third ball, Z , carrying a positive charge, is brought near the first two, as shown. A conducting wire is then connected between X and Y . The wire is then removed, and ball Z is finally removed. When this is all done, which of the following is true?

- (a) Balls X and Y are still uncharged.
 (b) Balls X and Y are both charged positively.
 (c) Balls X and Y are both charged negatively.
 (d) Ball X is positive and ball Y is negative.
 (e) Ball X is negative and ball Y is positive.

Explain your answer.

