

22. A particle of charge +12 μC and mass $3.8 \times 10^{-5} \text{ kg}$ is released from rest in a region where there is a constant electric field of +480 N/C. What is the displacement of the particle after a time of $1.6 \times 10^{-2} \text{ s}$?

$$x = v_0 t + \frac{1}{2} a t^2 = \frac{1}{2} a t^2$$

$$a = \frac{F}{m} = \frac{qE}{m}$$

$$x = \frac{1}{2} a t^2 = \frac{1}{2} \frac{qE}{m} t^2$$

$$x = \frac{1}{2} \frac{qE}{m} t^2 = \left(\frac{1}{2}\right) \left(\frac{(12 \times 10^{-6} \text{ C})(480 \text{ N/C})}{3.8 \times 10^{-5} \text{ kg}}\right) (1.6 \times 10^{-2} \text{ s})^2$$

$$x = 0.5 \left(151.6 \text{ m/s}^2\right) (2.56 \times 10^{-4} \text{ s}^2) = 1.94 \times 10^{-2} \text{ m}$$

$x = 1.9 \times 10^{-2} \text{ m}$

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