u = Initial velocity of charged particle = 200 m/s

m = mass of charged particle = 100 mg

$= 100 \times 10^{-6}$ kg $= 10^{-4}$ kg

q $\Rightarrow$ charge on particle = 40 uC = 40 $\times 10^{-6}$ C = 4×10^{-5} C

$|E|$ = Electric field intensity = 1×10^{5} N/C

Electrostatic force will act on the particle opposed to velocity as it is projected in the opposite direction of the electric field. Its mobility will therefore be delayed.

As electric field is constant, F = qE will be constants

Hence, a $= \dfrac{F}{m} = \dfrac{qE}{m}$ = will also be constant.

Thus, equations of motion can be used

$v^2 = u^2 + 2as$ ...(1)

$(0)^2 = (200)^2 + 2 \times \left(\dfrac{-qE}{m} \times S \right)$

$\dfrac{2 \times 4 \times 10^{-5} \times 1 \times 10^{5}}{10^{-4}} \times S$

$= 4 \times 10^{4}$

$S = \dfrac{4 \times 10^{4} \times 10 - 4}{8} = \dfrac{1}{2}$

m = 0.5 m