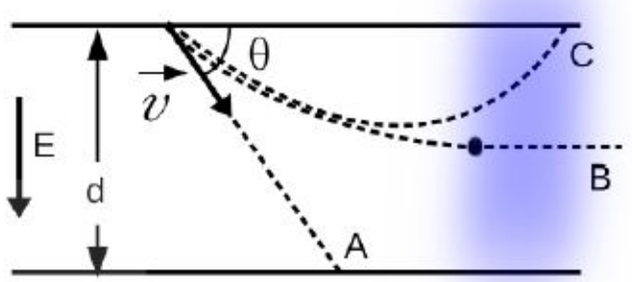
60. An electron of mass m_e and charge e is projected with a speed v making an angle θ with respect to the top electrode of a parallel plate capacitor as shown in the figure. Considering only the effect of the downward constant electric field E on the electron's motion, which of the following statements is correct.

A Electron moves along trajectory C with a time of flight given by $(m_e v/eE)\sin^2\theta$.

B Electron moves along trajectory C with a maximum horizontal displacement given by $(m_e v^2 \sin 2\theta)/eE$.

C Electron moves along trajectory A with a horizontal displacement given by $v\cos\theta\sqrt{2dm_e/eE}$.

D Electron moves along trajectory B with a final velocity $v\cos\theta$ parallel to the electrodes.



$\vec{E}$ still exists!

$V\cos(\theta)$: unaffected. } projectile motion ∴ parabolic trajectory.

$V\sin(\theta)$: affected.

∴ path A NOT right!

∴ B NOT right.

$$T = \frac{2V\sin(\theta)}{\frac{eE}{m}} = \frac{2mV\sin(\theta)}{eE}$$

$$f_{max} = V\cos(\theta)\,T = V\cos(\theta) \times \frac{2mV\sin(\theta)}{eE}$$

$$= \frac{mV^2\sin(2\theta)}{eE}$$