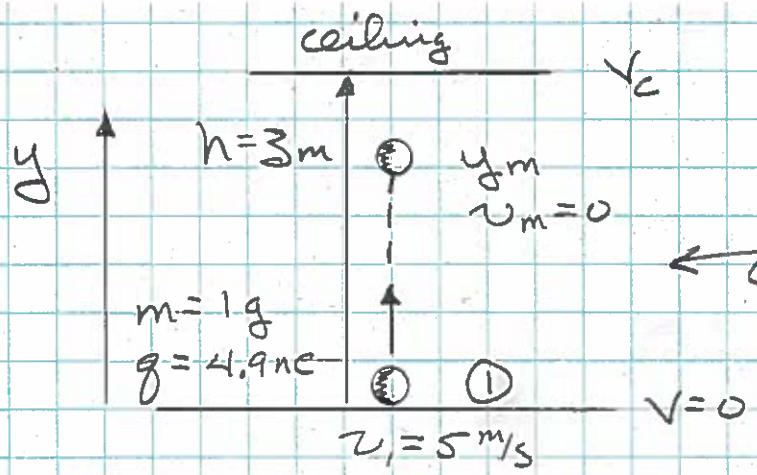

a.) for $V_c = 3\times10^6\ V$ and $V_c = Eh$

So $V = \frac{V_c}{h} y$ for any y

Now, conserve energy $1 \to m$:

$$\Delta E_{mech} = \Delta K + \Delta U_g + \Delta U_{elec} = 0$$

$$\frac{1}{2} m (v_m^2 - v_1^2) + mg(y_m - y_1) + q(V_m - V_1) = 0$$

$$-\frac{1}{2} m v_1^2 + mg y_m + q\frac{V_c}{h} y_m = 0$$

$$y_m = \frac{m v_1^2}{2\left(mg + q\frac{V_c}{h}\right)} = \underline{0.85\ m}$$

b.) for $V_c = -3\times10^6\ V$ and $V = \frac{V_c}{h} y$

same equ'n:

$$y_m = \frac{m v_1^2}{2\left(mg + q\frac{V_c}{h}\right)} \quad \text{where } V_c = -3\times10^6 V$$

$$\underline{y_m = 2.55\ m}$$