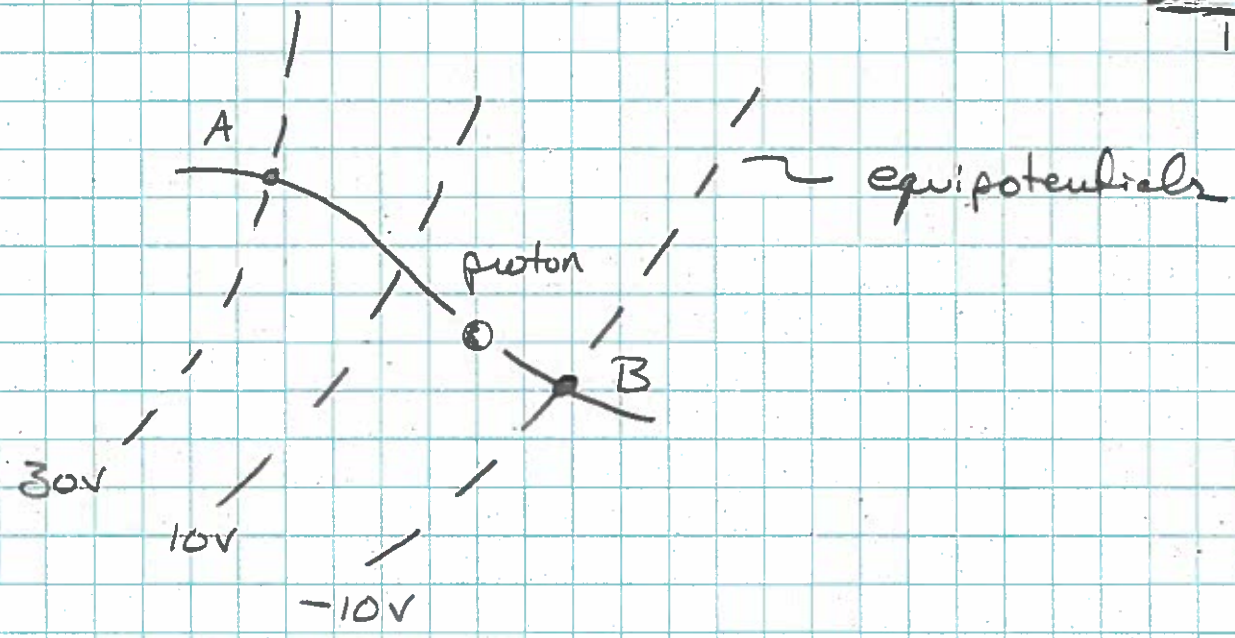

For proton: $q = +e$, $m = 1.67 \times 10^{-27}$ kg.

at A: $v_A = 50{,}000$ m/s

and $V_A = 30$V ; $V_B = -10$V

Conserve energy A → B:

$$\Delta E_{mech} = \Delta K + \Delta U = 0$$

$$(K_B - K_A) + q\Delta V = 0$$

$$\tfrac{1}{2} m v_B^2 - \tfrac{1}{2} m v_A^2 + e(V_B - V_A) = 0$$

So:

$$v_B = \left\{ v_A^2 - \frac{2e}{m}(V_B - V_A) \right\}^{1/2}$$

$$v_B = 100{,}800 \text{ m/s}$$