Given: A rectangular metal strip has current $I$ flowing to the right. Average drift velocity of the electrons is to the left. $B$ is out of the page.

Using the voltmeter shown in the figure, determine the relationship of the electric potential at $P_1$ and $P_2$.

A) $V_{P_1} > V_{P_2}$
B) $V_{P_1} \approx V_{P_2}$
C) $V_{P_1} < V_{P_2}$
D) Cannot be determined.
Using the right hand rule and $\vec{F} = \vec{v} \times \vec{B}$ where $\vec{v}$ is along the negative $x$ axis and $\vec{B}$ is along the positive $z$ axis, the resulting $\vec{F}$ is along along the negative $y$ axis

$$-\hat{i} \times \hat{k} = \hat{j},$$

since $q$ is negative, the answer is $-\hat{j}$, or along the negative $y$ axis. The bottom of the strip is negative and the top of the plate is positive, $V_{P_1} > V_{P_2}$.

Answer A.

29.06-02’Hall’Experiment 2004-3-24