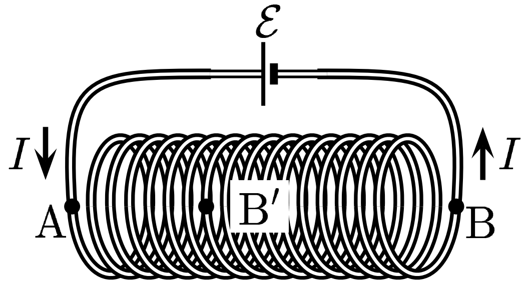


Consider the case where $\dfrac{dI}{dt} > 0\,.$

Find the direction of $\left\langle \dfrac{d\phi}{dt} \right\rangle$ and the sign of the induced electric potential $\Delta V'$ across the coil, where $\mathcal{E}_{ind} \equiv V'_A - V'_B$.

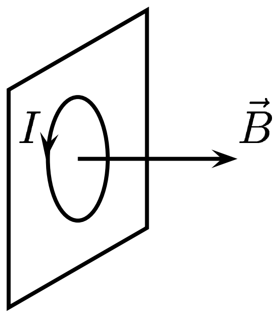
A) The direction of $\left\langle \dfrac{d\phi}{dt} \right\rangle$ is $\rightarrow$ and the sign of $V'_A - V'_B$ is $+$.

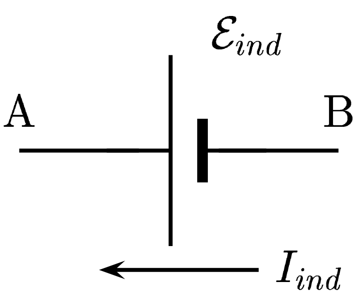
B) The direction of $\left\langle \dfrac{d\phi}{dt} \right\rangle$ is $\rightarrow$ and the sign of $V'_A - V'_B$ is $-$.

C) The direction of $\left\langle \dfrac{d\phi}{dt} \right\rangle$ is $\leftarrow$ and the sign of $V'_A - V'_B$ is $+$.

D) The direction of $\left\langle \dfrac{d\phi}{dt} \right\rangle$ is $\leftarrow$ and the sign of $V'_A - V'_B$ is $-$.

RHR #3 implies that $\left\langle \frac{d\phi}{dt} \right\rangle$ is to the right. So $\vec{B}_{ind}$ is to the left, or I_{ind} goes from B to A. In other words, $\mathcal{E}_{ind} = V'_A - V'_B > 0$





The induced electric potential sets up a "back emf", that is, $V_A - V_B$ (the battery's potential) and $V'_A - V'_B$ have the same sign.

Answer **A**.

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