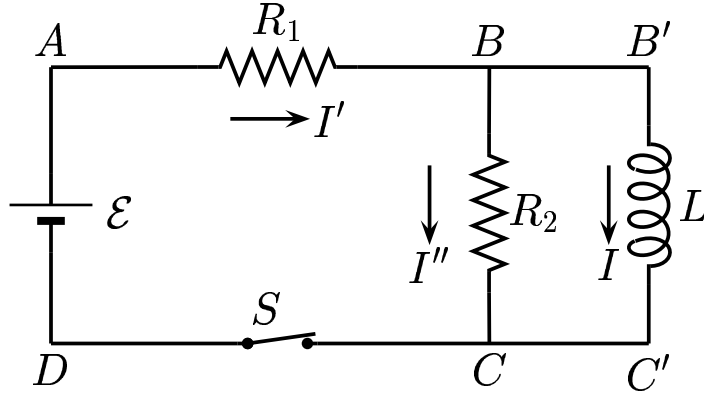


Close S at $t = 0$. Loop equation are

$$\text{for } BB'C'CB \text{ loop: } R_2 I'' = L \frac{dI}{dt};$$

$$\text{for } ABB'C'CDA: \mathcal{E} - R_1(I'' + I) - L \frac{dI}{dt} = 0.$$

Time dependence of I has the form $I = \frac{\mathcal{E}}{R_{eq}} \left[1 - \exp\left(-\frac{t}{\tau_{eq}}\right) \right]$



Determine the equivalent resistance R_{eq} for this circuit after a long time period; i.e., $t \gg 1$.

A) $R_{eq} = R_1.$

B) $R_{eq} = R_2.$

C) $R_{eq} = R_1 + R_2.$

D) $R_{eq} = \frac{R_1 R_2}{R_1 + R_2}.$

From the given expression for I , at large t , $I = \frac{\mathcal{E}}{R_{eq}}$. On the other hand,

by inspection at large t , the current should be steady with no potential drop

across L . So the asymptotic current should be $I = \frac{\mathcal{E}}{R_1}$. Thus $R_{eq} = R_1$.

Answer A.

32.02-04 RL Circuit with 2 loops 2006-9-14