The circuit shown here is allowed to equilibrate for a long time. After a long time, some current is flowing through the resistors and some charge is stored on the capacitor.

You should calculate how much charge is on the capacitor, and you should think it is easy to do. **Hint:** at this point, no current is flowing through the capacitor. Find the current through the 1 Ω resistor, that will tell you the voltage across it, and that will give you the charge on the capacitor.

Now, suppose the battery is suddenly disconnected from both sides, at the points shown by the dotted lines. The charge will start to leave the capacitor.

How long will it take for the charge on the capacitor to decrease to 1 µC (one micro-Coulomb)?

Multiple choice:

(a) $t = 0$ seconds  
(b) $t = 1$ second  
(c) $t = 10$ seconds  
(d) $t = \ln 10$ seconds  
(e) $t = 1$ µs (one micro-second)  
(f) $t = \ln 10$ µs  
(g) $t = 10 \ln 10$ µs  
(h) $t = \ln 0.1$ µs  
(i) $t = e^{-1}$ seconds  
(j) $t = e^{-1}$ µs  
(k) $t = e^{-10}$ seconds  
(l) $t = e^{-10}$ µs  
(m) The charge will never reach 1 µC  
(n) None of the above

Answer:_________________________