

Answer on Question #70845, Physics / Electric Circuits

Question An emf of 100 V is applied to a series RC circuit in which the resistance is 200 ohms and the capacitance is 10^{-4} farads. Determine the charge $q(t)$ on the capacitor if $q(0) = 0$. Also determine the current $i(t)$.

Solution

$$Q = CU(1 - e^{-t/RC}) = 10^{-4} \cdot 100(1 - e^{-t/(200 \cdot 10^{-4})}) = 10^{-2}(1 - e^{-0.005t})$$

$$I = \frac{V_b}{R} e^{-t/RC} = \frac{100}{200} e^{-t/(200 \cdot 10^{-4})} = 0.5 e^{-0.005t}$$