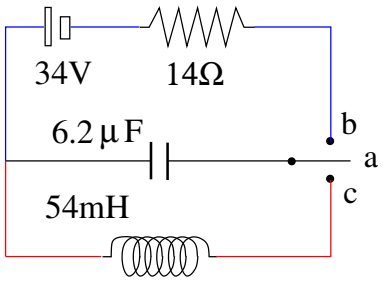
[lex87] RC circuit turning into LC circuit

In the circuit shown the capacitor is without charge and the switch is in position a.
(i) When the switch is moved to position b we have an RC circuit with the capacitor being charged up gradually. Determine the time constant $\tau = RC$. Find the charge $Q(t)$ on the capacitor including the value Q_{max} after a long time, when the device is fully charged. Find the current $I(t)$ through the resistor.
(ii) Then we reset the clock and move the switch from b to c. We now have an LC circuit. Determine the angular frequency of oscillation, $\omega = 1/\sqrt{LC}$, and the maximum current I_{max} that flows through the inductor periodically.
(iii) Determine the (constant) energy content $E = U_E(t) + U_B(t)$ of the electromagnetic oscillator.



Solution: