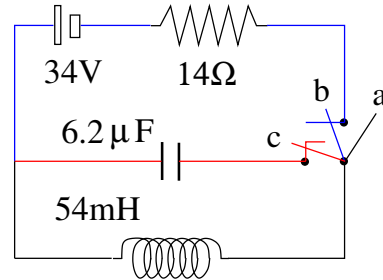## [lex80] RL circuit turning into LC circuit

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 RL circuit with the current building up gradually. Determine the time constant $\tau = L/R$ and find the current $I(t)$ through the inductor including its value I_{max} after a long time, when it is fully built up.
(ii) Then we reset the clock and move the switch from b to c with no interruption of the current through the inductor. We now have a an LC circuit. Determine the angular frequency of oscillation $\omega = 1/\sqrt{LC}$ and the maximum charge Q_{max} that goes onto the capacitor periodically.
(iii) Determine the (constant) energy content $E = U_E(t) + U_B(t)$ of the electromagnetic oscillator.,

Solution: