RLC Circuit: Application (2)

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: $I(t) = (\mathcal{E}/R)[1 - e^{-t/\tau}]$.

Find the time constant τ and the current I_{max} after a long time.

(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: $I(t) = I_{max}\cos(\omega t)$.

Find the angular frequency of oscillation ω and the maximum charge Q_{max} that goes onto the capacitor periodically.