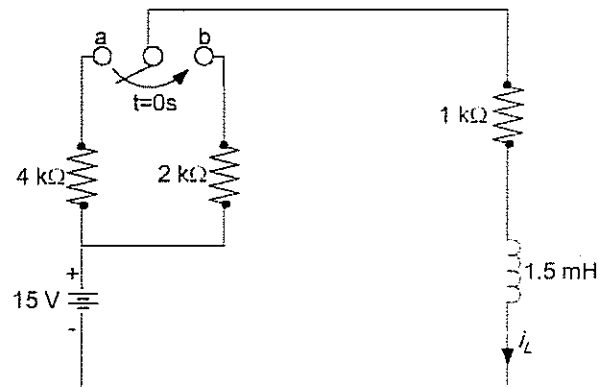


University of Toronto
Department of Electrical & Computer Engineering
ECE110S – Electrical Fundamentals
Quiz 4 – April 5, 2006, 4:30-5:00 PM

Instructions: Non-programmable calculators allowed. No other aids. Answer in the space provided on these sheets. The back sides of these sheets can be used as well. For full marks (20) you must show methods, state UNITS and compute numerical answers when requested. **Please write in PEN, not pencil.**

1. In the circuit below the switch has been in position *a* for a long time when it is switched to position *b* at time $t=0$ s.
- (a) Find the initial and final conditions for the current $i_L(t)$. (2 marks)
 - (b) Determine the time constant τ for $t \geq 0$ s. (1 mark)
 - (c) Find $i_L(t)$ as a function of time for $t \geq 0$ s. (3 marks)
 - (d) Draw an approximate sketch of $i_L(t)$, including $t \leq 0$ s. (2 marks)



2. The circuit below is in sinusoidal steady state.
- Transform the circuit into the phasor domain. **(2 marks)**
 - Find the phasor current \mathbf{I} . **(2 marks)**
 - Find phasor current \mathbf{I}_o and phasor voltage \mathbf{V}_o . **(4 marks)**
 - Transform \mathbf{I}_o and \mathbf{V}_o into the time domain ($i_o(t)$ and $v_o(t)$). **(3 marks)**
 - What is the phase difference between $v_o(t)$ and $i_o(t)$ and which one is leading? **(1 mark)**

