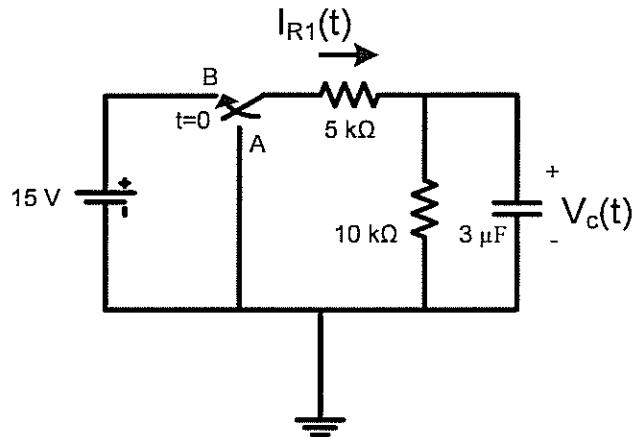


University of Toronto  
Department of Electrical & Computer Engineering  
ECE110S – Electrical Fundamentals  
Quiz 4 – April 4, 2007, 4:30-5:00 PM

**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. [10 marks] Consider the circuit shown below. The switch has been in position A for a long time when it is changed to position B at time  $t=0$ .
  - (a) Find the initial ( $t=0$ ) and final condition ( $t=\infty$ ) for the capacitor voltage,  $V_c(t)$ . (2 marks)
  - (b) Find the time constant  $\tau$ , for  $t \geq 0$ . (2 marks)
  - (c) Determine voltage  $V_c(t)$  for all  $t \geq 0$ . (4 marks)
  - (d) Determine current  $I_{R1}(t)$  for all  $t \geq 0$ . (2 marks)



2. [10 marks] Consider the circuit shown below:

- (a) Transform the circuit to the phasor domain. (2 marks)
- (b) Calculate the equivalent impedance between points A and B. (2 marks)
- (c) Find phasor current  $I_L$  and phasor voltage  $V_C$  and indicate their position in a phasor diagram. (4 marks)
- (d) Transfer  $V_C$  and  $I_L$  into the time domain to find  $V_C(t)$  and  $I_L(t)$ . (2 marks)

