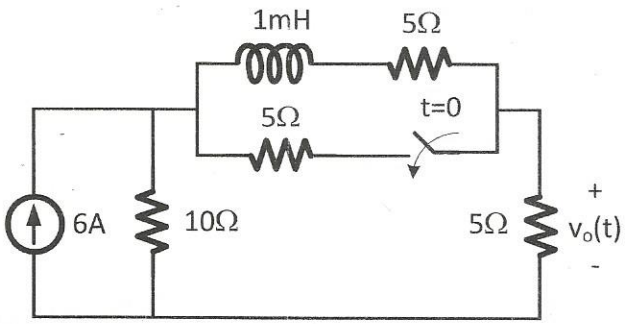
**EE10** **Final Exam** **Fall 2016**

Total of four questions (25 points each), three hours.

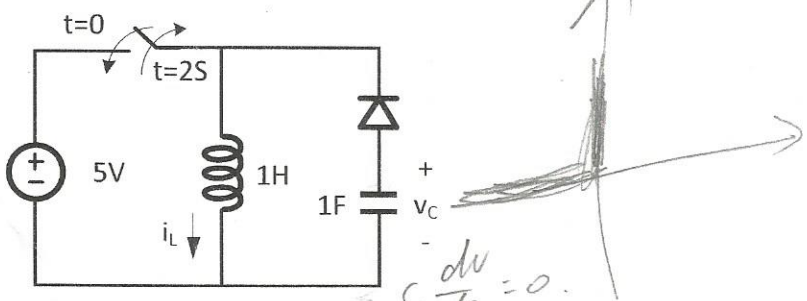
Box your answers.

Leave margin on your answer sheet for staple.

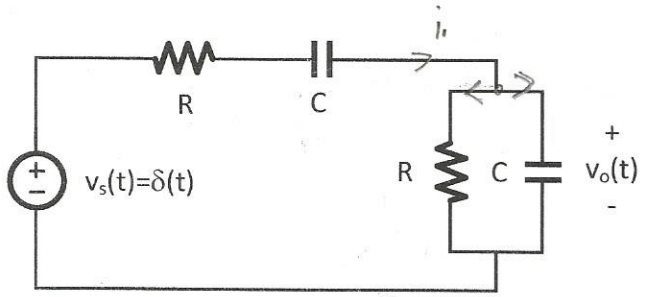
1. The circuit below has been idle (switch open) for a long time. At $t = 0$ the switch is closed.
   a) Give mathematical expression of $v_o(t)$
   b) Plot $v_o(t)$




2. The circuit below is at zero state for $t < 0$, and the diode is ideal. The switch closes at $t = 0$, and opens at $t = 2$.
   a) Calculate and plot $i_L(t)$ as marked on the circuit
   b) Calculate and plot $v_C(t)$ as marked on the circuit



3. In the following second-order circuit, R is resistance and C is capacitance.
   a) Calculate and plot the impulse response ($v_o$ is the output);
   b) Intuitively, find the values of $v_o(0^+)$ and $\frac{dv_o}{dt}(0^+)$.




4. The following circuit is in sinusoidal steady state, and $v_s(t) = 2\cos 2t$.
   a) Find the Thevenin equivalent on the left side of nodes *a*-*b*;
   b) Determine the optimum values for $M$ and $C_2$ to deliver the maximum average power to the load $Z_L$;
   c) Calculate this maximum average power delivered to the load.