EE223 Test I: Student Objectives Review Sheet

I. Single capacitor/inductor circuits: Given a circuit with exactly one capacitor OR inductor, a source (i or v) and zero resistors,
   A. given an i(t) or v(t) find the other (method: integration/differentiation)
   B. find w(t), and p(t) (method: integration/differentiation, \( w(t) = \frac{1}{2}Cv^2 = \frac{1}{2}Li^2 \))
   C. tweaks
      • be able to work the problem if the current or voltage is given in an piecewise-defined manner (i.e. a different equation in different time regions).
      • be able to work the problem if given several C's or L's that can be reduced to one (method: parallel/series simplification)

II. DC steady-state circuits: Given a circuit with any number of capacitors, inductors, resistors, and switched DC sources (i and/or v),
   A. be able to find the voltages and currents through everything before switching (method: caps \(\rightarrow\) opens, inductors \(\rightarrow\) shorts)
   B. tweaks: using \(Q=CV\) and formulae for energy, find charge stored in capacitor and energy stored in inductors and capacitors

III. First order circuits: Given a circuit with
   • (any number of resistors) and
   • (one capacitor or inductor) and
   • any number sources that have one steady value and
      o (a switch that changes position at \(t=0\)) and/or (sources with a \(u(t)\) function),
   A. find \(i_C(t)\) or \(v_C(t)\) (method: plug \& chug equation with \(V_0, V_\infty, \tau\))
   B. tweaks:
      • ask for a voltage or current other than \(i_C(t)\) or \(v_C(t)\) (method: use \(i=Cv', v=Li', \Omega's\) law, KVL, KCL, etc. to find)
      • add an opamp (method: above plus do KCL at the opamp input terminals, never the outputs)

Test Questions
1. I 20%
2. II 20%
3. III 30%
4. III 30%