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
     - (a switch that changes position at t=0) and/or (sources with a u(t) function),

   A. find $i_L(t)$ or $v_C(t)$ (method: plug 'n chug equation with V_0, V_∞, τ)
   B. tweaks:
      - ask for a voltage or current other than $i_L(t)$ or $v_C(t)$ (method: use i=Cv', v=Li', Ω'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%