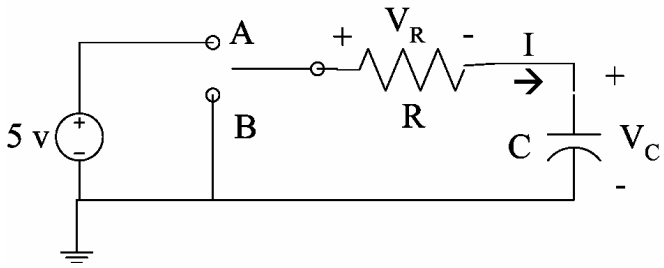
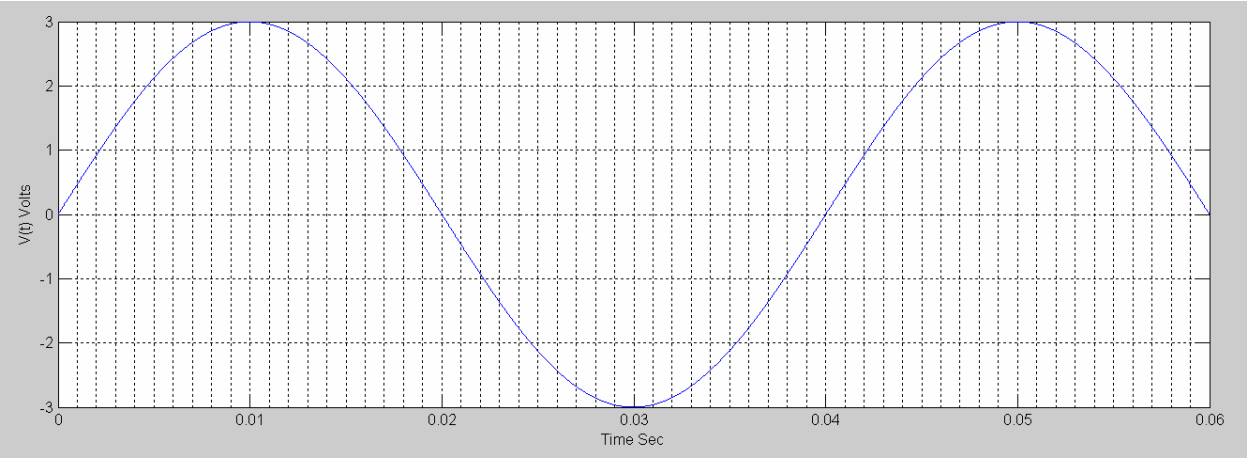
All the normal rules apply: *Due next class, work on separate paper, start early, show your work, label everything (especially on graphs -including axes, time/voltage divisions, function plots, etc.), specify units, circle answers.*

The following diagram applies to problems 1 and 2 (do not reuse data between problems).



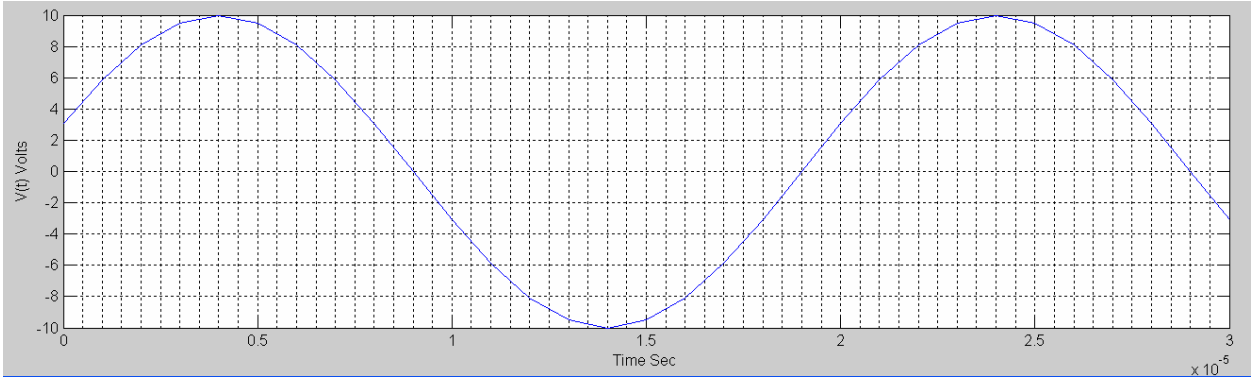
1. In a simple RC circuit shown in the diagram above, the switch has been in position B for a long time and switches to A at t = 0. We observe a capacitor charging with the standard exponential growth curve. At t=37.5ms we measure the resistor voltage V_R is 1.115 v. Determine the time constant τ for the circuit.

2. For the diagram above, we determine that the time constant τ is 7.00 us. We assume that the switch has been in position A for a long time and moves to position B at t = 0. At a particular time after the switch has moved to position B, we observe that I = -9.1 mA, and V_c = 0.725 v.
   a. Determine what time these observations occur.
   b. Solve for the capacitor value C.



3. For the figure above, find the indicated values and express the function v(t) in equation form:

   Find: Peak voltage V_p, peak-to-peak voltage V_{pp}, RMS voltage V_{rms}, Period T, frequency f, angular frequency ω, time shift t_{max}, and phase angle Θ.



4. For the figure above, find the indicated values and express the function v(t) in equation form (*be careful to note that the units for time on this graph are in 10^{-5} seconds*).

   Find: Peak voltage V_p, peak-to-peak voltage V_{pp}, RMS voltage V_{rms}, Period T, frequency f, angular frequency ω, time shift t_{max}, and phase angle Θ.

5. For the equation below, find V_p, V_{pp}, V_{rms}, T, f, ω, t_{max}, Θ; and graph the function for $0 < t < 5/16$ seconds. Remember to label you axes, units, and all relevant points on the graph. *Hint: Try to keep your time divisions in terms of fractions rather than decimals, this will be easier to graph. This entire problem is easier without a calculator if you use fractions!*

   $v(t) = 25\cos(8\pi t - 30^\circ)$ volts