1. Shown above is a first order all pass filter. Design the filter so that the phase shift is $90^\circ$ when $f = 7.3\ kHz$ and magnitude of the ratio of the output voltage to the input voltage is $30$ for all frequencies when $v_i$ is a sine wave. Pick the differential input impedance of the instrumentation amplifier to be $660\ k\Omega$.

Use National Instruments SPICE to plot the magnitude and phase of $T(s) = V_o/V_i$ as the frequency varies from $100\ Hz$ to $100\ kHz$.

2. Use National Instruments SPICE to plot the output versus time when the input is a square wave with a dc level of $0$, a peak-to-peak value of $2\ V$, and a frequency of $1\ kHz$. Make the plot for two cycles of the input.