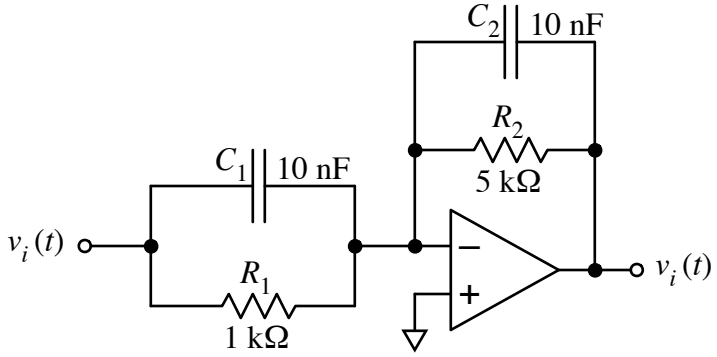
EE 230 — HW 2.26 Name_____

a. Calculate the transfer function (in terms of *R*s and *C*s) for the first-order circuit shown at right.



$T(s)$ = _____

b. What are the values of the magnitude of the gain and the phase shift at very low frequencies (ω much smaller than any pole or zero frequencies)?

$|T|$ = _____; θ = _____

c. What are the values of the magnitude of the gain and the phase shift at very high frequencies (ω much higher than any pole or zero frequencies)?

$|T|$ = _____; θ = _____

d. What is the corner frequency for the filter? ω_c = _____

(Be careful. This is a little trickier than it might appear, because this is not a straight loq-pass filter. Make a rough sketch of the magnitude as a function of frequency. It looks like a low-pass but it flattens out at higher frequencies and does not keep dropping. (Make a rough sketch of the magnitude frequency response to see what is happening.) To find the corner frequency, find the magnitude at low frequency and then use the transfer function to find the frequency where the magnitude 70.7% of the max. This will be close to the pole frequency, but not exactly equal to it.)

Write your answers — and whatever work will fit — on this sheet. Staple any sheets with additional work behind.