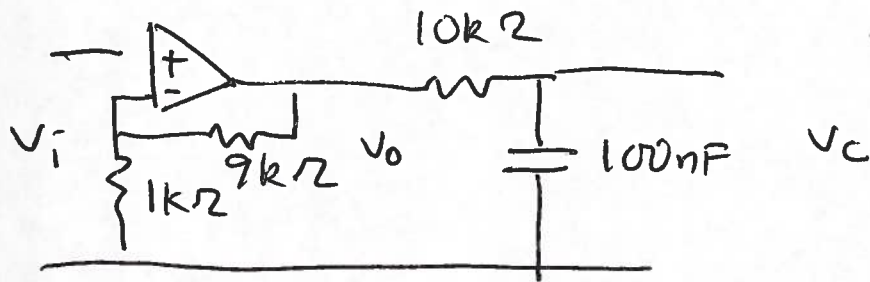


EE 3 W'13 Quiz 2 Solution



a. No current enters the op amp, and so

1-5 $V_n = \frac{1k}{1k+9k} V_o = -1 V_o$; since $V_i \approx V_n$, -5

$V_o = 10 V_i = 10 V$

b. The op amp stage continues to satisfy $V_o = 10 V_i$. The output stage is a voltage divider

2 $V_c = \frac{1/j\omega C}{R + 1/j\omega C} V_o = \frac{V_o}{1 + j\omega RC} = \frac{10 V_i}{1 + j\omega RC}$ 1

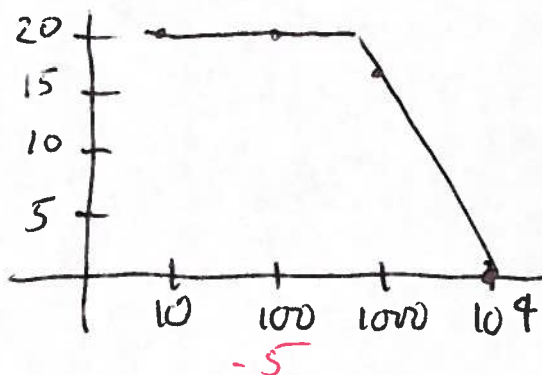
c. $\left| \frac{V_c}{V_i} \right| = \sqrt{\frac{100}{(1 + \omega^2 RC)^2}}$

$RC = 10^4 \times 10^2 \times 10^{-9} = 10^{-3}$

1-5

ω	$ V_c/V_i $	$20 \log V_c/V_i $
10	10	20
100	4.95	20
1000	7.07	17
10000	.995	20

-5



The drop off begins shortly before $\omega = 1000$ rad/s

-5