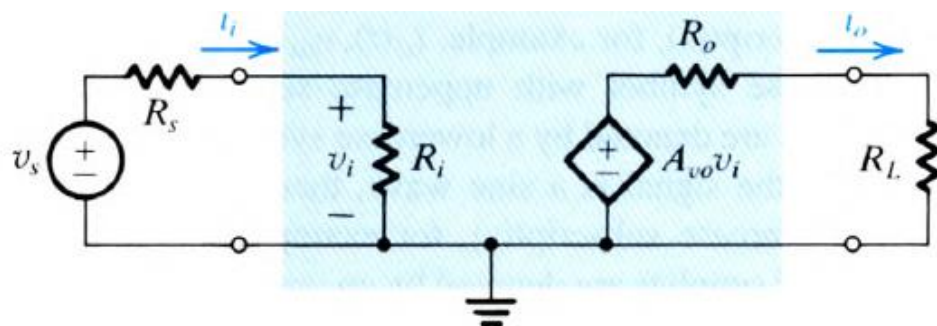


1. Consider the voltage-amplifier circuit model shown in Fig.

$A_{vo} = 100 \text{ V/V}$ under the following conditions:

30pts



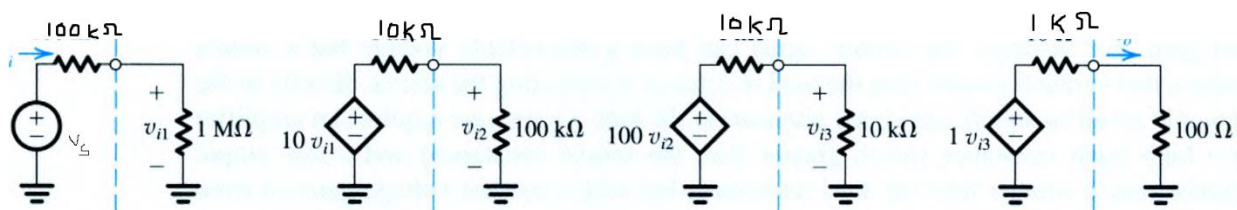
(a) $R_i = 10R_s$, $R_L = 10R_o$

(b) $R_i = R_s$, $R_L = R_o$

(c) $R_i = R_s/10$, $R_L = 10R_o$

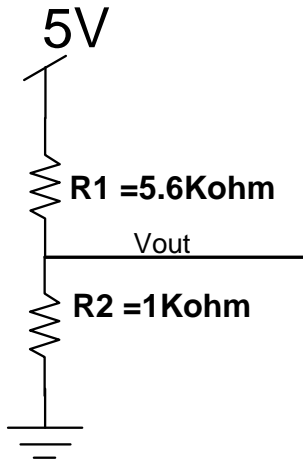
Calculate the overall voltage gain v_o/v_s in each case, expressed both directly and in decibels.

2. The amplifier is fed by a signal source with a source resistance of $100 \text{ k}\Omega$ and delivers its output into a load resistance of $100 \text{ }\Omega$. The first stage has a relatively high input resistance and a modest gain factor of 10. The second stage has a higher gain factor but lower input resistance. Finally, the last, or output, stage has unity gain but a low output resistance. We wish to evaluate the overall voltage gain, that is, v_L/v_s , the current gain, and the power gain. 20pts

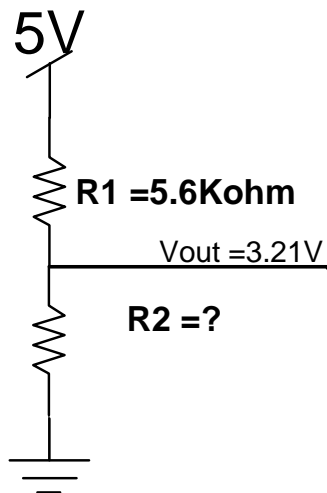


3. Question on voltage divider. 10pts

a. Find V_{out}



b. Find $R2$



4. Define High pass filter. Draw the frequency response curve of high pass filter. 5pts

5. Why do you need to amplify a signal? 5pts