

**EECS 40, Fall 2007**  
**Prof. Chang-Hasnain**

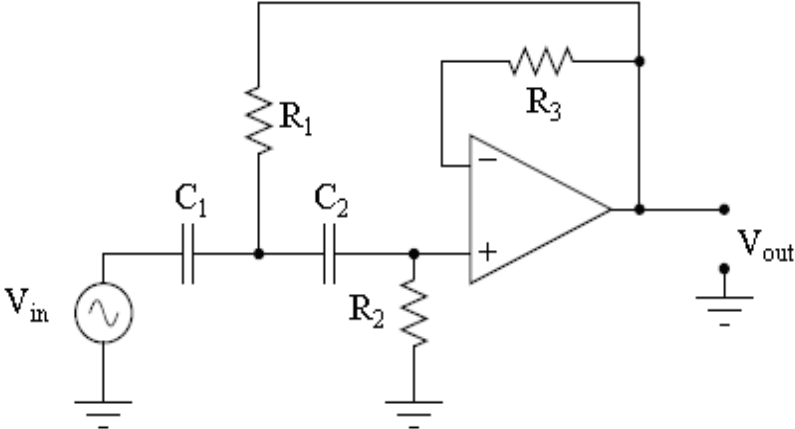
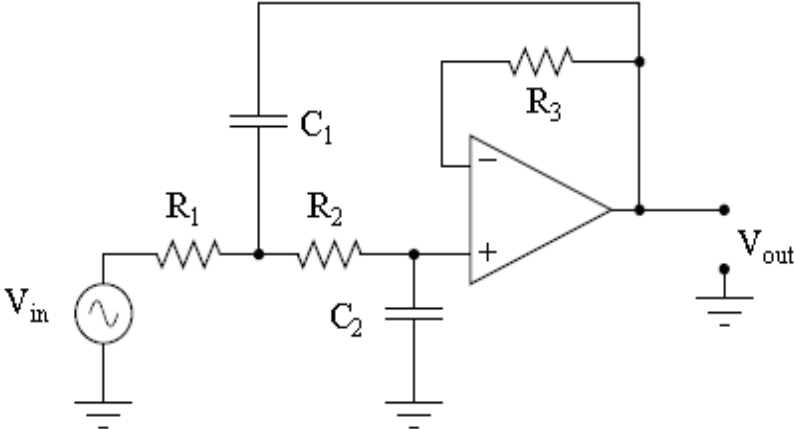
**Homework #7**

Due at 5 pm in 240 Cory on Thursday, 11/08/07  
Total Points: 100

- Put (1) your name and (2) discussion section number on your homework.
- You need to put down all the derivation steps to obtain full credits of the problems. Numerical answers alone will at best receive low percentage partial credits.
- No late submission will be accepted except those with prior approval from Prof. Chang-Hasnain.
- Problems of this HW are from Hambley 4<sup>th</sup> Edition

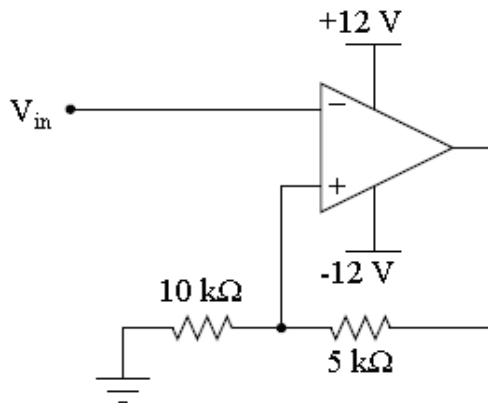
**Negative Feedback (35 points)**

1. (Non-Inverting Amplifiers) P14.34 (10 points)
2. (Integrators and Differentiators) P14.75, and P14.80 (5 points each).
3. (Active Filters) For each of these, answer whether it is lowpass or highpass, and explain the role of R3 (15 points).

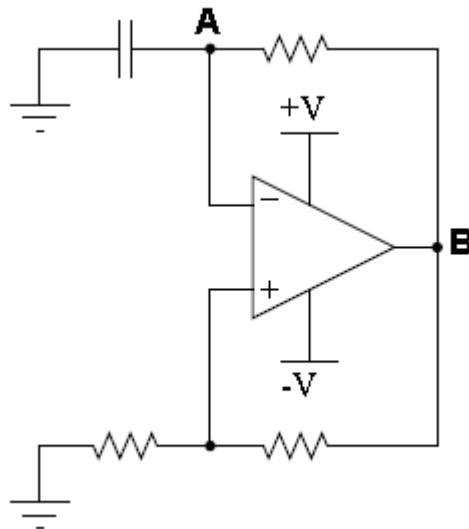


**Positive Feedback** (40 points)

4. P14.29 (8 points)
5. Assume the op-amp is ideal, except that the output voltage is limited to extremes of  $-12\text{V}$  or  $12\text{V}$ . For input voltage  $13 \sin(2\pi t)$ , sketch the output voltage (Assume that the circuit has already been operated with this input voltage for some cycles.) (14 points)



6. Suppose in the following circuit that all resistors have resistances  $R$  and the capacitor has capacitance  $C$ . Assuming the output of the otherwise ideal op-amp is limited to be between  $V$  volts and  $-V$  volts. Sketch the voltage at nodes **A** and **B** as a function of time, assuming the circuit has been operating for some time. Be sure to mention the role of the RC constant. (18 points)



**Diodes** (25 points)

7. P10.7 (8 points)
8. P10.17 (8 points)
9. P10.22 (9 points)