

EE4086 Quiz 1

JULY 16, 1997

Professor Leach

Name _____

Instructions. Print your name in the space above and on all quiz work sheets. Place a box around all answers. Write the word “over” if you continue your work on another page.

1. For the circuit of Figure P1, it is given that $R_1 = R_2 = 20 \text{ k}\Omega$, $R_3 = R_4 = 10 \text{ k}\Omega$, and $R_F = 100 \text{ k}\Omega$.
 - (a) Solve for v_O .
 - (b) A capacitor $C = 0.1 \text{ }\mu\text{F}$ is added to the circuit in parallel with R_2 . What effect does this capacitor have on the gain from v_{I1} to v_O ? Write the transfer function that accounts for the effect of C on this gain.
2. For the circuit of Figure P2, it is given that $R_1 = 5 \text{ k}\Omega$, $R_2 = 500 \text{ }\Omega$, $R_F = 50 \text{ k}\Omega$, and $C = 0.04 \text{ }\mu\text{F}$.
 - (a) Solve for the transfer function for V_o/V_i .
 - (b) Sketch the Bode magnitude plot for the transfer function. Label the gain on all horizontal asymptotes and label all break frequencies in rad/s and in Hz.
3. For the circuit of Figure P3, it is given that $R_1 = R_2 = R_3 = 10 \text{ k}\Omega$ and $R_F = 20 \text{ k}\Omega$.
 - (a) Solve for v_O .
 - (b) Solve for the input resistance seen by the source.
 - (c) Solve for the common-mode component of v_{I1} and v_{I2} .
4. For the circuit of Figure P4, it is given that $R_1 = R_F = 10 \text{ k}\Omega$, $R_2 = 1 \text{ k}\Omega$, and $V_{REF} = -10 \text{ V}$. Sketch and label the graph of v_O versus v_I . Assume the op-amp has saturation voltages of $+12 \text{ V}$ and -12 V .

Figure P1.

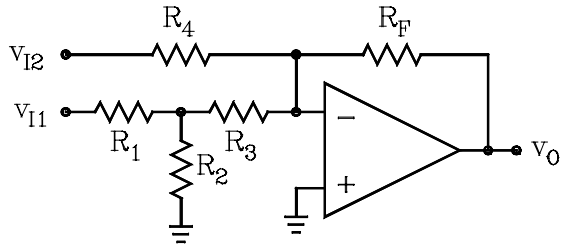


Figure P2.

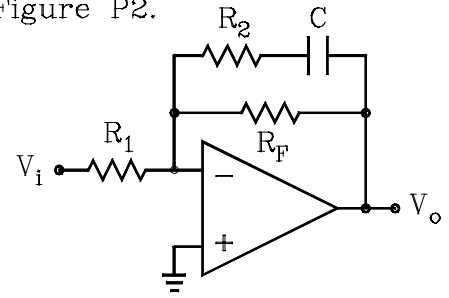


Figure P3.

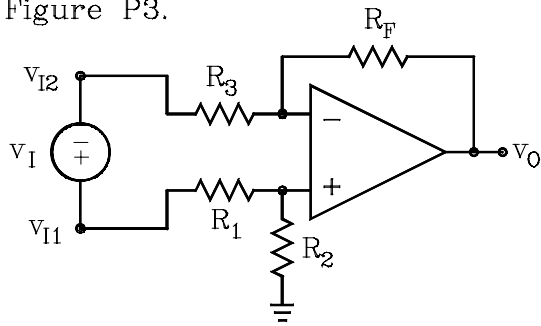


Figure P4.

