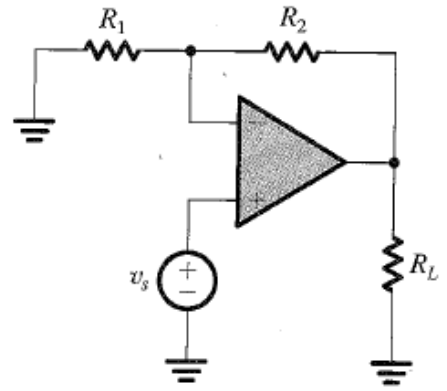
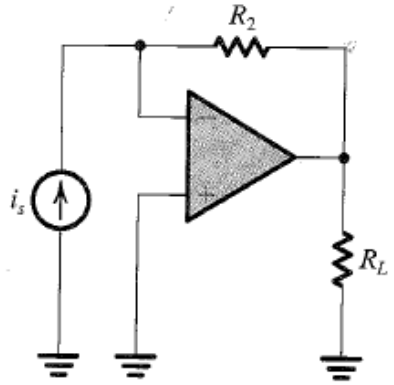
# EE338 Ch8 Problems

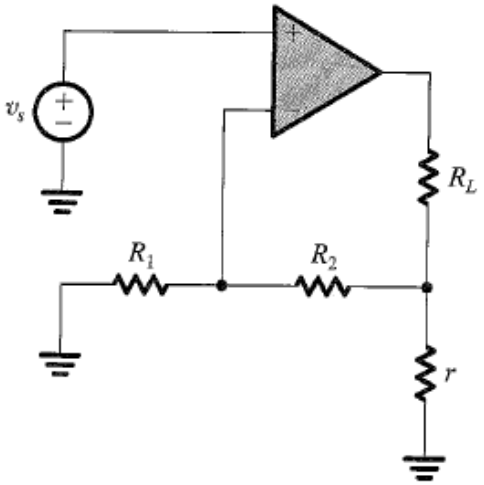
***8.26** For each of the op-amp circuits shown in Fig. P8.26, identify the feedback topology and indicate the output variable being sampled and the feedback signal. In each case, assuming the op amp to be ideal, find an expression for $\beta$, and hence find $A_f$.



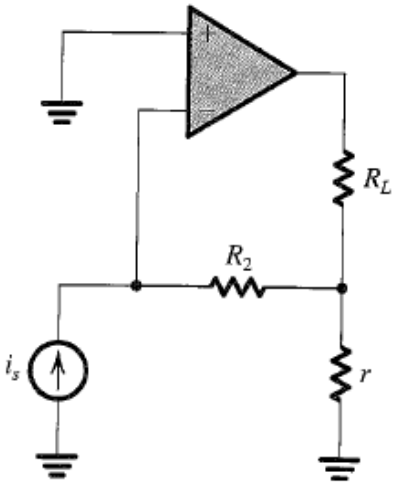

(a)




(b)




(c)




(d)

***8.32** In the series–shunt amplifier shown in Fig. P8.32, the transistors operate at $V_{BE} \cong 0.7$ V with $h_{FE}$ of 100 and an Early voltage that is very large.

(a) Derive expressions for $A$, $\beta$, $R_i$, and $R_o$.
(b) For $I_{B1} = 0.1$ mA, $I_{B2} = 1$ mA, $R_1 = 1$ kΩ, $R_2 = 10$ kΩ, $R_s = 100$ Ω, and $R_L = 1$ kΩ, find the dc bias voltages at the input and at the output, and find $A_f \equiv v_o / v_s$, $R_{\text{in}}$, and $R_{\text{out}}$.

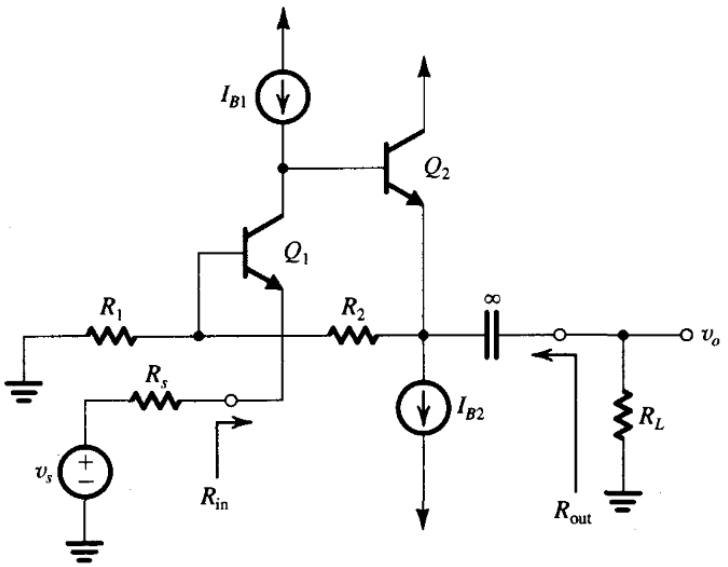



**FIGURE P8.32**

**8.42** The shunt–shunt feedback amplifier in Fig. P8.42 has $I = 1$ mA and $V_{GS} = 0.8$ V. The MOSFET has $V_t = 0.6$ V and $V_A = 30$ V. For $R_s = 10$ kΩ, $R_1 = 1$ MΩ, and $R_2 = 4.7$ MΩ, find the voltage gain $v_o / v_s$, the input resistance $R_{\text{in}}$, and the output resistance $R_{\text{out}}$.

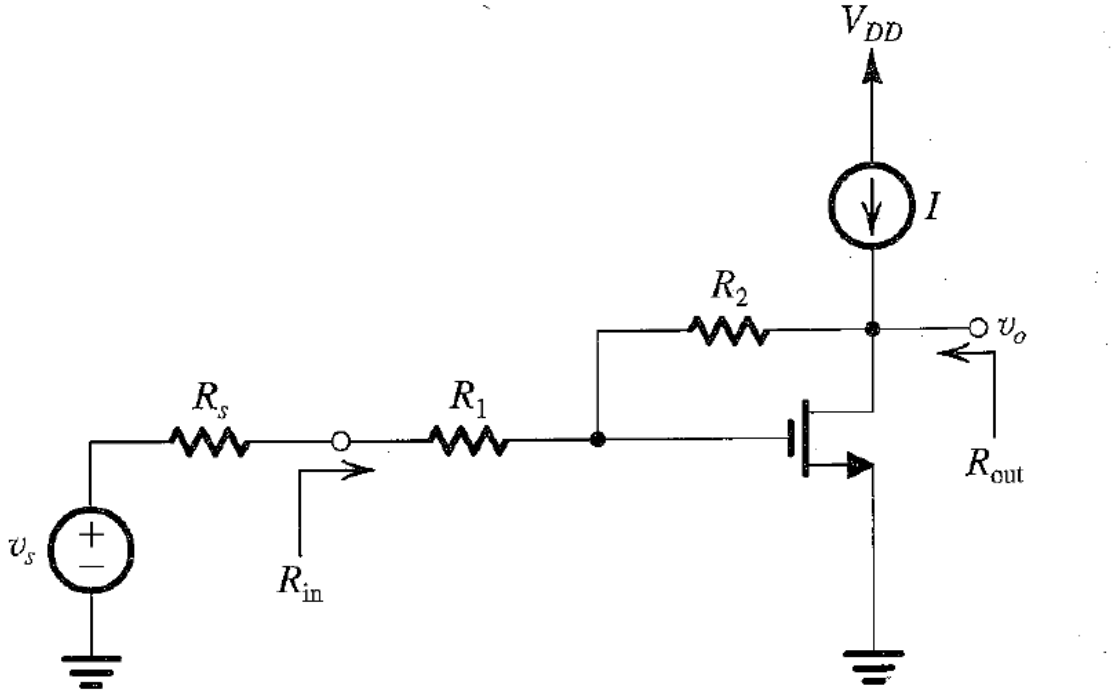



**FIGURE P8.42**

***8.51** For the amplifier circuit in Fig. P8.51, assuming that $V_s$ has a zero dc component, find the dc voltages at all nodes and the dc emitter currents of $Q_1$ and $Q_2$. Let the BJTs have $\beta = 100$. Use feedback analysis to find $V_o/V_s$ and $R_{in}$.

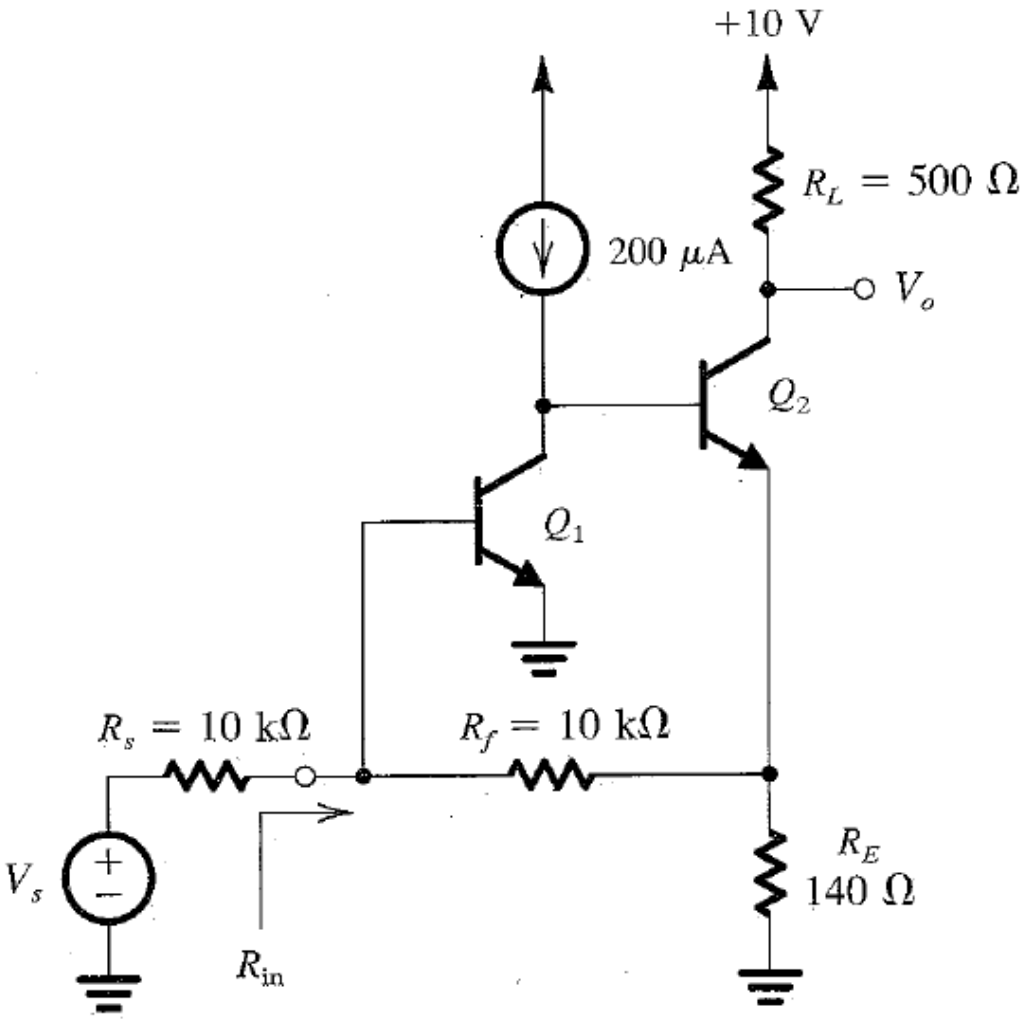



**FIGURE P8.51**