1. Explain in your own words how to minimize the following imperfections:
   a. Input offset voltage, $V_{os}$.
   b. Input bias current
2. You are given the following characteristics for a real amplifier along with the circuit on the right.

   **Op amp Characteristics:**
   - Input offset voltage: $V_{ios} = 4.0\text{mV}$
   - Input offset current: $I_{os} = 200\text{nA}$
   - Input bias current: $I_{ib} = 600\text{nA}$
   - Input resistance: $R_i = 1\text{M}\Omega$
   - Output resistance: $R_o = 50\Omega$
   - Open-loop gain: $A_o = 100\text{dB}$
   - Unity-gain bandwidth: $f_T = 2\text{MHz}$
   - Output swing limits: (within 2V or supply) $\pm 15\text{V}$
   - Slew rate: $4\text{V/\mu s}$

   [Circuit Diagram]

   (a) What is the voltage gain of the circuit? (make sure the sign is right)
   (b) For small input signals, what is the bandwidth of the circuit?
   (c) For an output signal of 10Vpp, what is the bandwidth of the circuit?
   (d) What is the maximum peak-to-peak output you can get without clipping?
   (e) Find the effect of the input offset voltage ($v_{in} = 0\text{V}$). (i.e. find output value when input =0)
   (f) How should the circuit be modified to minimize the effect of the input bias current? Show the modification on the schematic above and find the value of any added parts.

3. Drill Exercises 2.24, 2.26
4. Book Problems: 2.101, 2.110, 3.2
5. Assume the diodes are both ideal. State whether D1 and D2 are forward biased or reverse biased and verify your results. Determine $I$ and $V_o$

6. Assume the diodes are both ideal. State whether D1 and D2 are forward biased or reverse biased and verify your results. Determine $I$ through D1 and D2, and $V_o$

7. Assume the diode is ideal. Let $R_s = 10k\Omega$, $R_L = 10k\Omega$. Sketch and clearly label the voltage transfer characteristic $V_o$ vs. $V_s$. 

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