1. Identify the type of feedback used in the circuit below. Then find the corresponding values for A and f.

![Circuit Diagram]

2. The following circuit is used for feedback in a series-current configuration. Find the value of f for this circuit.

![Circuit Diagram]

3. Show the Bode magnitude and phase plots for a lowpass transfer function with corner frequencies of $0.1\omega$, $\omega$ and $10\omega$.

4. Describe how phase margin and gain margin can be obtained from Bode plots of amplitude and phase, i.e., plots of $af(s)$.

5. Find the y parameters for the following circuit.

![Circuit Diagram]
6. Identify the type of feedback used in the circuit below. Then find the corresponding values for A and f.

7. Identify the type of feedback used in the circuit below. Then find the corresponding values for A and f.
8. Identify the type of feedback used in the circuit below. Then find the corresponding values for \( A \) and \( f \).

9. A feedback amplifier has a return ratio of the form:

\[
T(s) = \frac{10^4}{\left(\frac{s}{10^4} + 1\right)\left(\frac{s}{10^6} + 1\right)\left(\frac{s}{10^7} + 1\right)}
\]

a. Determine whether this amplifier is stable or unstable and determine its phase margin.

b. If the amplifier is unstable a compensation capacitor, \( C_c \), can be inserted to reduce the lowest frequency pole approximately as

\[
\omega_1 = 10^5(1 - 19.98 \times 10^9 C_c)
\]

Compensate the amplifier so that the phase margin is 45 degrees. What value of compensation capacitor is needed?
10. A feedback amplifier has a return ratio of the form:

\[ T(s) = \frac{10^4}{\left(\frac{s}{10^3} + 1\right)\left(\frac{s}{10^6} + 1\right)\left(\frac{s}{10^7} + 1\right)} \]

a. Determine whether this amplifier is stable or unstable and determine its phase margin.

b. If the amplifier is unstable a compensation capacitor, \( C_c \), can be inserted to reduce the lowest frequency pole approximately as

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Compensate the amplifier so that the phase margin is 45 degrees. What value of compensation capacitor is needed?

11. Design a Class AB amplifier, with \( V_{BE} \) multiplier crossover distortion removal network. Assume the forward drop of the power transistors is 0.65 volts and the current to the multiplier circuit is 100 \( \mu \)A. The amplifier should be capable of supplying 50 W of power to an 8\( \Omega \) load. Estimate the quiescent current through the power transistors for your design.

12. Design a circuit to supply 15VDC with less than 1V ripple, at 1A load, from a 120VAC outlet.

13. Make sure that you understand the operation of, and are able to design, a simple series regulator including current limiting circuitry.

14. Make sure that you understand the basic operation of buck, boost and buck-boost switching regulators.