HW # 1

FOR WEDNESDAY

1.16. A certain amplifier has an open-circuit voltage gain of unity, an input resistance of 1 MΩ, and an output resistance of 100 Ω. The signal source has an internal voltage of 5 V and an internal resistance of 100 kΩ. The load resistance is 50 Ω. If the signal source is connected to the amplifier input terminals and the load is connected to the output terminals, find the voltage across the load and the power delivered to the load. Next, consider connecting the load directly across the signal source without the amplifier, and again find the load voltage and power. Compare the results. What do you conclude about the usefulness of a unity-gain amplifier in delivering signal power to a load?

1.19. The output voltage v_o of the circuit of Figure P1.19 is 100 mV with the switch closed. With the switch open, the output voltage is 50 mV. Find the input resistance of the amplifier.

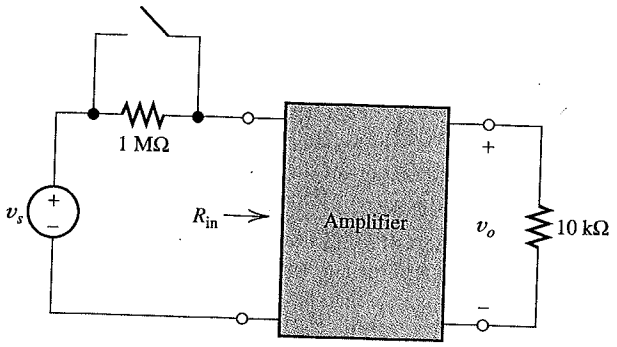

Figure P1.19

1.21. Two amplifiers have the characteristics shown in Table P1.21. If the amplifiers are cascaded in the order A–B, find the input impedance, output impedance, and open-circuit voltage gain of the cascade. Repeat if the order is B–A.

Table P1.21 Amplifier Characteristics for Problem 1.21.

Amplifier	Open-Circuit Voltage Gain	Input Resistance	Output Resistance
A	100	3 kΩ	400 Ω
B	500	1 MΩ	20 Ω

1.37. An amplifier has an input resistance of 20 Ω, an output resistance of 10 Ω, and a short-circuit current gain of 3000. The signal source has an internal voltage of 100 mV rms and an internal impedance of 200 Ω. The amplifier load is a 5-Ω resistance. Find the current gain, voltage gain, and power gain of the amplifier. If the power supply has a voltage of 12 V and supplies an average current of 2 A, find the power dissipated in the amplifier.