1. A pressure transducer has an open-circuit sensitivity of 2 mV per PSI and an output (or source or internal) resistance of 200 ohms. The transducer is connected to a load of 1800 ohms. If the voltage across the load resistor is 5 volts, find the pressure being measured, in PSI. (Answer = 2778 PSI)

2. Find $V_x$ and $R_x$ so that the voltage across $RL$ is zero at 0 °C, and has a scale factor (or sensitivity) of 10 mV/°C. Hint: analyze the circuit at two different temperatures

![Transducer circuit diagram]

$V_t = (10 \text{ mV/°F}) \text{ (temperature)}$
$R_{int} = 50 \Omega$
$RL = 450 \Omega$

3. A pressure transducer has an open-circuit sensitivity of 5 mV per PSI and an output (or source or internal) resistance of 500 ohms. The transducer is connected to a load of 2000 ohms. If the pressure being measured is 1800 PSI, find the voltage across the terminals of the transducer. (Answer = 7.2 volts)

4. A pressure transducer has an open-circuit sensitivity of 10 mV per PSI and an output (or source or internal) resistance of 100 ohms. The transducer is connected to a load of 1200 ohms. If the voltage across the load resistor is 2 volts, find the pressure being measured (in PSI). (Answer = 216.7 PSI)

5. An amplifier has an input resistance of 1000 ohms, an open circuit voltage gain of 40 dB, and an output resistance of 4 ohms. The amplifier is driving a 16 ohm load. Find the loaded voltage gain, current gain in decibels, and power gain. Hint: assume some small input voltage, such as .1 volt. (Answer: $G_v = 80$, $G_i = 74$ dB, $G_p = 400,000$)

6. An amplifier has an input resistance of 800 ohms, an open circuit voltage gain of 60 dB, and an output resistance of 6 ohms. The amplifier is driving a 24 ohm load. If the input voltage is 20 mV, find the power delivered to the load. (Answer = 10.7 W)

7. A non-inverting amplifier with an input resistance of 17K ohms, open circuit voltage gain of 40 dB, and an output resistance of 37 ohms is driving a load of 296 ohms. The signal source for the amplifier’s input voltage is a temperature transducer with an open circuit scale factor of 19 mV per degree and a source resistance of 2125 ohms.

   a) At a temperature of 4 degrees, find the voltage across the load and the current gain of the amplifier in decibels. (Answer: $V_{load} = 6.005$ volts, $G_i = 74.16$ dB)

   b) If the voltage across the load were −8 volts, find the temperature being measured. (Answer = -5.33°)