

Your Name
 AM Radio Design Lab
 Date Completed

PRELAB

1. Calculate the value of R3 that will allow 0.3 mA DC to flow through the microphone in Figure 6. (For this question, assume the microphone has an internal resistance of 0 Ω .)
2. The op-amp in Figure 6 is acting like an inverting amplifier. If R1 is 10 k Ω , calculate R2 so that the amplifier will have a gain of -56.
3. What is the wavelength of a 100.3 MHz radio wave?
4. We will be using a variable capacitor with a nominal value of 66 pF. If we use this value for the capacitor in Figure 8, what inductor value is needed to give the tank circuit a center frequency of 1.45 MHz? With this inductor, what is the Q of this circuit? Hint: you will first need to solve for the transfer function of the tank circuit, $\frac{V_o(s)}{I_s(s)} = H(s)$.
5. Using the inductor value calculated in Question 4, what is the center frequency of the filter if the capacitor is set to its minimum value (8.5 pF)? What is center frequency if the capacitor is set to its maximum value (120 pF)?
6. What is the cutoff frequency of the low pass filter in figure 9? Hint: you will first need to solve for the transfer function of the tank circuit, $\frac{V_o(s)}{I_s(s)} = H(s)$.
7. If R1 in Figure 7 is 10 k Ω , calculate the resistor value needed for R2 to make the gain of the op-amp 57.

BUILDING THE RECIEVER

8. Repeat Question 4 using the frequency assigned to you by your T.A.
9. Adjust your variable capacitor to its minimum capacitance. At what frequency is the center of the bump in the FFT?
10. Adjust your variable capacitor to its maximum capacitance. At what frequency is the center of the bump in the FFT?
11. Set your variable capacitor to its minimum capacitance. What radio frequency produces the loudest sound from your speakers? Do not touch either antenna while you are adjusting the AFG.
12. Set your variable capacitor to its maximum capacitance. What radio frequency produces the loudest sound from your speakers? Do not touch either antenna while you are adjusting the AFG.