

Lab 11 (Rev. 1)
Sine Wave Oscillators

Part 1

1. Assemble the circuit in Fig. 1; simulate the circuit in MultiSim and then test the real circuit:

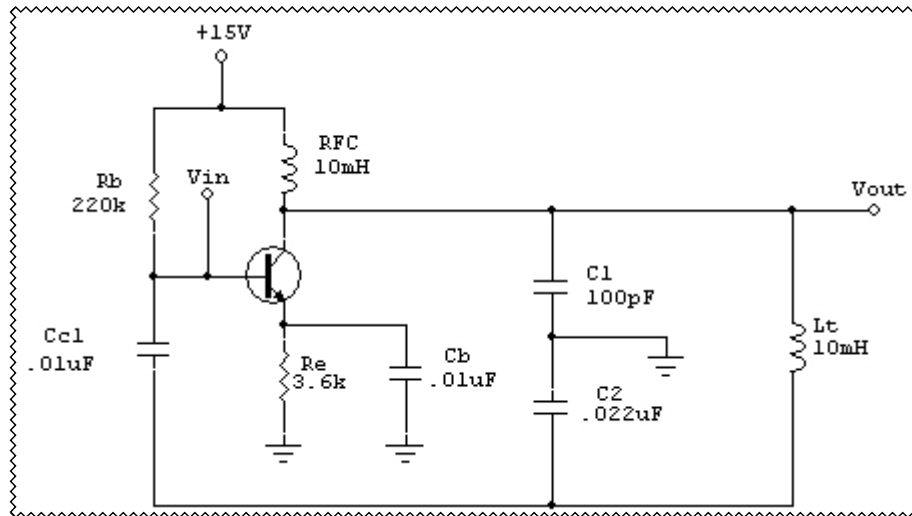


Fig. 1

2. Measure the following values:

$V_B =$ _____

MultiSim: $V_B =$ _____

$V_C =$ _____

MultiSim: $V_C =$ _____

$V_E =$ _____

MultiSim: $V_E =$ _____

3. Connect channel 1 of the oscilloscope to V_{IN} and channel 2 to V_{OUT} ; then measure the voltage gain of the circuit; is the gain greater than 1?

$$A_V = \frac{V_{OUT}}{V_{IN}} =$$

4. Calculate the total capacitance in the “tank” circuit:

$$C_T = \frac{C_1 C_2}{C_1 + C_2} =$$

5. Calculate the frequency of oscillation:

$$F_O = \frac{1}{2\pi\sqrt{L_T C_T}} =$$

6. Observe the output waveform and sketch the waveform in Fig.2: (indicate peak to peak amplitude)

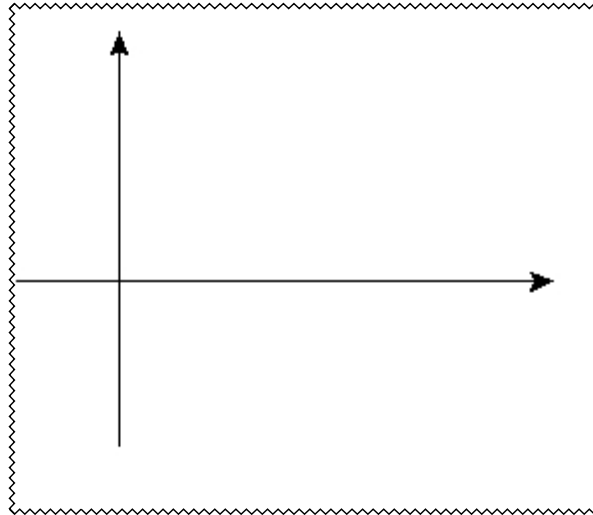


Fig. 2

7. Is a smooth sine wave produced? Compare the calculated, measured and MultiSim values for this circuit.

Part 2

1. Assemble the circuit in Fig. 3:

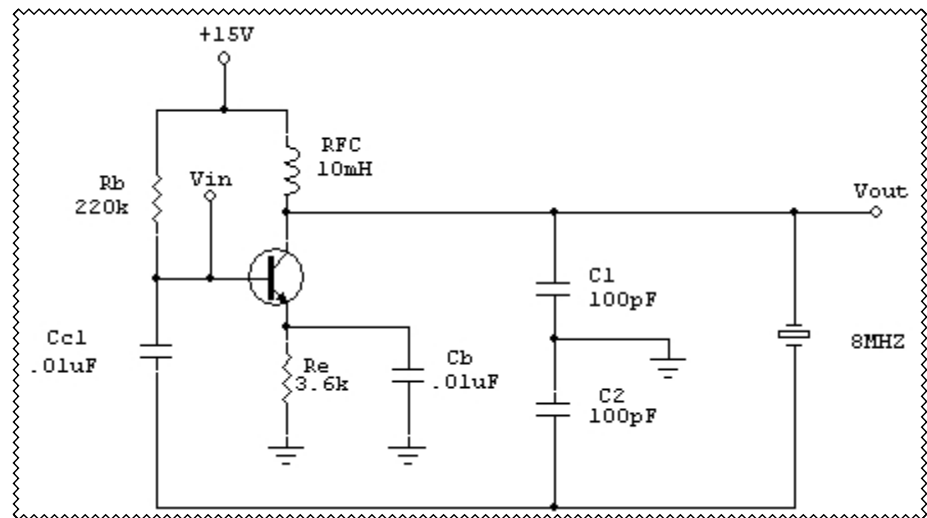


Fig.3

2. Once again observe the output waveform at V_{OUT} : What is the frequency of oscillation? How close is this frequency to the value marked on the crystal?

3. Sketch the output waveform in Fig. 4; indicated the amplitude in peak to peak. Is the waveform smooth free of distortion?

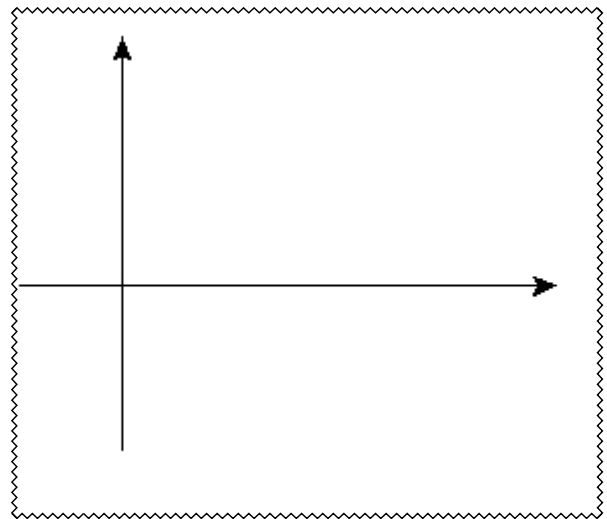


Fig. 4