ET-341/L Solid State II
Lab 4 Frequency Effects

1. Assemble the circuit in Fig. 1:

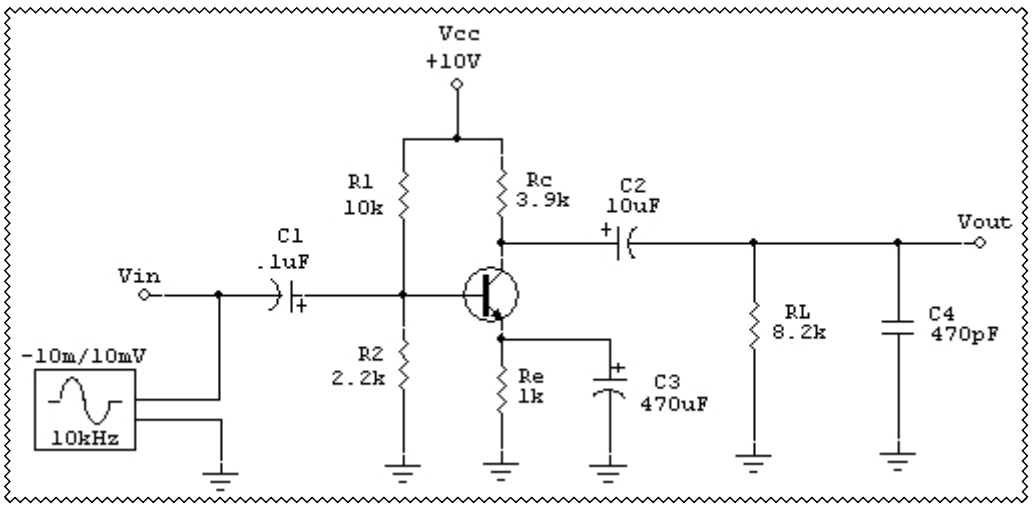

Fig.1

2. Apply a signal of 20mVpp and at 10kHz.

3. Place channel 1 of the oscilloscope at V_{IN} and channel 2 at V_{OUT}.

4. Measure Vout: _____

5. Calculate the gain of this circuit: $A_v = 20\log\left(\frac{Vout}{Vin}\right)$ _____dB

6. Increase the frequency of the signal generator until the output drops to .707 of the maximum value measured in step 4. V_{OUT} = _____

7. Note the frequency at which the value of V_{OUT} dropped; this is the high frequency cut-off: F_H = _____

8. Measure the gain at this frequency using the formula from step 5.

Av = _____

9. Lower the frequency of the signal generator until V_{OUT} drops to .707 of the maximum value measured in step 4. V_{OUT} = _____

10. Note the frequency at which the value of V_{OUT} dropped; this is the low frequency cut-off: F_L = _____

11. Again, measure the gain at this frequency using the formula from step 5.

Av = _____.

12. The results of these measurements is that F_L and F_H are two "corner" frequencies at which V_{OUT} should drop to .707 of the maximum value of V_{OUT} or 3dB less than the maximum gain.

13. Using the measurements from the previous steps, sketch a Bode plot in Fig. 2 and indicate maximum gain, the gain at the corners; upper cut-off frequency (F_H) and lower cut-off frequency (F_L.)

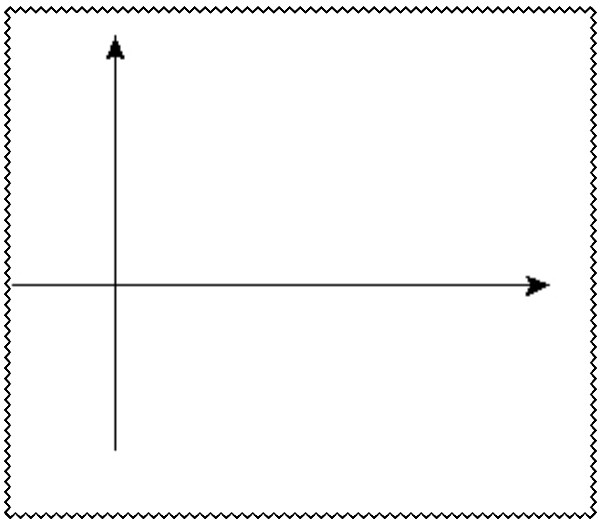

Fig. 2

14. Modify the original circuit by changing C1 to $.47\,\mu F$ and C4 to $220\,pF$. The results of these changes are that both the low frequency cut-off and the high frequency cut-off should change.

15. Repeat the previous steps to find the new frequency response and sketch a new Bode plot in Fig. 3.

16. How have the corner frequencies changed?

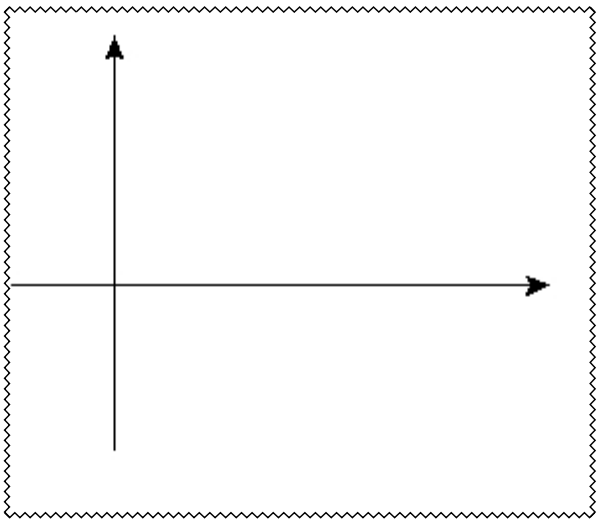

Fig. 3