Experiment 8
Bipolar Junction Transistor
In-Lab Report

Q1. Fill table 1 below and comment on the gain change as the input amplitude or frequency change?

Vs	Vo	Vo/Vs	Is	Io	Io/Is	Ps	Po	Po/Ps
0.1V 10KHz	0.04125	0.4125	51.56	51.56	1	12.49	3.77 m	0.301
1.0V 10KHz	0.4125	0.4125	0.125	0.125	1	73.43	51.5 m	0.702
0.1V 50Hz	0.04125	0.4125	51.56	51.56	1	12.49	12.49	0.301
0.1V 1MHz	0.04125	0.4125	51.56	51.56	1	12.49	12.49	0.301

TABLE 1.

In a passive element (resistors) , the gain doesn't depend on the frequency or on the change in the input amplitude.

Q2. In the circuit of figure 3c, measure the DC values of I_C, I_B, V_{BE}, and V_{CE} and verify that the BJT is operating the active region. Indicate the measured values and your comment in the space below.

Vbe = 0.65 V
Vce = 4 V

we are operating in the active region since Vce is between the non-active region (12 V) and the saturation region (0.2 V). thus we are in the active region. 12>4>0.2.

Q3. Fill table 1 below and comment on the gain change as the input amplitude or frequency change?

V_S	Vo	Vo/Vs	Is	Io	Io/Is	Ps	Po	Po/Ps
100mV 100KHz	2.02 V	20	11 micr	0.606 n	55	0.568 n	1.211 n	2133.5

TABLE 2.

Q4. Decrease the frequency of the input signal to less than 100 Hz and note how the output changes. Increase the frequency of the input to more than 1 MHz and note how the output changes. Increase the amplitude of the input signal to more than 300 mV peak- to-peak and note how the output change. Comment on the results.

if the frequency less than 100Hz (70 Hz) then V0 = 0.112 V
if the frequency greater than 1 MHz (1.5 MHz) thus V0 = 0.360 V
if the amplitude greater than 300 mV (400 mV) thus V0 = 6.64V and we have distortion.

Q5. Indicate the values of f1, f2 and the bandwidth of the amplifier.

F1 = 750 Hz

F2 = 60 KHz

bandwidth = F2-F1 = 59.25 KHz