Assignment 2 - Negative Feedback and Push-Pull Amplifier - ABET

This Assignment aims at verifying and expanding, with experiments and supporting simulations, your knowledge and understanding of the negative feedback concept.

Please document each step with snapshots, pictures, and your observations. Wherever possible please include the date and time field and the AD S/N. Please include this page.
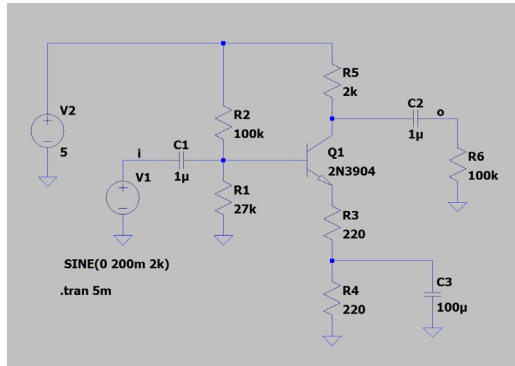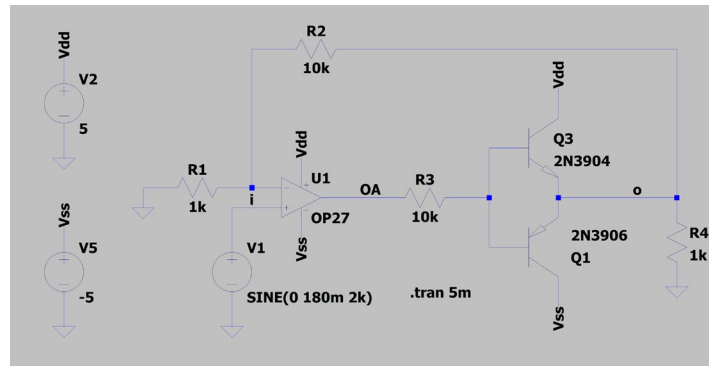

Figure 1	Figure 2

1) Using the simulator, design the configuration in Fig. 1 by connecting the top of capacitor C3 directly to the emitter of Q1 (**8pts**)

   a) adjust the input amplitude to obtain at the output a ~1.5V 2kHz sinusoidal signal
   b) simulate the fast Fourier transform (FFT) using the Hamming window
   c) simulate the frequency response (Bode plot) and measure the -3dB frequency

2) Starting from the previous configuration, connect the top of capacitor C3 at the node between R3 and R4 as shown in Fig. 1 (**8pts**)

   a) adjust the input amplitude to obtain at the output a ~1.5V 2kHz sinusoidal signal
   b) simulate the fast Fourier transform (FFT) using the Hamming window
   c) simulate the frequency response (Bode plot) and measure the -3dB frequency

3) Build the circuits at (1) and (2) and experimentally reproduce all simulations (**30pts**)

4) Using the simulator, design the configuration in Fig. 2 by connecting the right side of R2 to the output OA of U1 (**8pts**)

   a) adjust the input amplitude to obtain at the output a 2V 2kHz sinusoidal signal
   b) simulate the fast Fourier transform (FFT) using the Hamming window

5) Starting from the previous configuration, connect the right side of R2 to the output of the BJT pair (emitters) as shown inFig.2 (**8pts**)

   a) adjust the input amplitude to obtain at the output a 2V 2kHz sinusoidal signal
   b) simulate the fast Fourier transform (FFT) using the Hamming window

6) Build the circuits at (4) and (5) and experimentally reproduce all simulations (**30pts**)

7) Explain in your own words any difference between simulations and measurements, and why the configurations at (2) and (5) have lower distortion (less harmonics) than the configurations at (1) and (4) (**8pts**)) *(ABET PI-63, PI-64)*