ELEC 401 Homework 1 & 2 Solutions

Review Sheet #3

V_{SDQ}=2.02V
g_m=1.26mA/V
R_{in}=794Ω
R_{out}=24kΩ
A_v=24.2V/V

4.44 a) V_{GSQ}=1.107V, R_1=345.2kΩ, R_2=2291kΩ, R_S=6kΩ
b) g_m=0.7071mA/V, A_v=0.809, R_o=1.14kΩ

6.20 I_{CQ}=1.921mA
g_m=73.9mA/V, r_π=1.35kΩ, r_o=52.1kΩ
A_v=-8.04V/V
A_I=-44.9A/A
R_i=1.184kΩ

6.47 a) I_{BQ}=6.17μA, V_B=61.7mV, V_E=0.762V
b) g_m=19mA/V, r_π=4.21kΩ, r_o=304kΩ
c) A_v=0.906, A_I=14.8
d) A_v=0.728, A_I doesn't change

7.11 a) A_V=-159
b) τ_1=5.31ms, τ_2=332ns
c) C_c=932nF, C_L=55.3pF

7.32 a) I_{CQ}=198μA, V_E=-717mV, V_c=1.483V, R_c=7.65kΩ
b) r_π=15.73kΩ, g_m=7.627mA/V, A_v=-25.8
c) $f_C = \frac{1}{2\pi(R_C+R_L)C_C}$, $f_E = \frac{1}{2\pi\left(\frac{r_\pi+R_i}{\beta+1}\right)C_E}$
d) C_C=115nF, C_E=74.8μF

7.33 a) V_{GS}=1.8V, R_S=6.4kΩ, V_D=2.2V, R_D=5.6kΩ
b) g_m=1mA/V, f_A=4.97Hz, f_B=36.8Hz
c) f_B=31.8Hz

7.39 V_{GS}=3.55V, g_m=1.55mA/V, C_L=121pF, A_V=0.4V/V

7.40 I_{BQ}=11.3μA, I_{CQ}=1.13mA, r_π=2.3kΩ, g_m=43.46mA/V, A_m=43.7dB
f_L=4.83Hz, f_H=3.15MHz