

ELEC 401 Homework 1 & 2 Solutions

Review Sheet #3

$$V_{SDQ}=2.02V$$

$$g_m=1.26mA/V$$

$$R_{in}=794\Omega$$

$$R_{out}=24k\Omega$$

$$A_v=24.2V/V$$

4.44 a) $V_{GSQ}=1.107V$, $R_1=345.2k\Omega$, $R_2=2291k\Omega$, $R_S=6k\Omega$

b) $g_m=0.7071mA/V$, $A_v=0.809$, $R_o=1.14k\Omega$

6.20 $I_{CQ}=1.921mA$

$$g_m=73.9mA/V, r_{\pi}=1.35k\Omega, r_o=52.1k\Omega$$

$$A_v=-8.04V/V$$

$$A_i=-44.9A/A$$

$$R_i=1.184k\Omega$$

6.47 a) $I_{BQ}=6.17\mu A$, $V_B=61.7mV$, $V_E=0.762V$

b) $g_m=19mA/V$, $r_{\pi}=4.21k\Omega$, $r_o=304k\Omega$

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) $\tau_1=5.31ms$, $\tau_2=332ns$

c) $C_c=932nF$, $C_L=55.3pF$

7.32 a) $I_{CQ}=198\mu A$, $V_E=-717mV$, $V_c=1.483V$, $R_c=7.65k\Omega$

b) $r_{\pi}=15.73k\Omega$, $g_m=7.627mA/V$, $A_v=-25.8$

c) $f_C = \frac{1}{2\pi(R_C+R_L)C_C}$, $f_E = \frac{1}{2\pi\left(\frac{r_{\pi}+R_L}{\beta+1}\right)C_E}$

d) $C_c=115nF$, $C_E=74.8\mu F$

7.33 a) $V_{GS}=1.8V$, $R_S=6.4k\Omega$, $V_D=2.2V$, $R_D=5.6k\Omega$

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 $I_{BQ}=11.3\mu A$, $I_{CQ}=1.13mA$, $r_{\pi}=2.3k\Omega$, $g_m=43.46mA/V$, $A_m=43.7dB$

$$f_L=4.83Hz, f_H=3.15MHz$$

