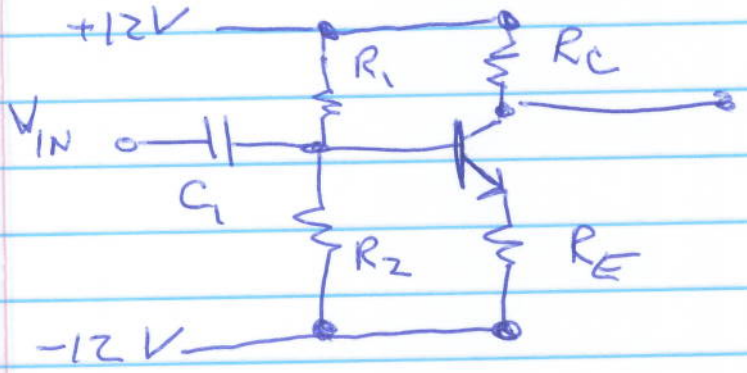
COMMON EMITTER AMPLIFIER

$G = -10$, $V_{SUPPLY} = \pm 12\ V$

$f_{3dB} = 10\ kHz$ (WORKING $f = 100\ kHz$)

FOLLOW EXAMPLE ON P116, MANUAL
FOR SIMPLICITY IGNORE BYPASS C.



FOR $I_Q = 1\ mA$, CHOOSE $\boxed{R_C = 10\ k\Omega}$
$G = -10$, CHOOSE $\boxed{R_E = 1\ k\Omega}$
NOTE, THIS PUTS $V_E = -1\ V$
SO, $V_B = -10.4\ V$

~~SELECT~~ SELECT R_1/R_2 RATIO

$R_2/R_1 \simeq \frac{1.6}{22.4}$ (USING ABSOLUTE VALUES OF VOLTAGE DROPS)

$\simeq \frac{1}{14}$

SET $R_2 = 10\ k\Omega$, $R_1 = 120\ k\Omega$
(STD RESISTOR VALUES)

COMMON EMITTER AMPLIFIER

CALCULATE V_B MORE ACCURATELY

$$V_B = \frac{R_B}{R_2+R_1} * 24V \quad -12V$$

$$= \frac{24V}{13} - 12V$$

$$V_B = -10.1V$$

$$\Rightarrow V_E \simeq -10.7V$$

$$\Rightarrow I_Q = \frac{-10.7V-(-12V)}{1k\Omega} = 1.3\ mA$$

THIS IS CLOSE ENOUGH TO OUR DESIGN CURRENT OF $I_Q = 1\ mA$.

$$f_{3dB} = \frac{1}{2\pi R' C_1}, \quad w/R' = R_1 \| (R_2 \| \beta R_E) \simeq R_2$$

$$\Rightarrow C_1 \simeq \frac{1}{2\pi f_{3dB} R_2}$$

SET $f_{3dB} \equiv \frac{1}{10} f_{WORK}$

$= 10kHz$

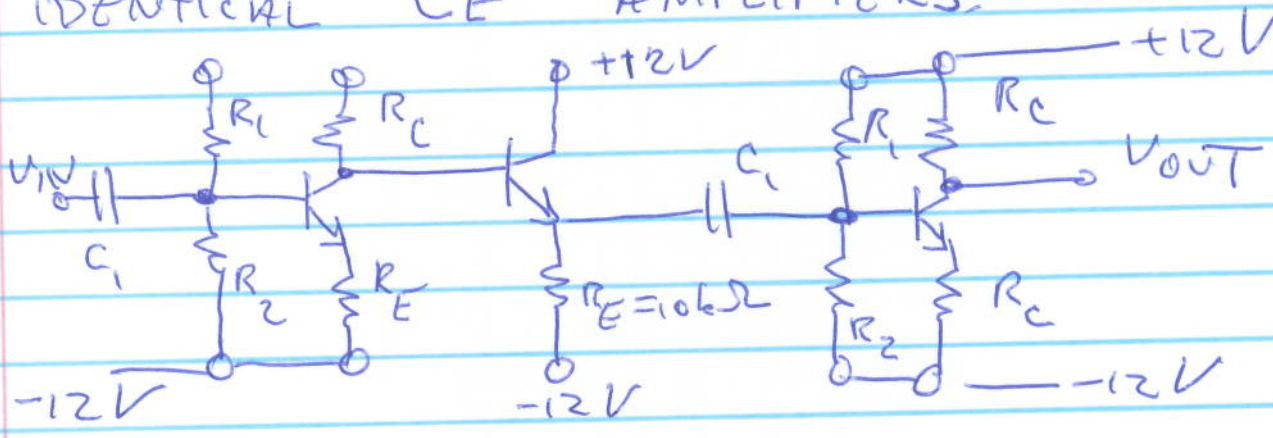
So,

$$C_1 \triangleq \frac{1}{2\pi \times 10kHz * 10k\Omega}$$

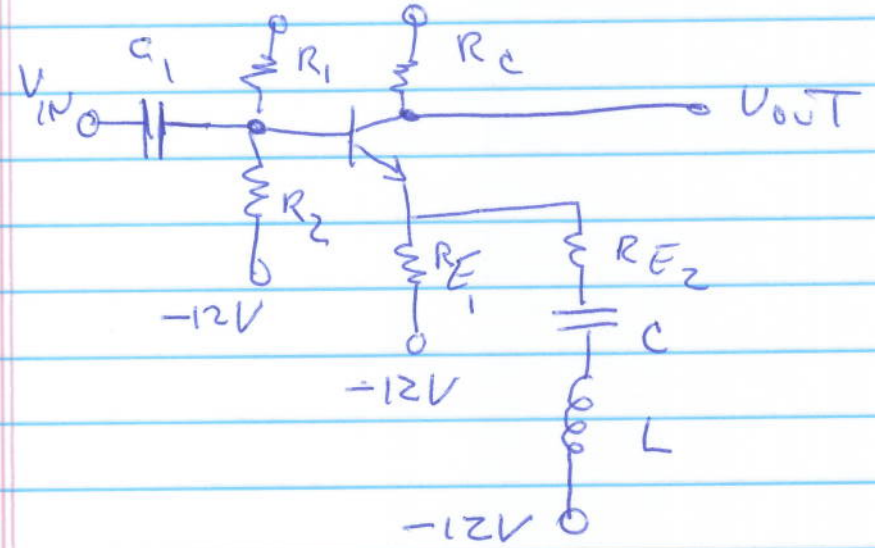
$$\boxed{C_1 \simeq 0.001\ \mu F}$$

#2 MANY VARIATIONS POSSIBLE.

BASIC IDEA IS TO INSERT EMITTER FOLLOWER BETWEEN IDENTICAL CE AMPLIFIERS.



#3. MANY VARIATIONS POSSIBLE. HERE'S ONE.



CHOOSE R_1 & R_2:

$R_1 = 120\,k\Omega$

$R_2 = 10\,k\Omega$

$C_1 = 0.01\,\mu F$

$R_C = 15\,k\Omega$

$R_{E_2} = 150\,\Omega$

$G = -15\,k\Omega / 150\,\Omega = -100$

$R_{E_1} = 1\,k\Omega$

$Z_L = j\omega L$

$Z_C = -j/\omega C$

@ $f = 10\,kHz$ THESE IMPEDANCES CANCEL