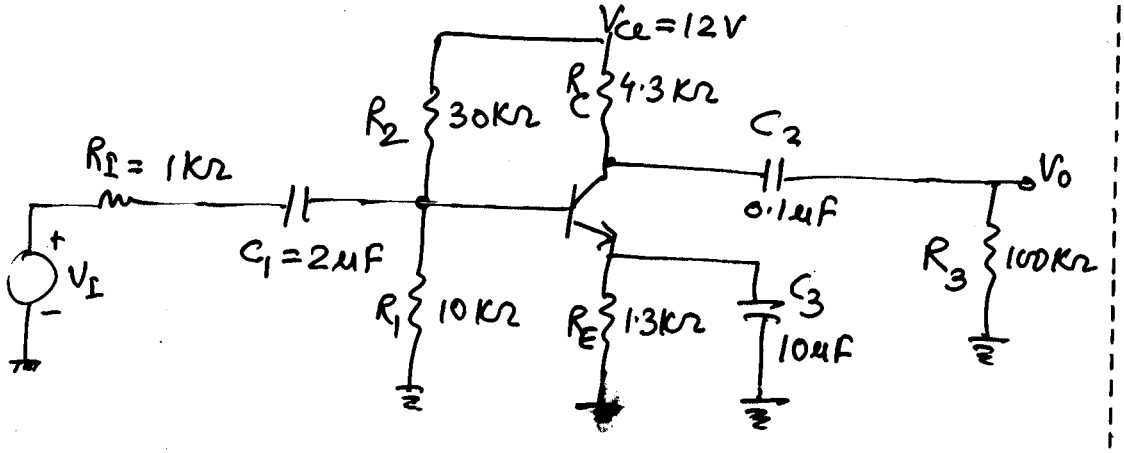
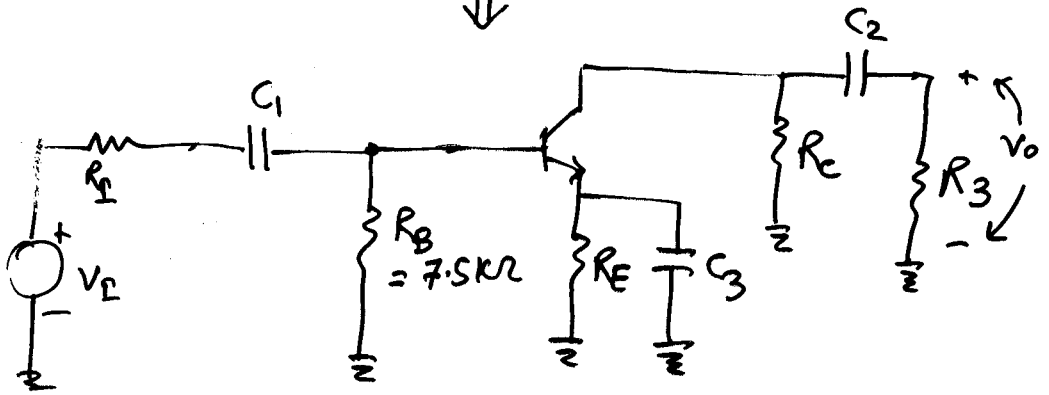
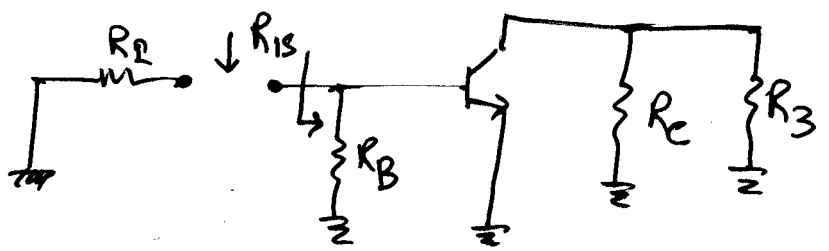
Estimate of ω_L for the CE amplifier (Fig 17.6)





R_{IS} (Resistance seen by C_1)

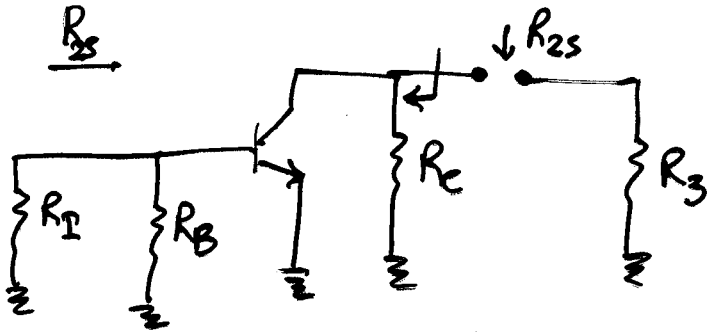


$I_C = 1.73\,mA$
$V_{CE} = 2.32\,V$
$\beta_0 = 100$
$V_A = 75\,V$
$r_\pi = 1.45K\Omega$
$r_o = 44.71K\Omega$

$$R_{IS} = R_I + (R_B \| r_\pi) = 1000 + (7500 \| 1450) = 2.22K\Omega$$

$$\frac{1}{R_{IS} \cdot C} = \frac{1}{(2.22K)(2\mu F)} = 225\ rad/sec$$

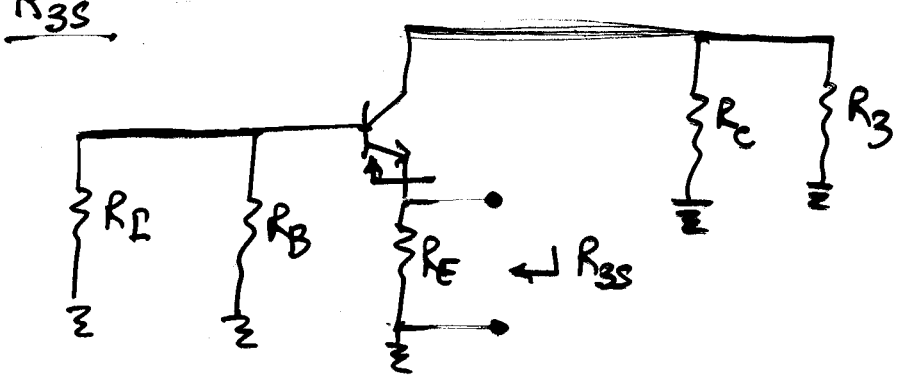
R_{2s}



$$R_{2s} = (R_C \| r_o) + R_3 = (4.3\text{k}\Omega \| 44.7\text{k}\Omega) + 100\text{k} = 104\ \text{k}\Omega.$$

$$\frac{1}{R_{2s} \cdot C_2} = \frac{1}{(104\ \text{k}\Omega)(0.1\ \mu\text{F})} = 96.1\ \text{rad/sec}$$

R_{3s}



$r_o \rightarrow \infty$

$$R_{3s} = \left[R_E \| \frac{\{r_\pi + (R_1 \| R_B)\}}{(\beta_o + 1)} \right] = 22.7\ \Omega$$

$$\frac{1}{R_{3s} C_3} = 4410\ \text{rad/sec}$$

$$\omega_L = \sum_{i=1}^{3} \frac{1}{R_{is} C_i}$$

$$\omega_L = 225 + 96.1 + 4410$$

$$\approx 4730 \text{ rad/sec}$$

$$f_L = \frac{\omega_L}{2\pi} = 753 \text{ Hz.}$$