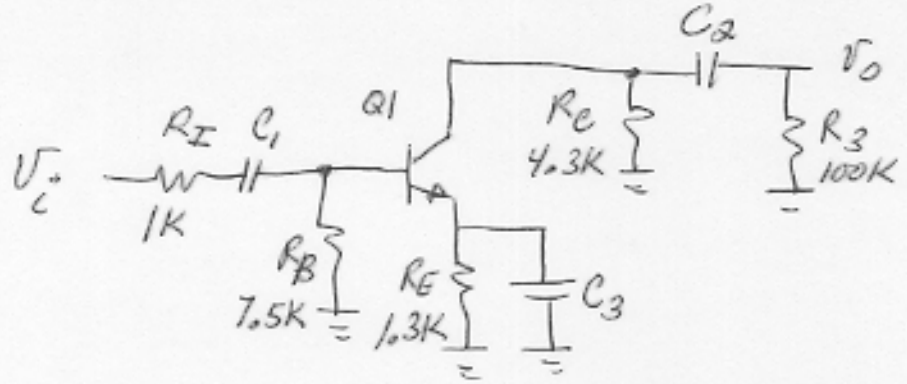
Jaeger 3rd ed

16.34



Q1 data

$I_C = 1\,mA$

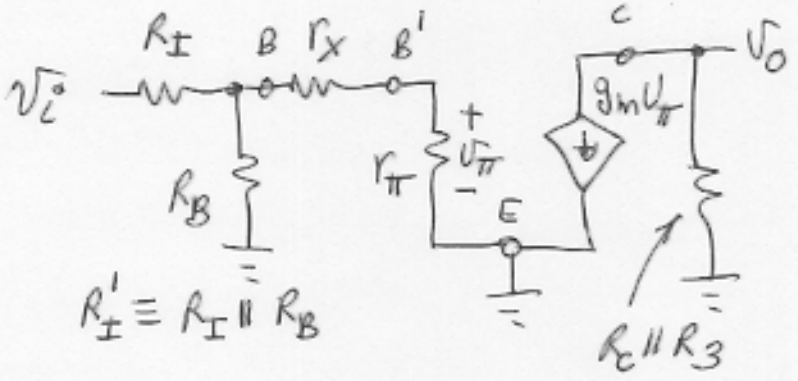
$\beta_0 = 125$ (rather large)

$r_x = 500\Omega/\Omega\ 0\Omega$

$g_m = \frac{I_C}{V_T} = 40\ mS$

$r_\pi = \frac{\beta_0}{g_m} = 3125\Omega$

MB eq 7



MB gain

$$A_V \equiv \frac{v_o}{v_i} = \underbrace{\frac{r_\pi}{R_I' + r_x + r_\pi}}\ \underbrace{\frac{R_B}{R_I + R_B}}_{0.88}\ \underbrace{(-g_m)(R_C \| R_3)}_{-165}$$

(a) $A_V = -100.9$ for $r_x = 500\Omega$

(b) $= -113.5$ for $r_x = 0\Omega$

The point? r_x lowers the midband gain, but often it's not by enough to accurately measure r_x through a MB gain measurement. r_x is better measured through HF testing.