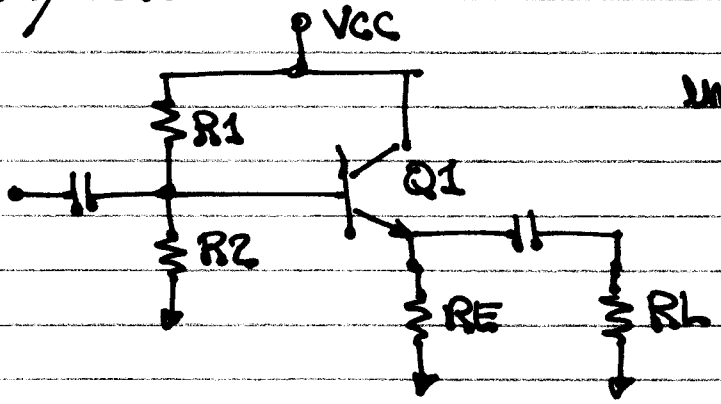
PP10.1/367.



emitter follower

$V_{CC}=18V$ $RE=910\Omega$ $R1=16K$ $R2=22K$ $h_{FE}=200$

$$V_B = V_{CC} \times R2/(R1+R2) = 18.0V \times 22K/(16K+22K)$$

$$\boxed{V_B = 10.42V}$$

$$V_E = V_B - 0.7V = 10.42V - 0.7V$$

$$\boxed{V_E = 9.72V}$$

$$I_E = V_E/RE = 9.72V/910\Omega$$

$$\boxed{I_E = 10.68mA}$$

$$V_{CEQ} = V_{cc} - V_E = 18.0V - 9.72V$$

$$\boxed{V_{CEQ} = 8.28V}$$

PP1Ø.2/368.

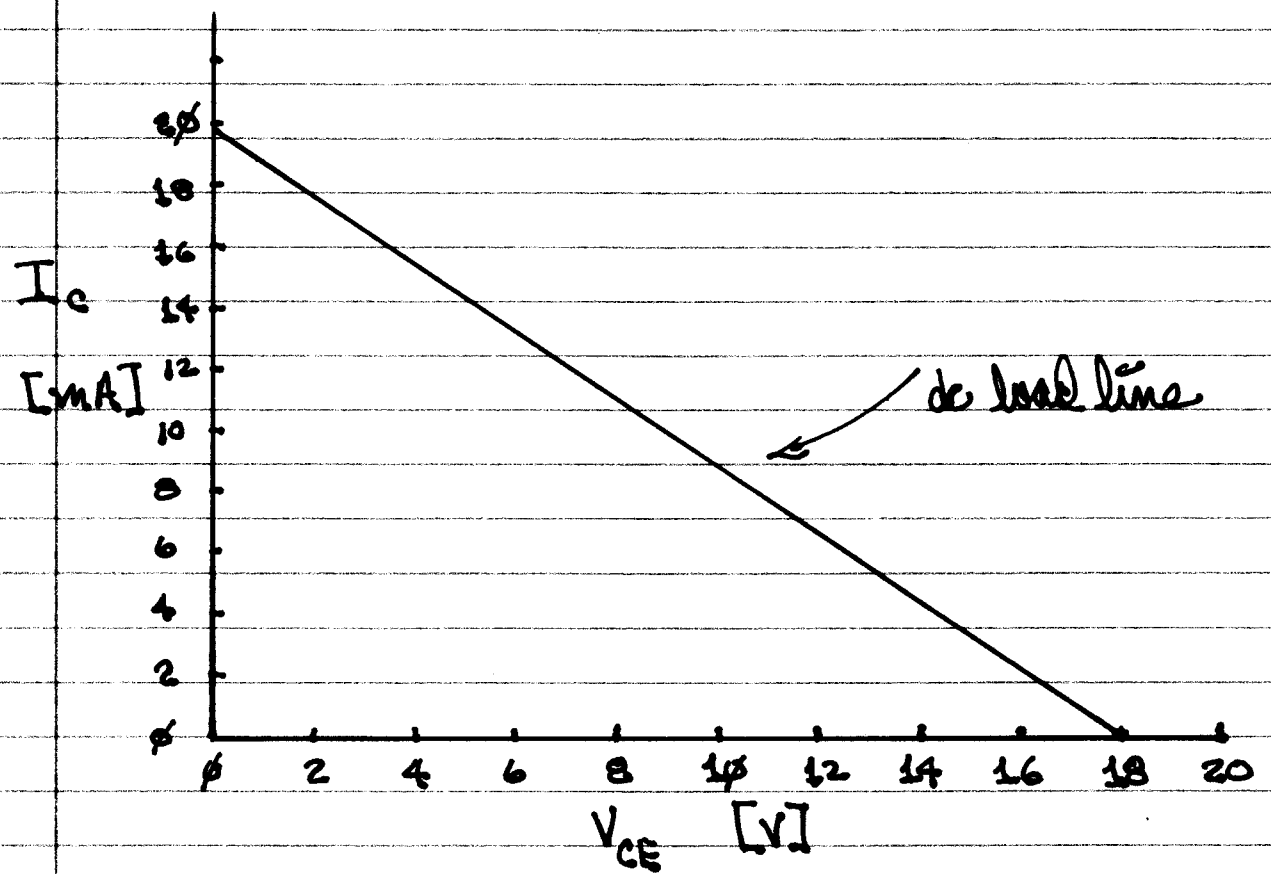
derive and draw the dc load line from PP1Ø.1

$V_{CC} = 18.ØV \qquad R_E = 91Ø\ \Omega$

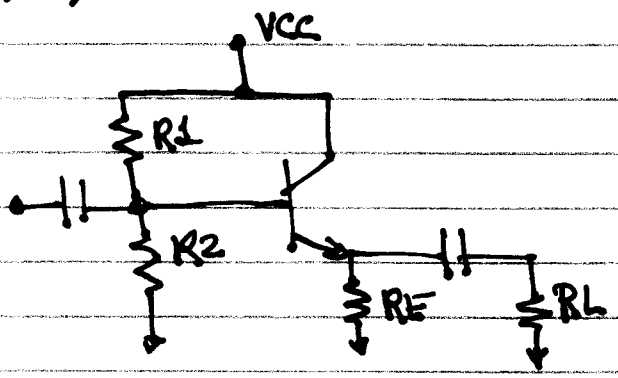
$I_{C(sat)} = V_{CC}/R_E = 18.ØV/91Ø\ \Omega$

$$\boxed{I_{C(sat)} = 19.8\ mA}$$

$$\boxed{V_{CE(off)} = V_{CC} = 18.ØV}$$



PP10.3 / 371.



VCC = 12V R1 = 25K R2 = 33K RE = 2K RL = 4K

$r_E = RE \| RL = 2K \| 4K$

$\boxed{r_E = 1.33K}$

$r_e' = 25mV / I_E = 25mV / 10.68mA$

$\boxed{r_e' = 2.34\,\Omega}$

$A_v = r_E / (r_e' + R_E)$

$A_v = 1.33K / (2.34\,\Omega + 1.33K)$

$\boxed{A_v = 0.9982}$

PP 10.4/372.

from 10.3/371 $A_v = 0.9982$

if $A_i = 24$

$$A_p = A_i A_v$$

$$A_p = 24.0 \times 0.9982$$

$$\boxed{A_p = 23.957}$$

PP 10.5 / 373

from PP10.1 $h_{fe} = 240$ $RL = 2K$

$h_{fc} \cong h_{fe} = 240$

$r_E = RE \parallel RL$

$r_E = 910\Omega \parallel 2K$

$\boxed{r_E = 625\Omega}$

$Z_{in(base)} = h_{fc}(r'_e + r_E)$

$Z_{in(base)} = 240 \times (2.34\Omega + 625\Omega)$

$\boxed{Z_{in(base)} = 150.6K}$

$Z_{in} = R1 \parallel R2 \parallel Z_{in(base)}$

$Z_{in} = 16K \parallel 22K \parallel 150.6K$

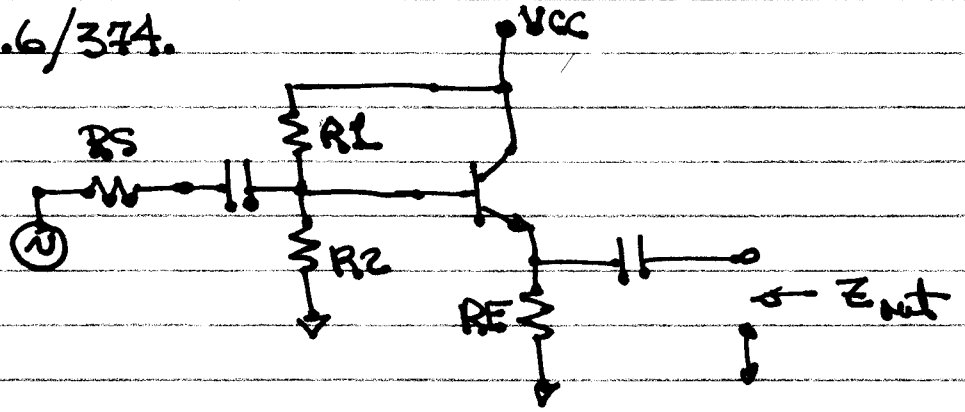
$1/Z_{in} = 1/16K + 1/22K + 1/150.6K$

$1/Z_{in} = 62.5\times10^{-6} + 45.45\times10^{-6} + 6.64\times10^{-6}$

$1/Z_{in} = 114.59\times10^{-6}$

$\boxed{Z_{in} = 8.727K}$

PP1ϕ.6/374.



$V_{CC} = 12.\phi V \quad R_E = 2\phi\phi\,\Omega \quad R1 = 2.5K \quad R2 = 3.3K$

$R_S = 5\phi\phi\,\Omega \quad h_{FC} = 18\phi \quad h_{fc} = 2\phi\phi \quad h_{ic} = 3K$

$r'_e = h_{ic} / h_{fc} = 3K / 2\phi\phi$

$$\boxed{r'_e = 15.\phi\,\Omega}$$

$R'_{in} = R1 \,||\, R2 \,||\, RS$

$R'_{in} = 2.5K \,||\, 3.3K \,||\, 5\phi\phi\,\Omega$

$1/R'_{in} = 1/2.5K + 1/3.3K + 1/5\phi\phi\,\Omega$

$1/R'_{in} = 4\phi\phi \times 1\phi^{-6} + 3\phi3.\phi \times 1\phi^{-6} + 2\phi\phi\phi \times 10^{-6}$

$1/R'_{in} = 2.7\phi3 \times 1\phi^{-6}$

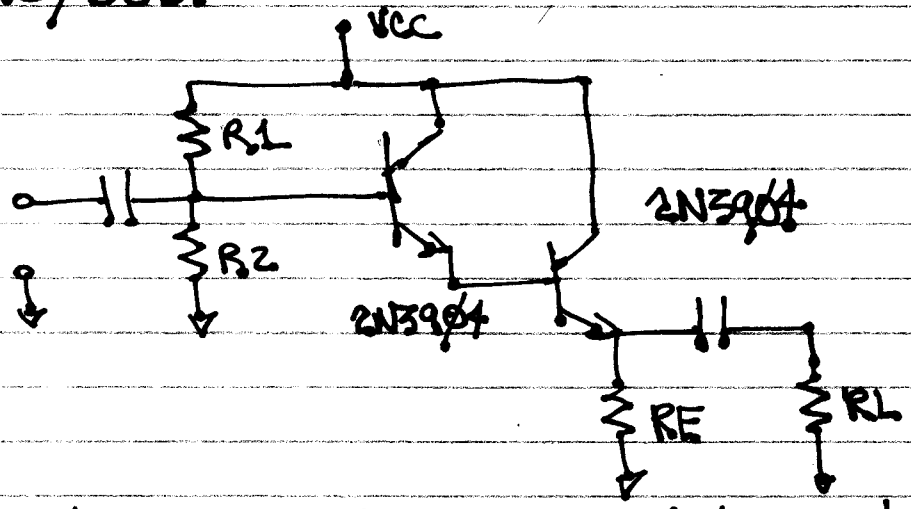
$$\boxed{R'_{in} = 37\phi.\phi\,\Omega}$$

$Z_{out} = RE \,||\, (r'_e + R'_{in}/h_{fc}) = 2\phi\phi \,||\, (15.\phi + \frac{37\phi}{2\phi\phi})$

$1/Z_{out} = 1/2\phi\phi + 1/16.85$

$$\boxed{Z_{out} = 15.54 \text{ ohms}}$$

PP10.8/383.



$R1 = 120K$ $R2 = 120K$ $VCC = 10.0V$ $h_{FC} = 240$

$RE = 390\ \Omega$

$$R_{IN1} = h_{FC1} \times h_{FC2} \times R_E$$

$$R_{IN1} = 240 \times 240 \times 390\ \Omega$$

$$\boxed{R_{IN1} = 22.464\ M}$$