ENEL 434 Lecture 6

13 March 2008

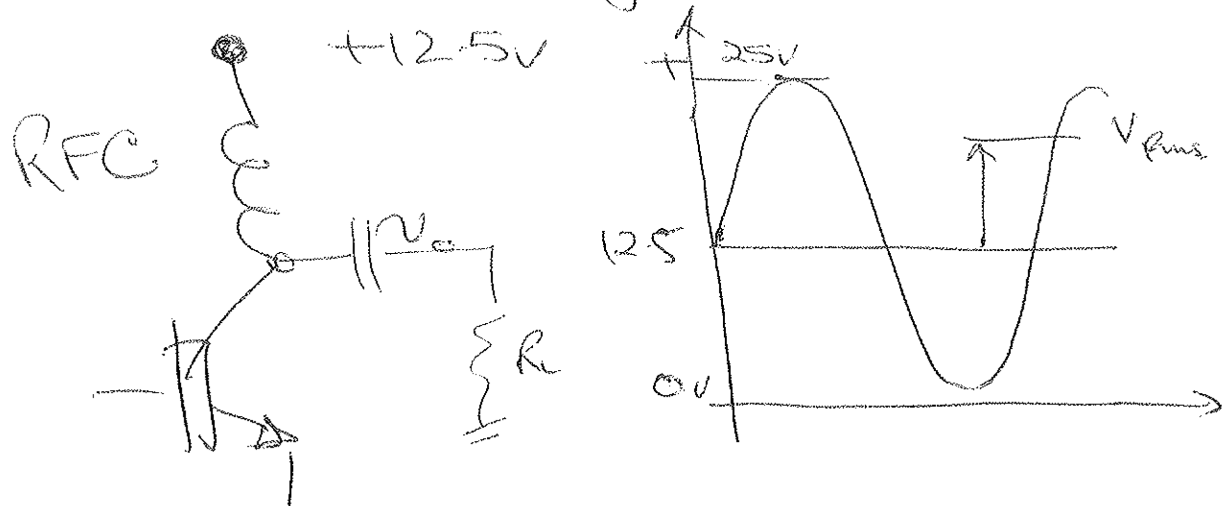
Impedance Matching.

This is needed when the actual load is not equal to the optimal load needed by the output transistor.

Example: Assume we have a 50Ω load (ie a $\lambda/2$ dipole).

Power supply voltage = 12.5 V.

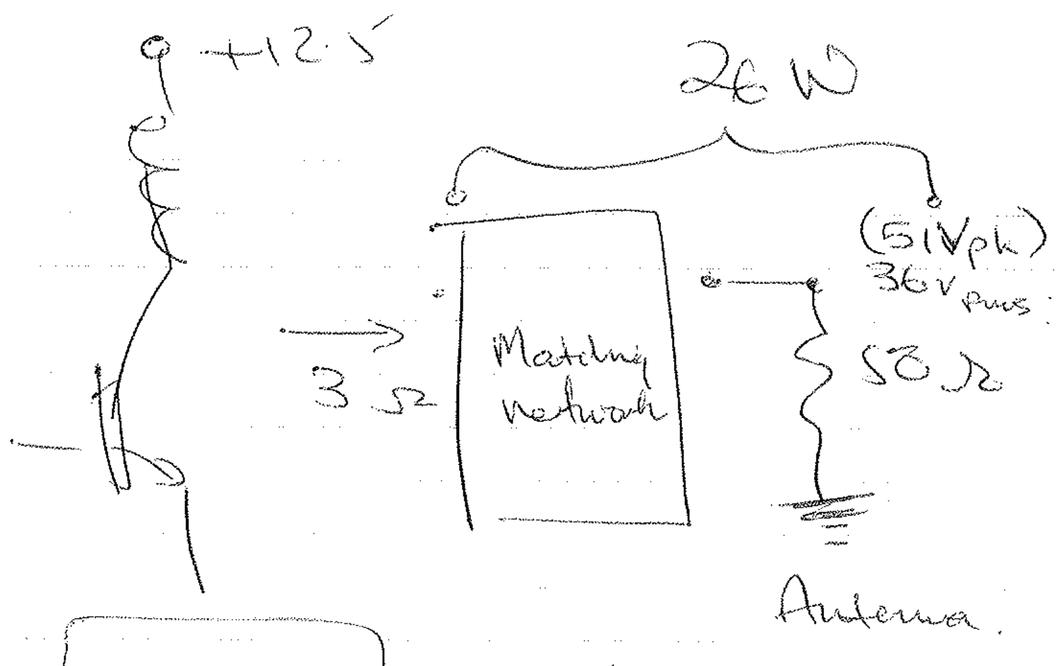
Max output power required = 26 W. (limit of mobile regs).

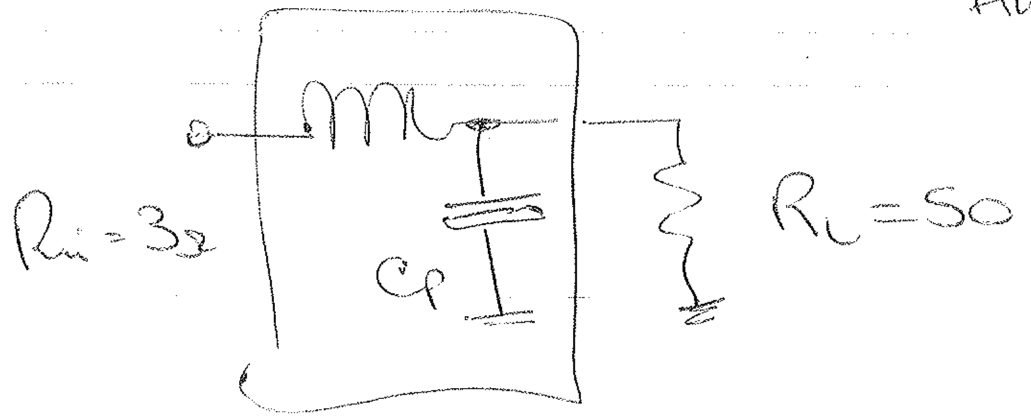


$v_{o\,RMS} = 8.84$ V

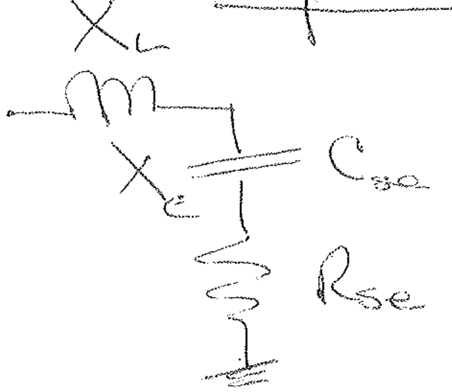
$R_L = (8.84)^2 / 26 \quad R_L = 3\Omega$.

At best since this assume $V_{CE(on)} = 0$





Simple two pole LPF



Assume f_o is known, choose a C_p so that Q_p results in

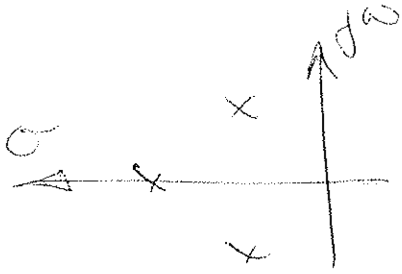
$$R_{se} = 3\Omega$$

Then resonate X_c with X_L so that $R_{in} = 3\Omega$.

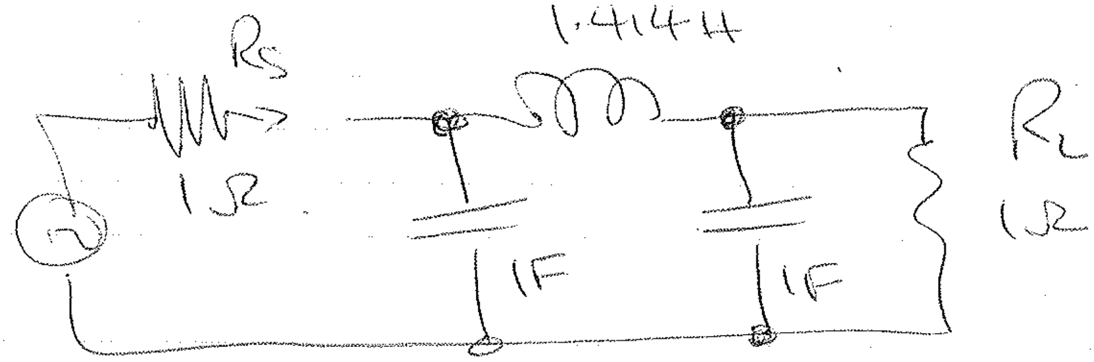
Example Choose $C_p = 253\,pF$

$\therefore X_c = 12.6\Omega \quad \therefore Q_p = 4$

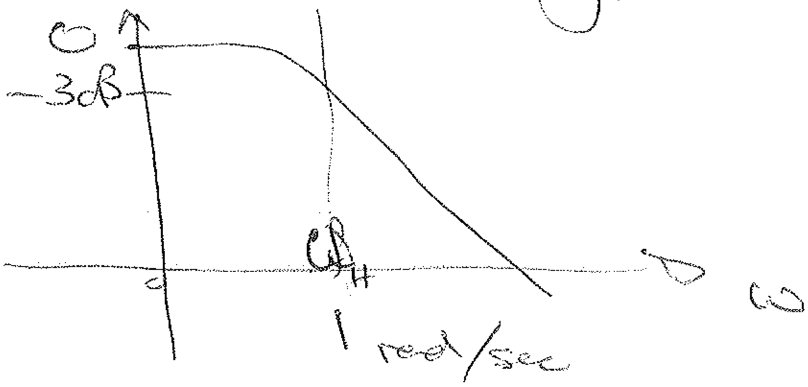
$\therefore R_{se} = 3\Omega \quad X_{cs} = -11.9\Omega$



π matching networks.

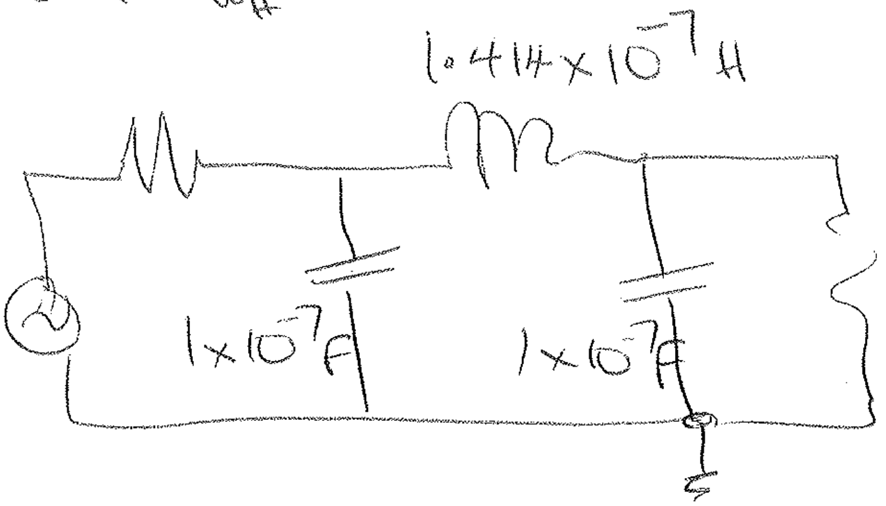


3 Pole LPF Prototype

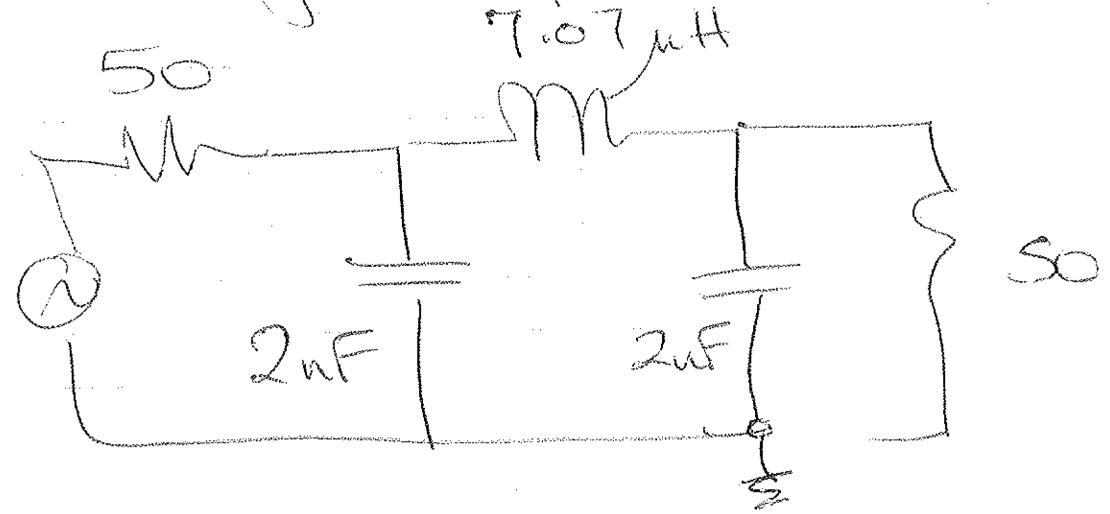


Scale to frequency.

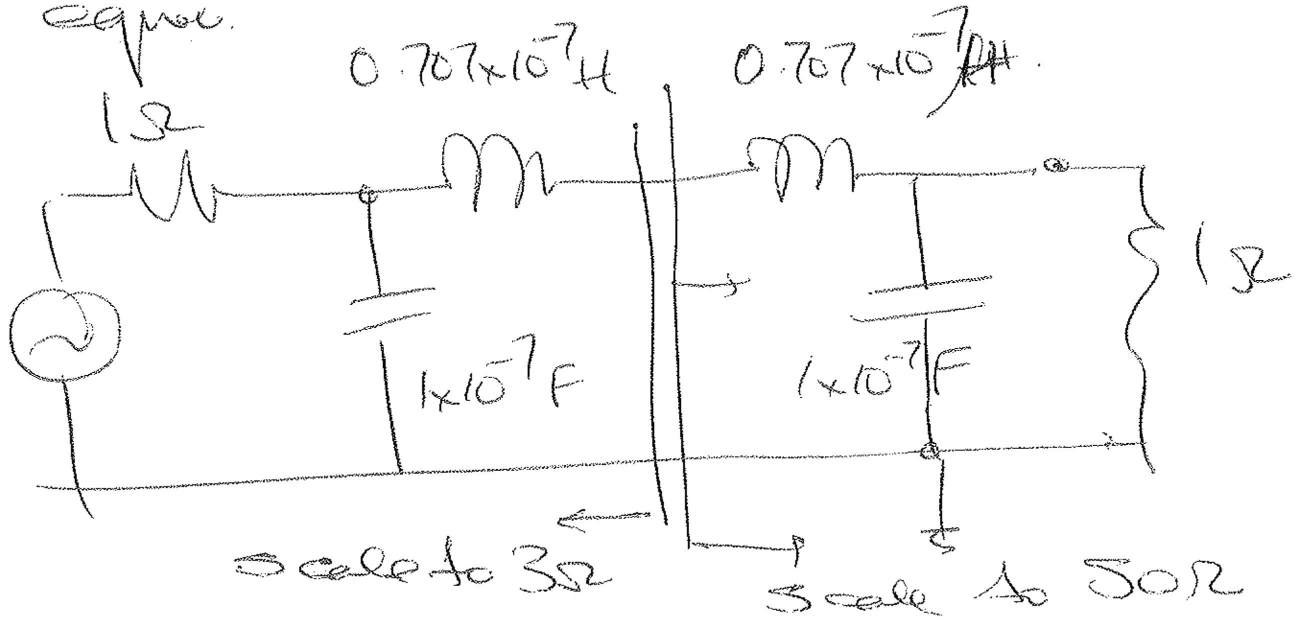
Set $\omega_H = 10^7$ ($f_H = 1.59$ MH

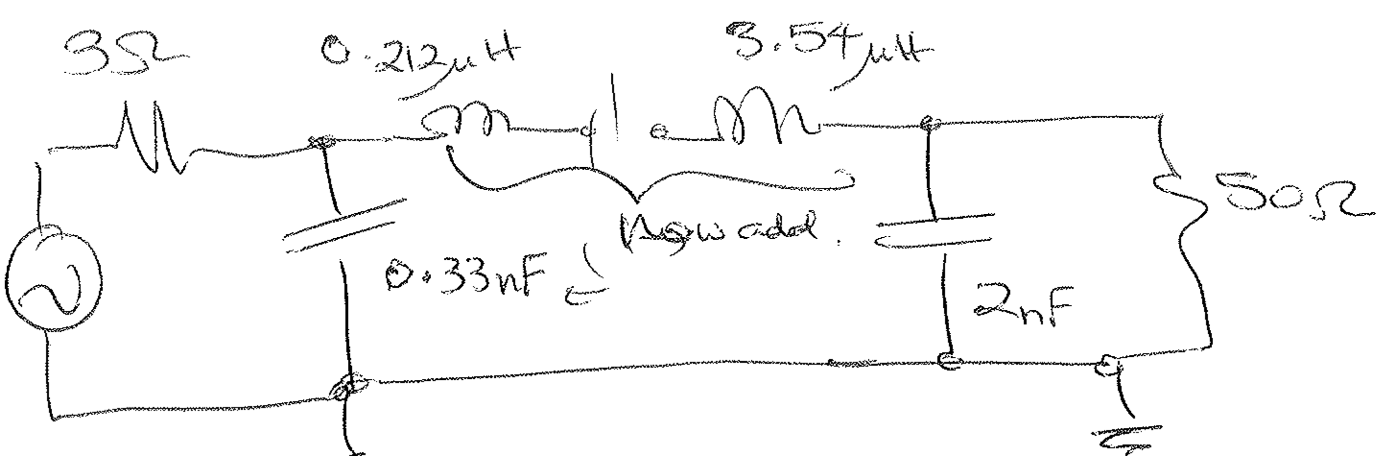


Scale for impedance (say R = 50Ω



Have the impedance don't have to be equal.





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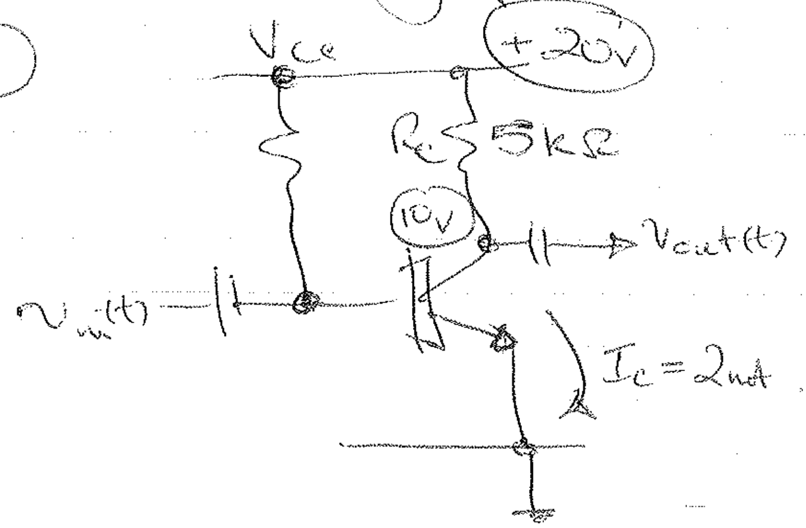
Electronics II.

Lecture 6

Fill in the gaps.

(1)



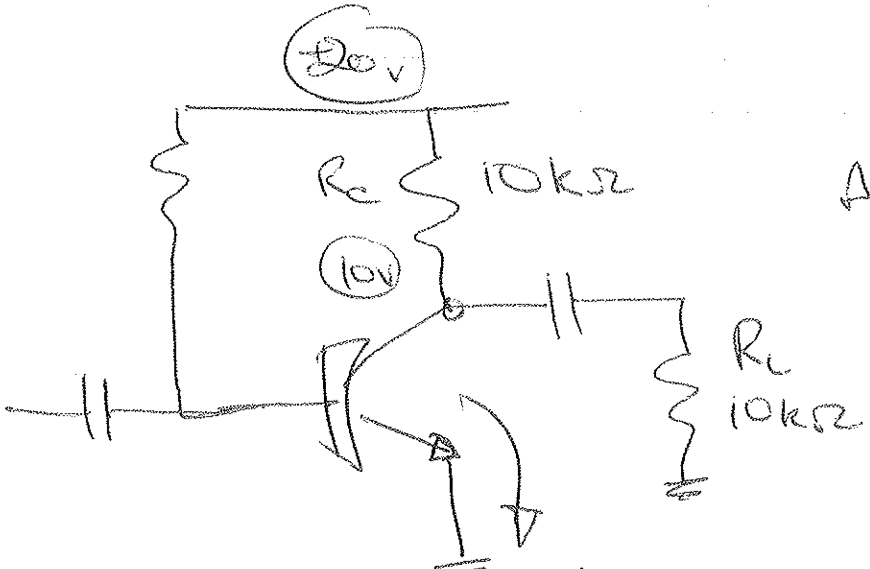
$A_{v(ss)} = \dfrac{\quad}{r_e}$

$= -\dfrac{\quad}{\quad}$

$= - \quad \times$

$= \quad dB$

(2)



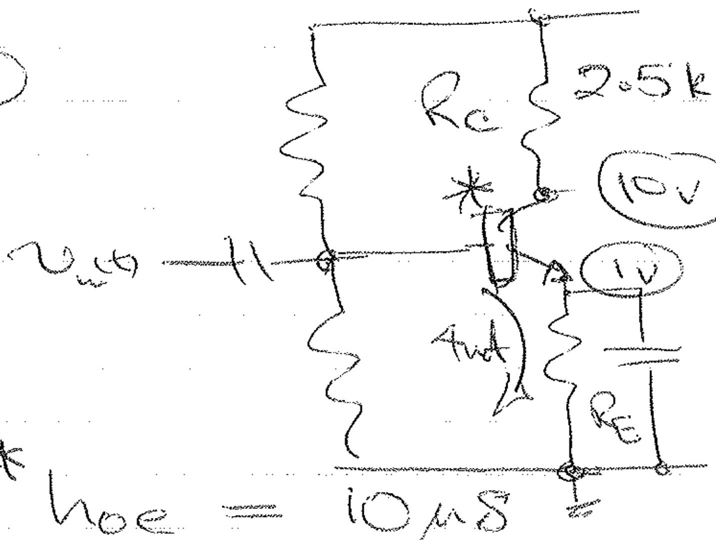
$A_{v(ss)} = -\dfrac{R_c //}{\quad}$

$= -$

$= - \quad \times$

$= \quad dB$

(3)



$$A_v = -\frac{\quad // \quad}{r_e + }$$

$= - \underline{\qquad\qquad}$

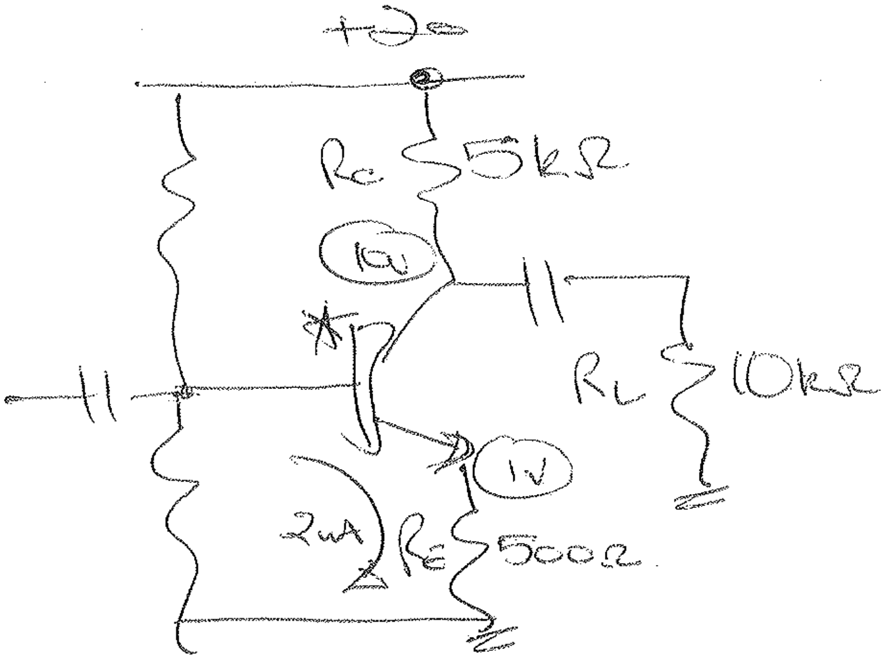
$= - \qquad \times$

$= \qquad$ dB

* $h_{oe} = 10\mu S$

$\therefore r_o =$

(4)



$h_{oe} = 100\mu S$ $\therefore r_o =$

$$A_v = - \frac{R_C // \quad //}{r_e}$$

$= - \underline{\qquad\qquad}$

$= - \qquad \times \qquad =$ dB