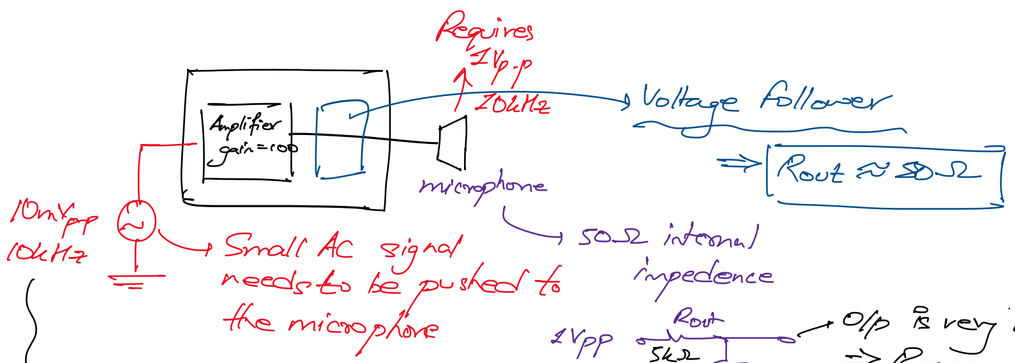
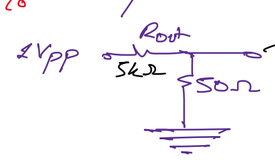
# Lab 8

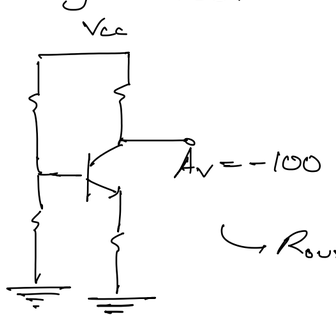
Thursday, 4 April 2024 1:30 PM




o/p is very less
⇒ Purpose of amplification is not served.

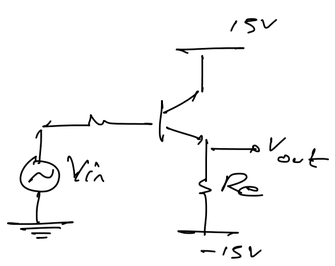
require gain = 100.

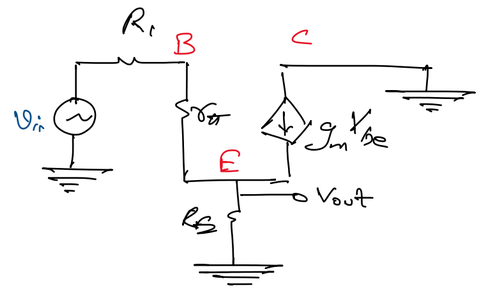



Alter:- 2 Stage Cascaded Amplifier.
* Higher gain

⇒ If Rout ≈ 50Ω/20Ω } Here we use voltage follower.
⇒ Input is amplified.

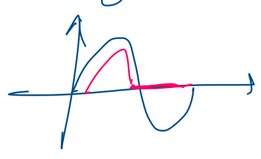
↳ Rout for amplifier = $R_C$ (say 5kΩ)




$V_{out} = i_e R_E$

i/p this is ground, we will get only positive cycle of not the negative cycle.



Small signal model

$$V_{out} = \frac{V_{in} \times R_e(1+\beta)}{R_e(1+\beta)+R_1+r_\pi} \approx V_{in}\frac{(R_e(1+\beta))}{(R_e(1+\beta))} \approx V_{in}$$

$$R_{out} = R_e \,//\, \frac{R_1+r_\pi}{1+\beta}$$

Very less

↳ Reflected Resistance

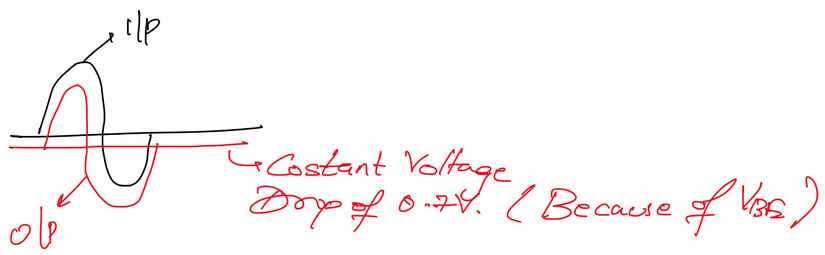
Rout is very small

Note:- $r_\pi \rightarrow I_c \rightarrow$ Bias Resistance (4) (Depends on $V_{be}$)

⇒ Smaller $r_\pi$ ⇒ Smaller Bias Resistance

⇒ Most Preferably change $R_e$

o/p is following the i/p.




$T = 0.693(R_a+2R_b)C = 10^{-3}$

$\frac{R_a+R_b}{R_a+2R_b} = 0.8$

$R_a+R_b = 1154.4$

$0.693(R_a+2R_b)10^{-6} = 10^{-3}$

$R_a+2R_b = 1443$

$R_b = 288.5$

$R_a = 865.80$

$1/\Delta T \approx 480\,Hz$

Duty Cycle = $T_{ON}$ =

$T_{OFF} = 180\,ms$

$T_{ON} = 840\,ms$

$\frac{840}{840+180} = \frac{840}{1020} \approx 82\%$