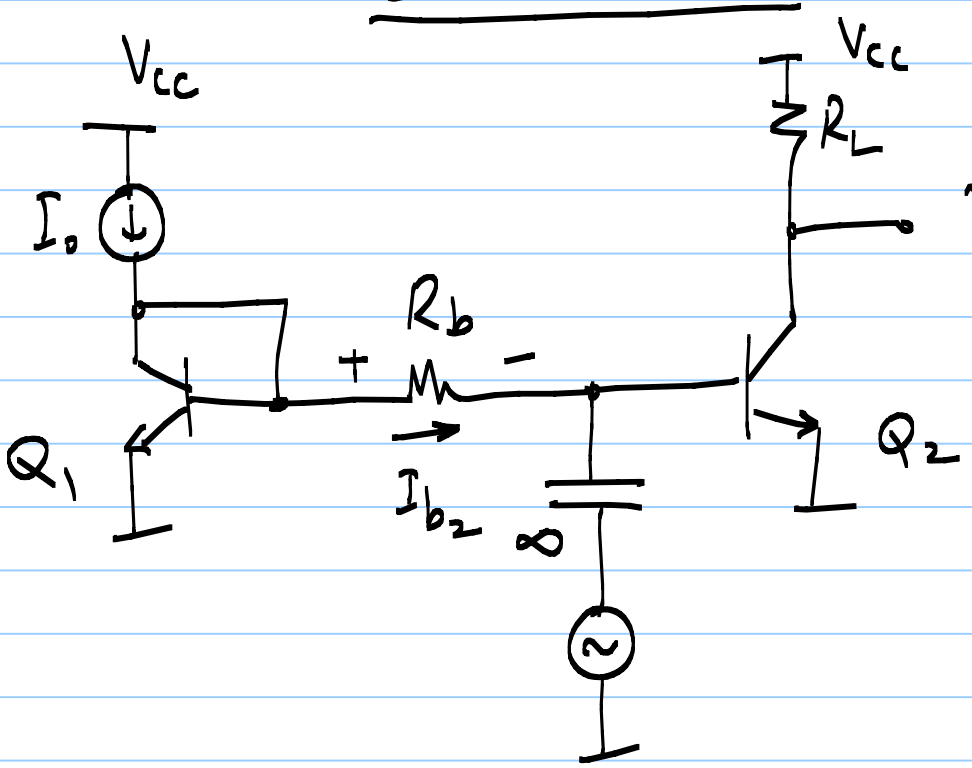
3/11/20

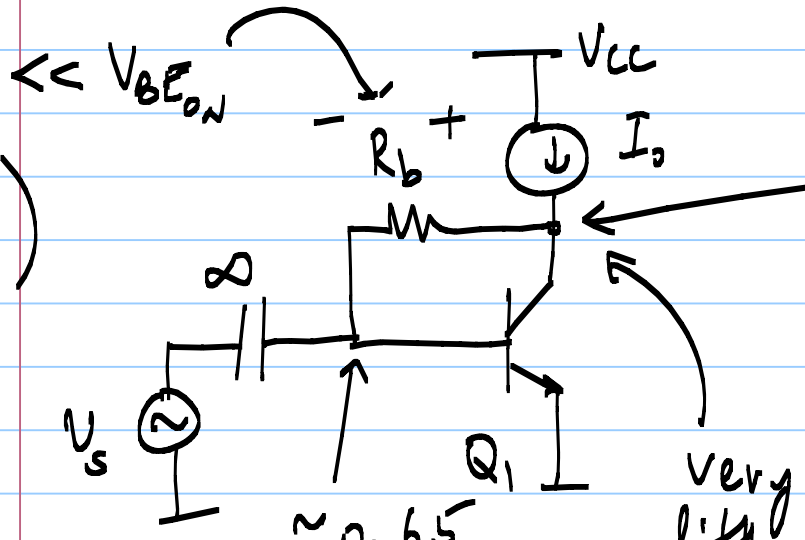
Lecture 48

1)



Not a good way of biasing.

1.5)

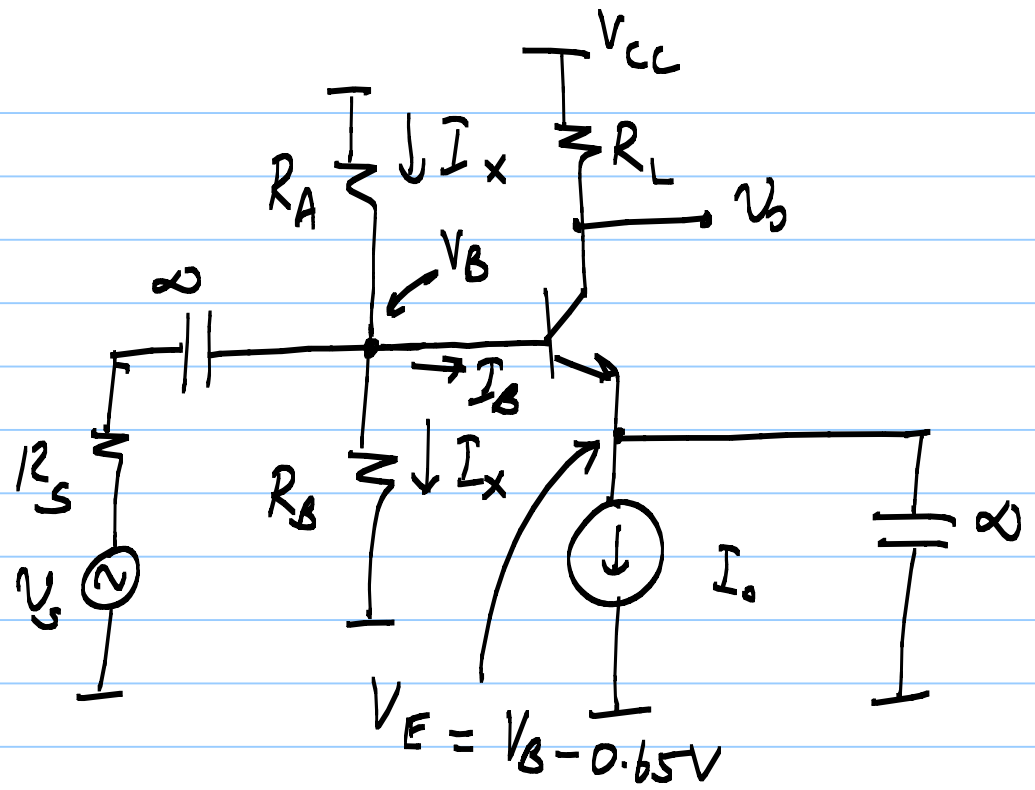


$V_{CE} \simeq 0.65$

$V_{CE_{sat}} \simeq 0.2$ → $V_{CB} \simeq 0.45\,V$

$V_{CB} = 0$ if $V_{CE} = 0.65\,V$

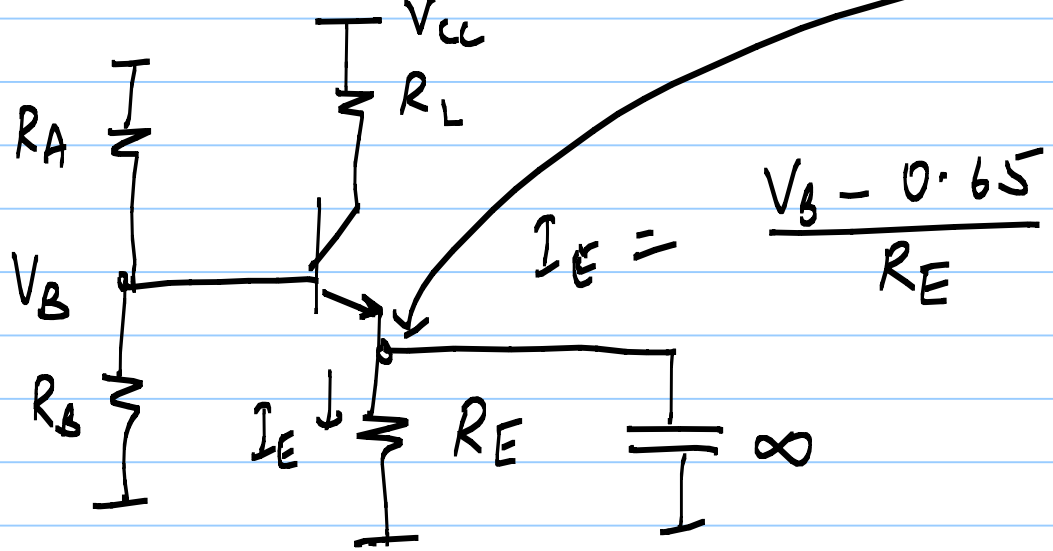
2)



$I_x \gg I_B$

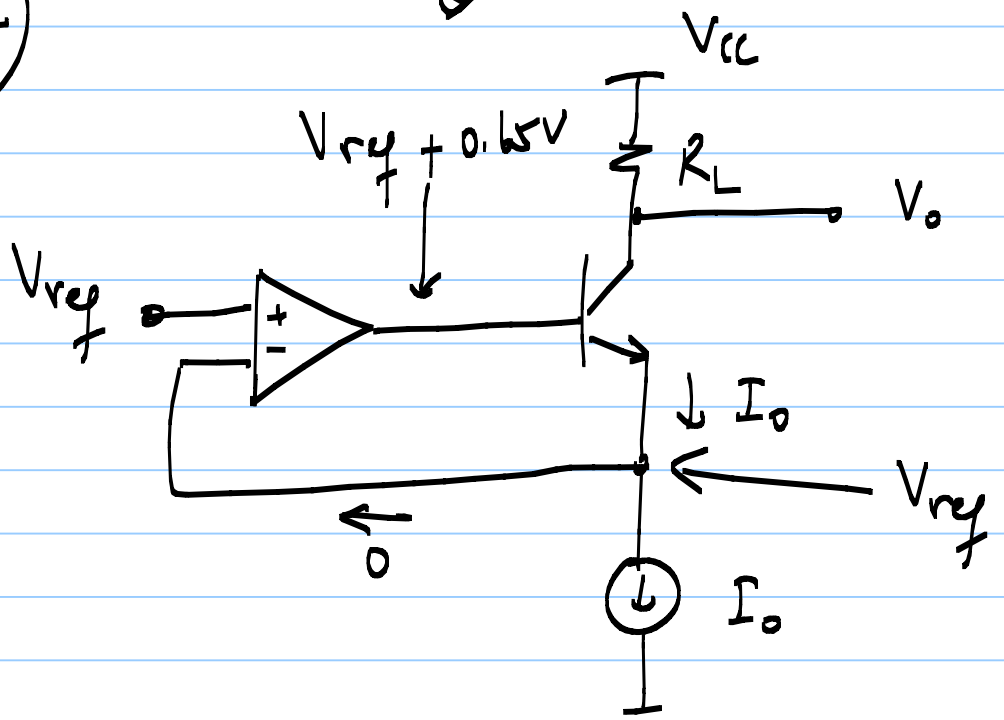
"Common Emitter Amplifier"

2.5)



Circuits (3) & (4) — HW { require opamps }

4)



Swing Limits

1) Saturation limit

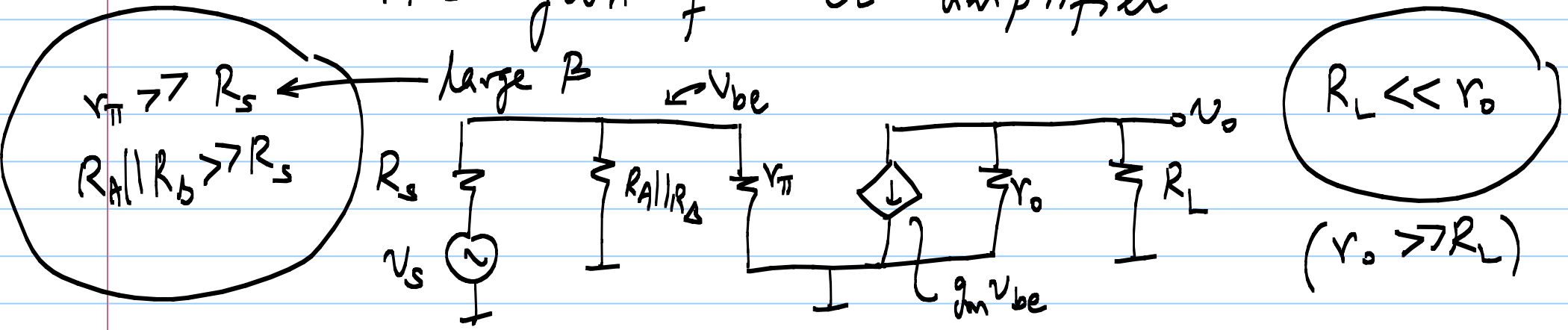
$$V_{CE_{sat}} = 0.2\,V$$

e.g. for circuit (2):

$$V_C - V_E = 0.2\,V$$

$$V_{CC} - I_0 R_L + \underbrace{A}_{-g_m R_L} V_A \sin\omega t - \left(V_B - 0.65\,V\right) = 0.2\,V$$

A = gain of CE amplifier



$$v_{be} \simeq v_s$$

$$v_o = -g_m R_L v_s$$

$$A = \frac{v_o}{v_s} = -g_m R_L$$

2) Cut off limit

$$I_c = 0$$

$$I_o + g_m V_A \sin \omega t = 0 \Rightarrow V_A = \frac{I_o}{g_m}$$