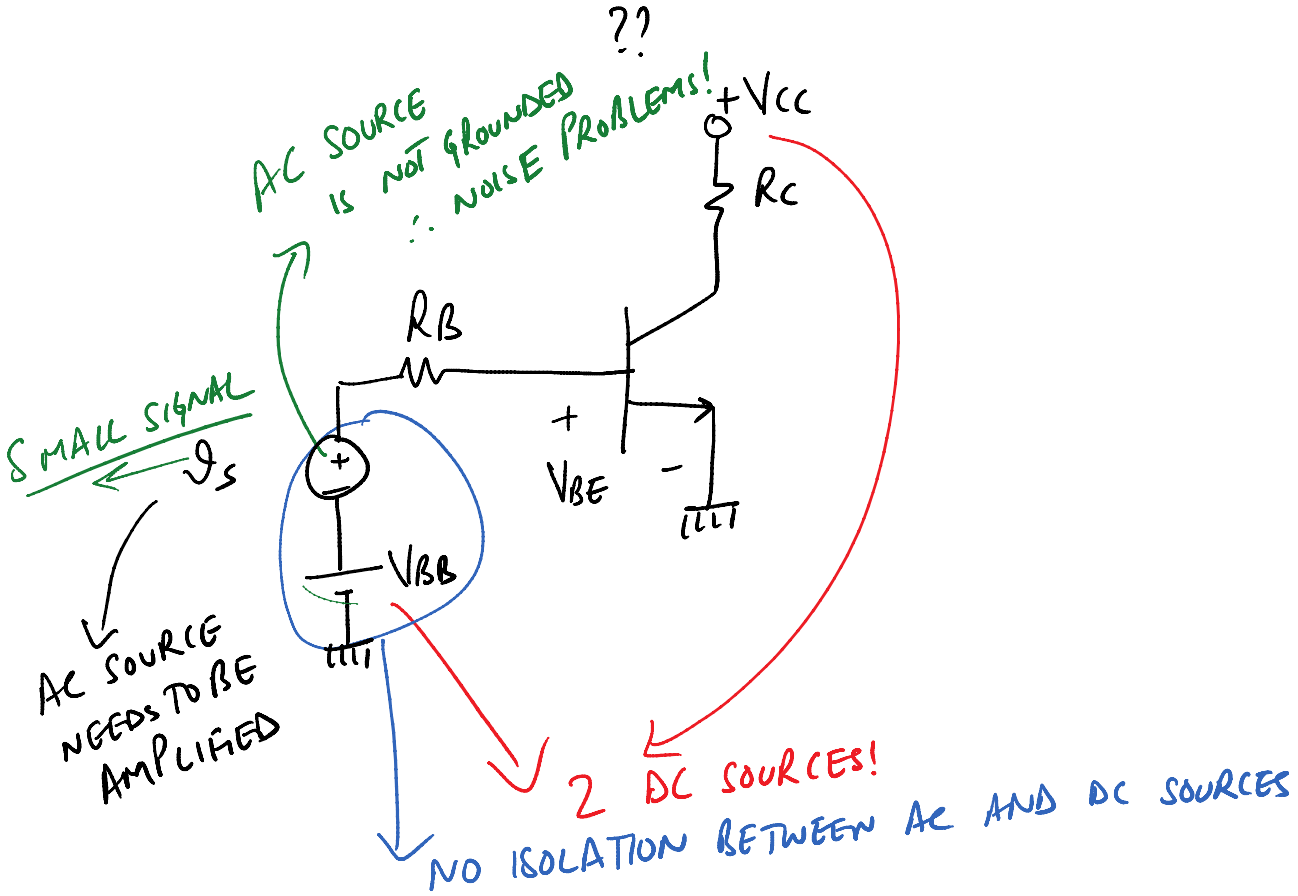
Tuesday, February 19, 2013
3:58 PM

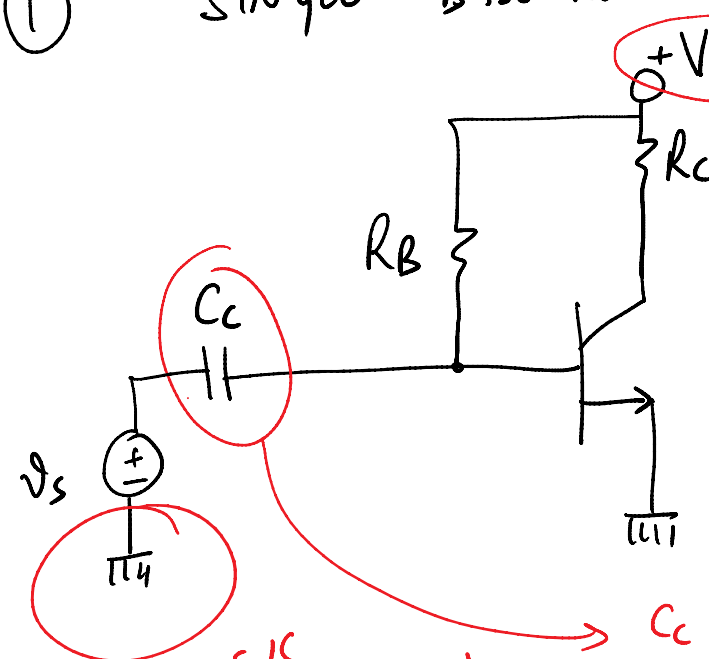
LECTURE -29

AMPLIFIER → Q-POINT HAS TO BE SET IN THE ACTIVE REGION !



Tuesday, February 19, 2013
4:08 PM

① SINGLE BASE RESISTOR BIASING

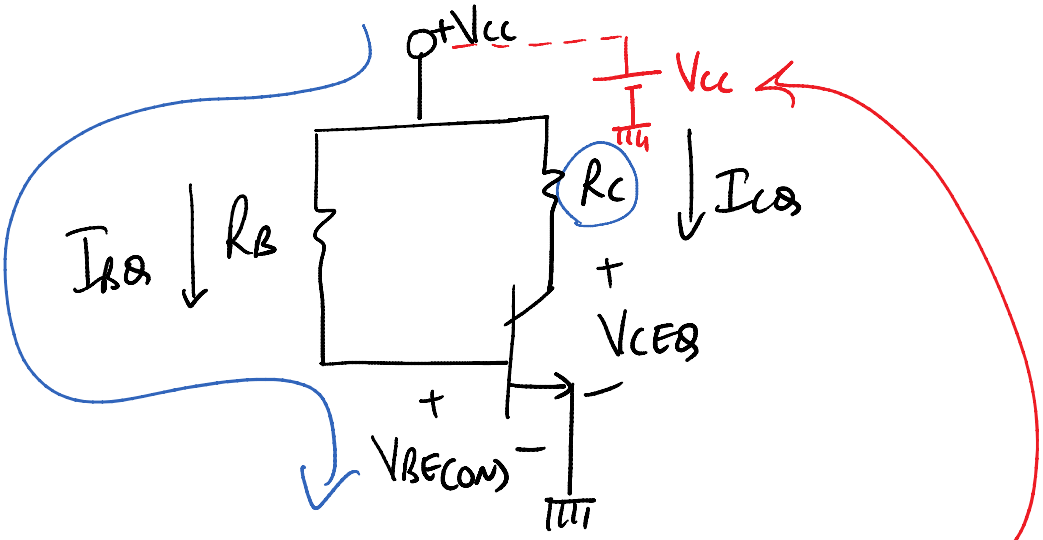


1 DC SOURCE

AC SOURCE IS GROUNDED!

Cc IS A COUPLING CAPACITOR PROVIDES ISOLATION BETWEEN DC AND AC SOURCES

DC EQUIVALENT CIRCUIT!



Ex CIRCUIT TO BE BIASED WITH 12V

$I_{CQ} = 1mA$ $V_{CEQ} = 6V$ → Q-POINT (V_{CEQ}, I_{CQ})

$V_{BE(ON)} = 0.7V$

β (ACTIVE) $= 100$

R_C? R_B?

KVL CE LOOP

$-V_{CC} + I_{CQ} R_C + V_{CEQ} = 0$ → LL EQ.

$$R_C = \frac{V_{CC} - V_{CEQ}}{I_{CQ}} = \frac{12-6}{1m} = 6k\Omega$$

$$I_{BQ} = \frac{I_{CQ}}{\beta} = \frac{1mA}{100} = 10\mu A$$

KVL BE LOOP

$-V_{CC} + I_{BQ} R_B + V_{BE(ON)} = 0$

$$R_B = \frac{V_{CC} - V_{BE(ON)}}{} = \frac{12-0.7}{} \quad 1.13M\Omega$$

$-V_{CC}+$ [illegible]

$$R_B = \frac{V_{CC} - V_{BE(ON)}}{I_{BQ}} = \frac{12 - 0.7}{10\mu} = 1.13\,M\Omega$$

↑↑↑ VERY LARGE!

Tuesday, February 19, 2013
4:17 PM

IF I_{BQ} FIXED THEN WHAT HAPPENS IF β CHANGES ??

$$I_{BQ} = \frac{V_{CC} - V_{BE(ON)}}{R_B} = \frac{12 - 0.7}{1.13\,M} = 10\,\mu A$$

* I_{BQ} DOES NOT DEPEND UPON β

$$I_{CQ} = \beta I_{BQ}$$

$$V_{CEQ} = V_{CC} - I_{CQ} R_C = 12 - I_C (6K)$$

β	50	100	150
Q POINT			
I_{CQ}	0.5m	1mA	1.5mA
V_{CEQ}	9V	6V	3V

① FOR A SINGLE BIAS RESISTOR, Q-POINT IS NOT STABALIZED AGAINST VARIATION IN β

② VALUE OF R_B FOUND IS NOT PRACTICAL!