ECE 321 - Quiz #4: Name _____

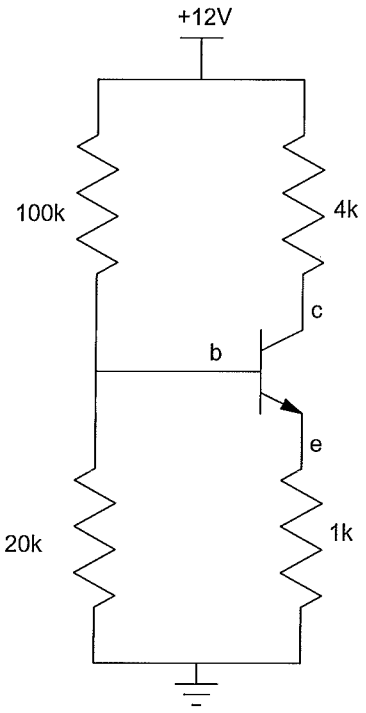
BJT Amplifiers. April 28, 2016

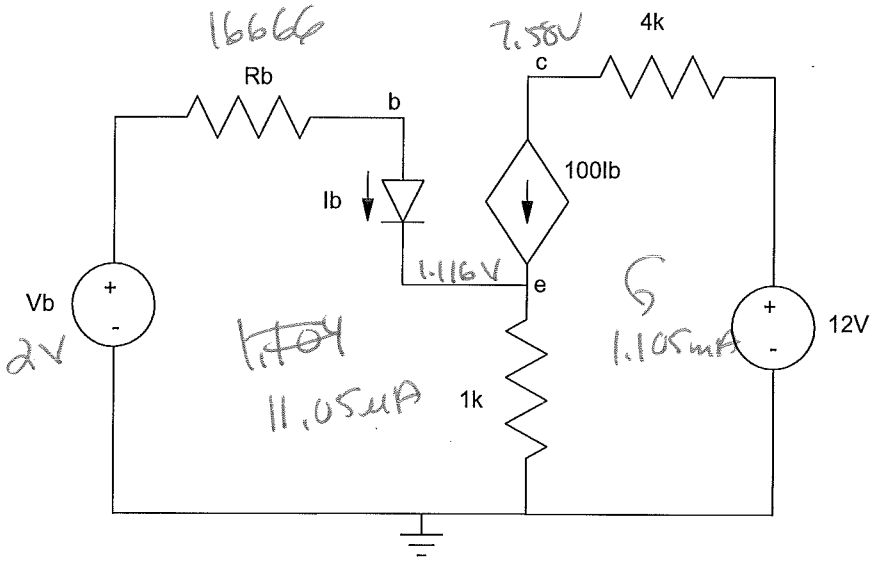
1) BJT DC Analysis:

1a) Convert R1 and R2 to its Thevenin equivalent to find Vb and Rb.

1b) Determine the Q-point for the following BJT circuit:

Vb	Rb	Ic	Vce
2V	16.67K	1.105mA	6.456V

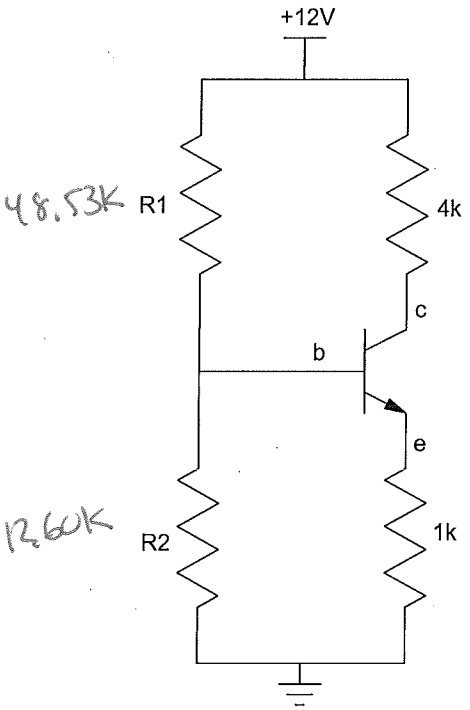


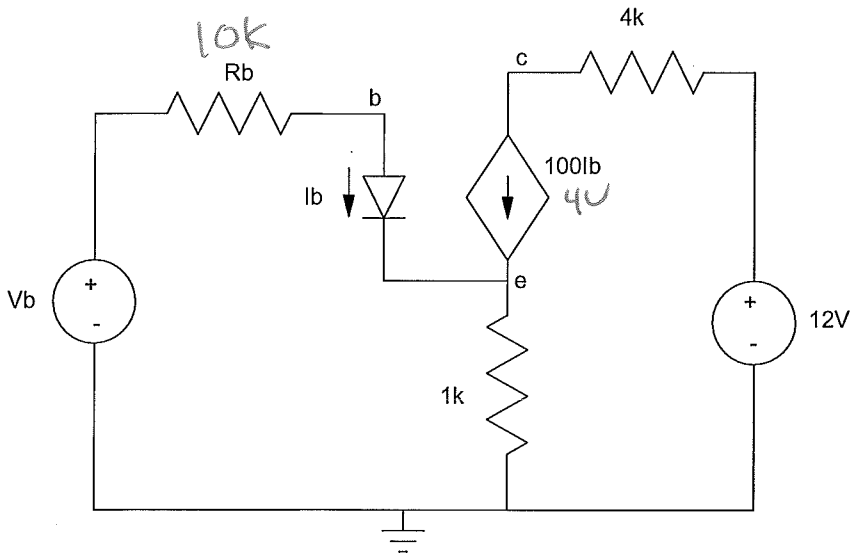


2) Find R1 and R2 so that

- The Q-point is stabilized for variations in β, and
- Vce = 4V

R1	R2	Vb	Rb
48.53k	12.60k	2.472V	10k
A	B	C	d





$8V = 4k \cdot I_c + 1k(I_c + I_b)$

$I_c = 1.597mA$

$I_b = 15.97\mu A$

$V_b = 2.472V$

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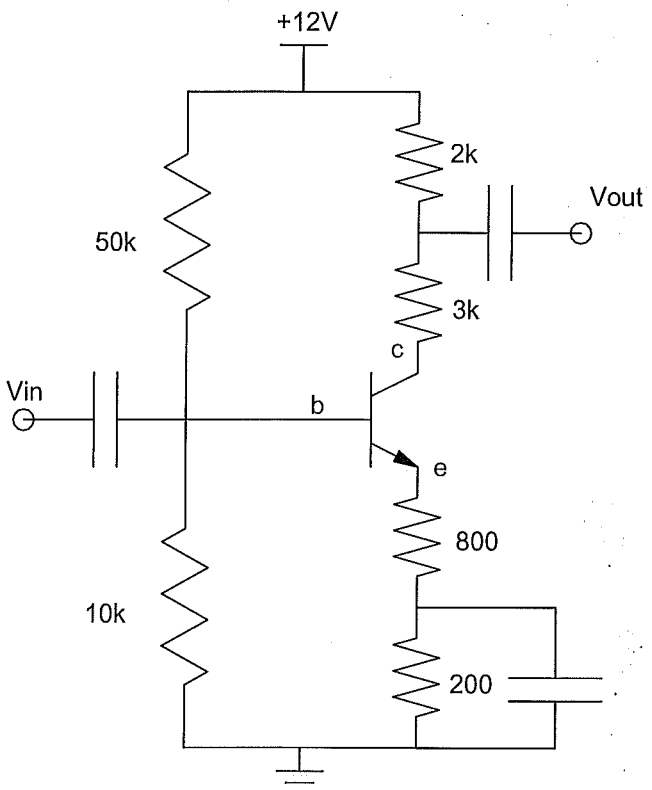
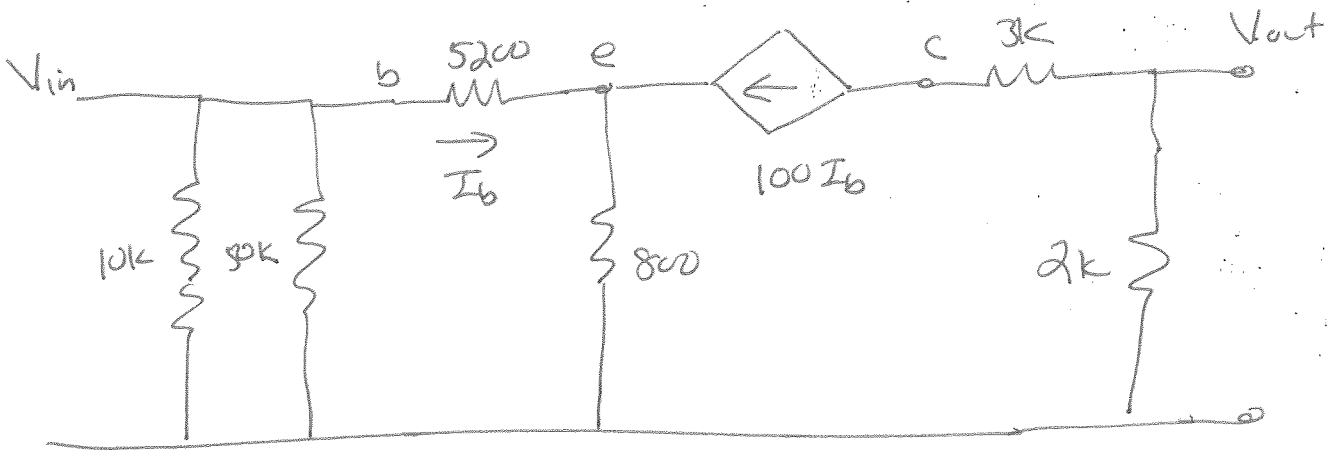
3) Assume the Q-point for the BJT amplifier is

- $I_{bq} = 10\mu A$
- $r_f = 5200\Omega$

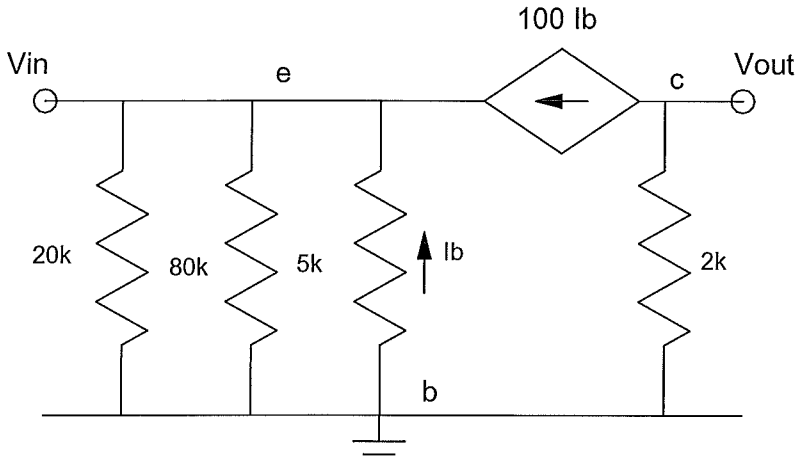
Draw the small-signal model (AC model) of the following circuit connected in common-emitter configuration:





4) Find the 2-port model for the following circuit:

Rin	Ai	Rout	Ao
49.35	0	2k	+40

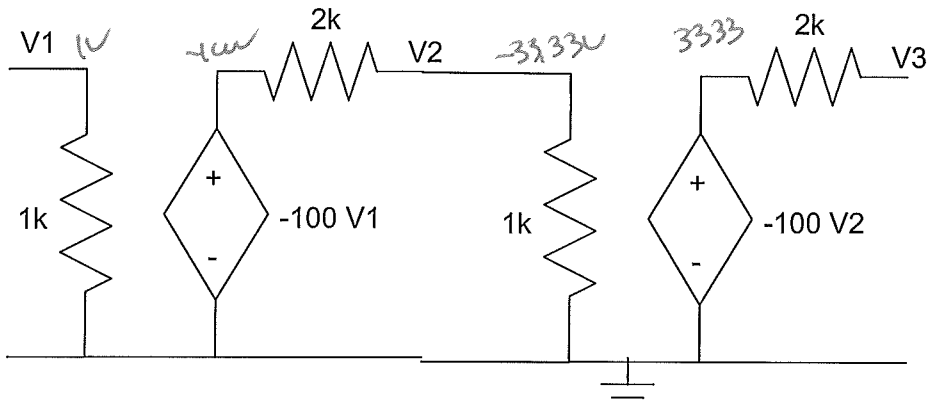


$R_{in} = 20k \| 80k \| 5k \| \frac{5k}{100} = 49.35$

$A_o = \frac{3.2k}{r_\beta} = \frac{100 \cdot 200\Omega}{500\Omega} = 40$

5) Find the 2-port model for the following CE : CE amplifier

Rin	Ai	Rout	Ao
1k	0	~~3k~~ 2k	+3333



Bonus: Godzilla / Bernie Sanders Trivia! Which is older:

- Godzilla (based upon the first movie release) or
- Bernie Sanders?