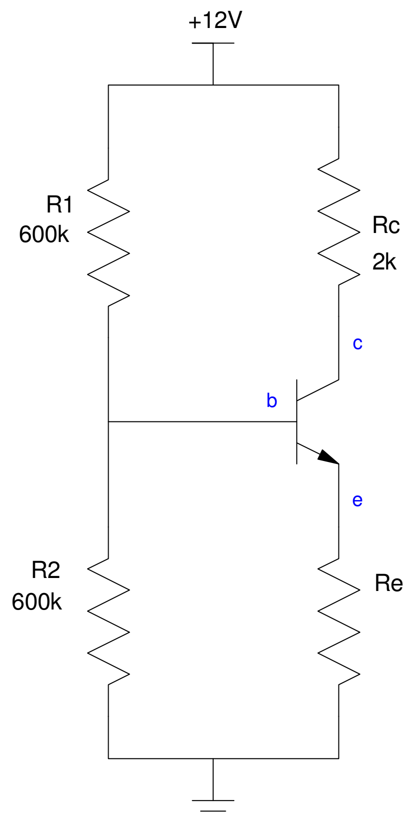
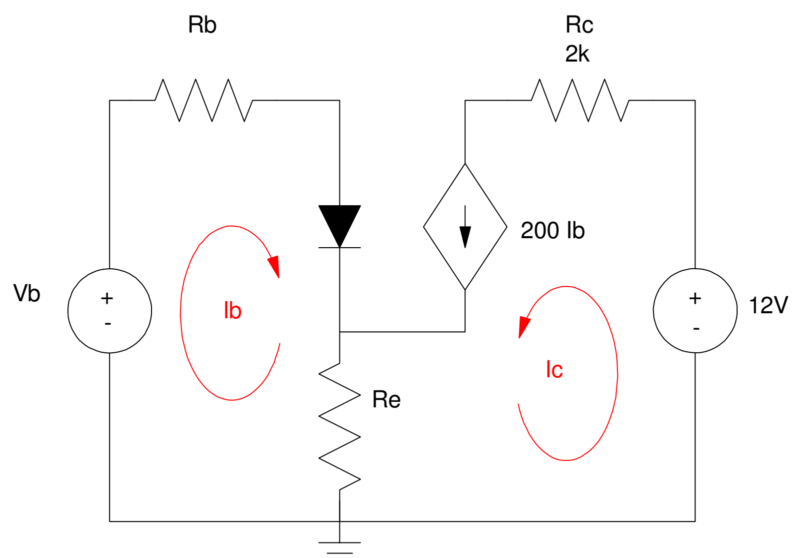
ECE 321 - Quiz #4 - Name ____________________

BJT Amplifiers. Spring 2023

1) BJT Amplifier: DC Analysis. Determine the Thevenin equivalent of R1 and R2 as well as the Q-point. Assume ideal silicon transistors:

- |Vbe| = 0.7V
- β = 200
- Re = 800 + 100*(your birth month) + (your birth day).





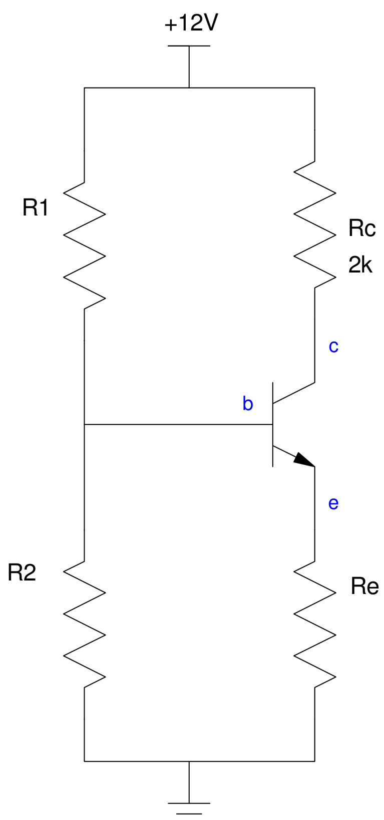
Re 800 + 100*mo + day	Vb	Rb	Vce	Ic

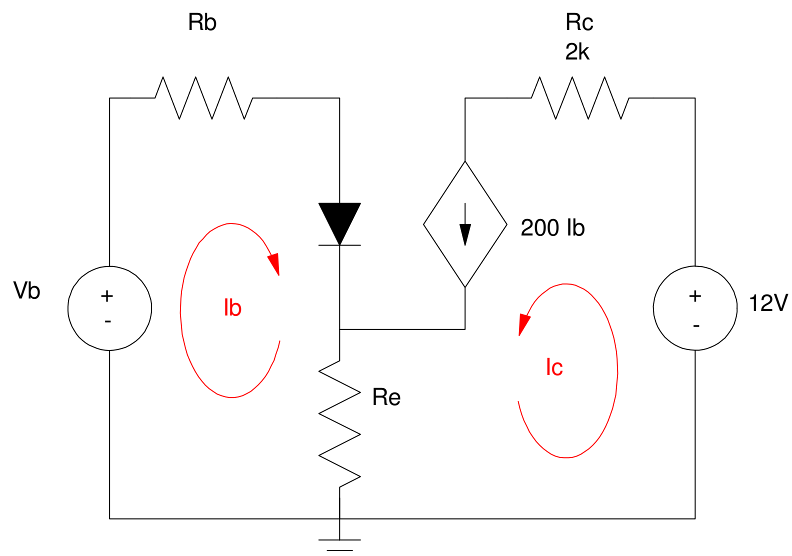
2) BJT Amplifier: DC Design. Determine R1 and R2 so that

- The Q point is Vc = 8.00V and
- The Q point is stabilized for variations in β

Assume

- Ideal silicon transistors (Vbe = 0.7V, $\beta = 200$)
- Re = 800 + 100*(birth month) + (birth day).

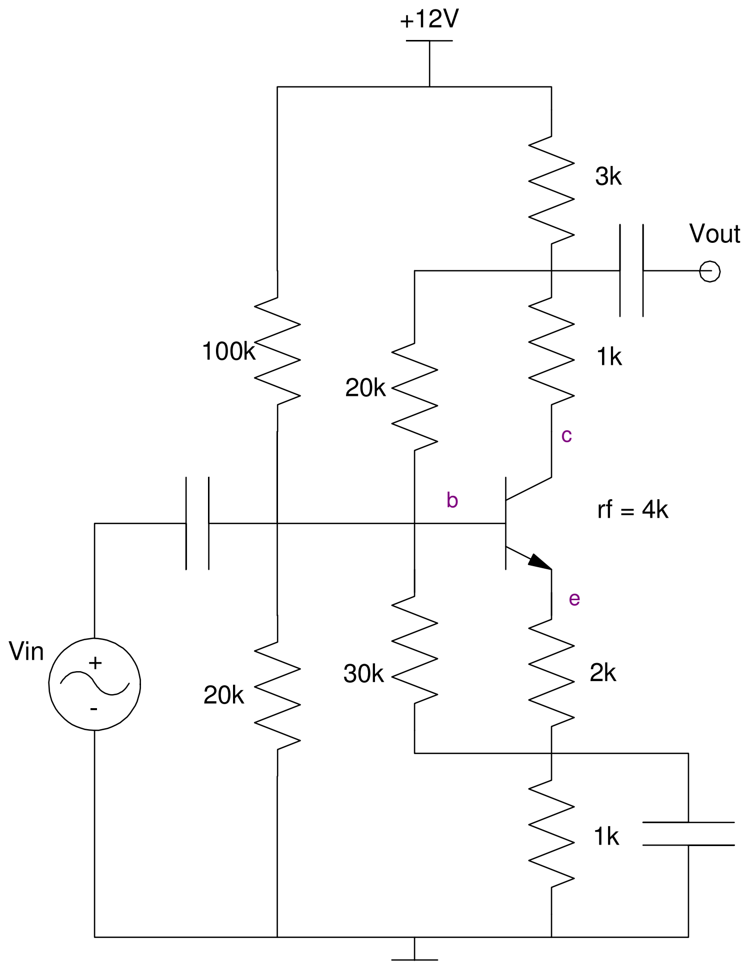




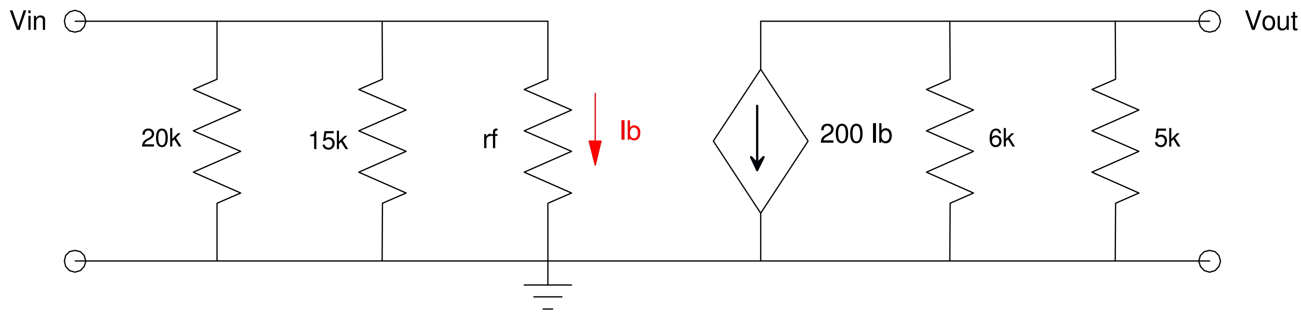
Re 800 + 100*mo + day	R1	R2	Vb	Rb

3) BJT: AC Analysis: Draw the small signal model for the following BJT amplifier. Assume

- $r_f = 4k\Omega$
- $\beta = 200$



4) BJT: AC Analysis: Determine the 2-port model for the following CE amplifer.



rf 800 + 100*mo + day	Rin	Ain	Rout	Ao

5) 2-Port model (experimental): Determine the 2-port parameters based upon the following experimental data:

Case 1:

- Vin = 1mV @ 1kHz
- R1 = 0 Ohms
- R2 = 10M Ohms

results in Vout = 230V

Case 2:

- Vin = 1mV @ 1kHz
- R1 = X Ohms
- R2 = 10M Ohms

results in Vout = 170mV

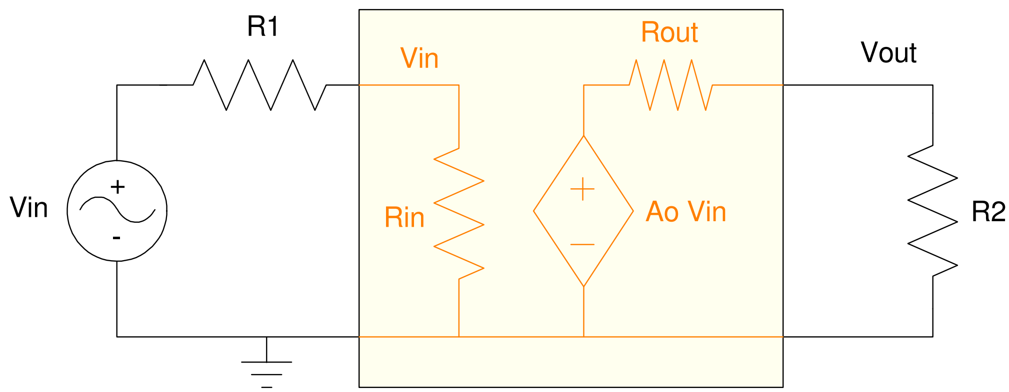
Case 3

- Vin = 1mV @ 1kHz
- R1 = 0 Ohms
- R2 = X Ohms

results in Vout = 130mV

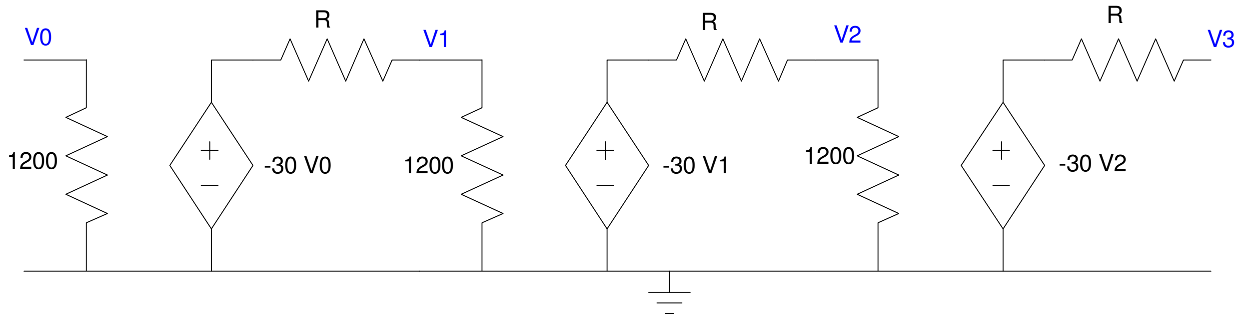
Assume

- X = 800 + 100*(your birth month) + (your birth date) Ohms



X 800 + 100*mo + day	Rin	Ai	Rout	Ao
		0		

6) Determine the 2-port model for the following cascaded CE amplfier



R 800 + 100*mo + day	Rin	Ai	Rout	Ao