

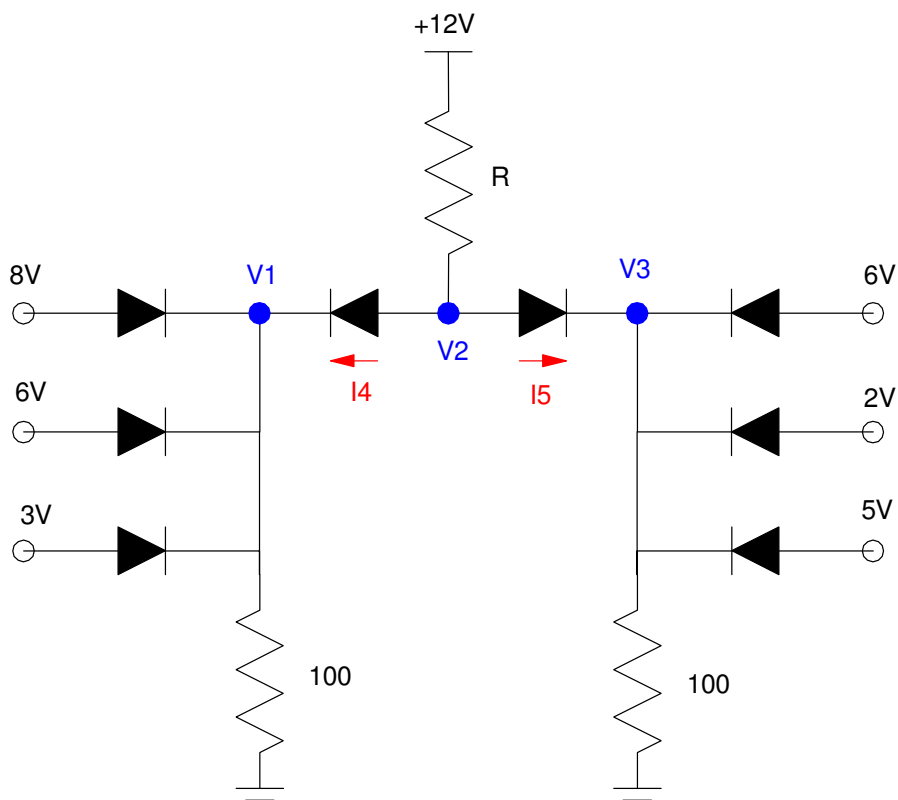
ECE 320 - Quiz #4 - Name _____

Max/Min, Clipper, Transistors. Spring 2023

1) Max/Min: Determine the voltages and currents for the following min/max circuit.

- Assume ideal silicon diodes ($V_f = 0.7V$)
- $R = 800 + 100 * \text{Birth Month} + \text{Birth Day}$. May 14th for example gives $R = 1314 \text{ Ohms}$

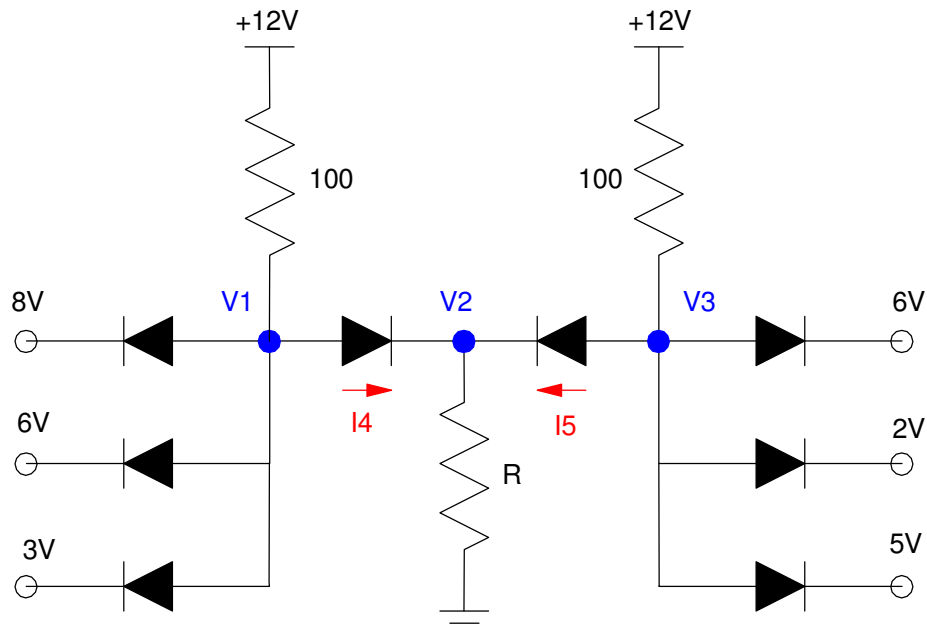
R $800 + 100 * Mo + Day$	V1	V2	V3	I4	I5



2) Max/Min: Determine the voltages and currents for the following min/max circuit.

- Assume ideal silicon diodes ($V_f = 0.7V$)
- $R = 800 + 100 * \text{Birth Month} + \text{Birth Day}$.

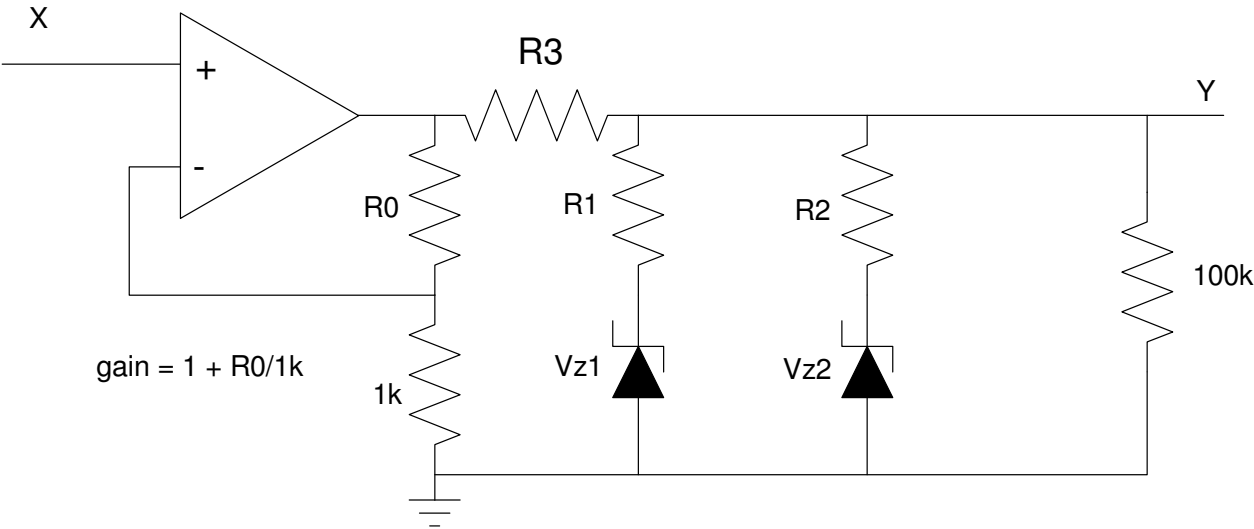
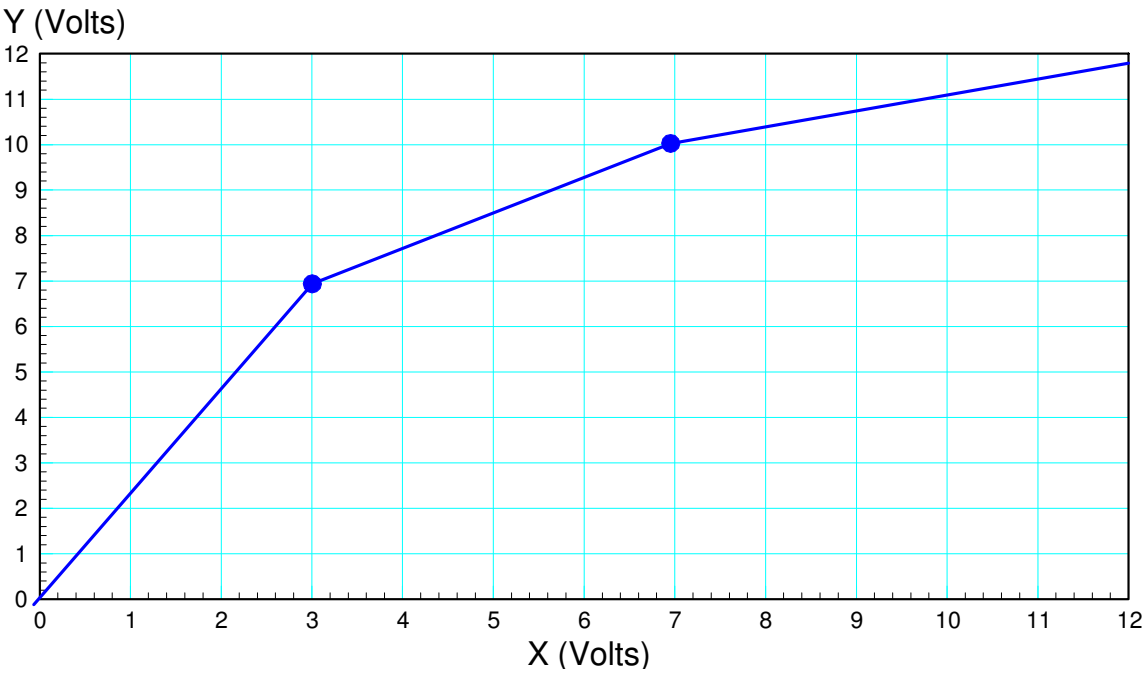
R $800 + 100 * Mo + Day$	V1	V2	V3	I4	I5



3) Clipper: Determine {R0, R1, R2, Vz1, Vz2} to implement the following function.

- Let R3 be 1000 + 100 * your birth month + your birth day.

R3 800 + 100*Mo + Day	R0	Vz1	R1	Vz2	R2



4) Clipper: Design a circuit to clip the voltage at +3V and -6V

$$y = \begin{cases} +3V & x > 3V \\ x & -6V < x < 3V \\ -6V & x < -6V \end{cases}$$

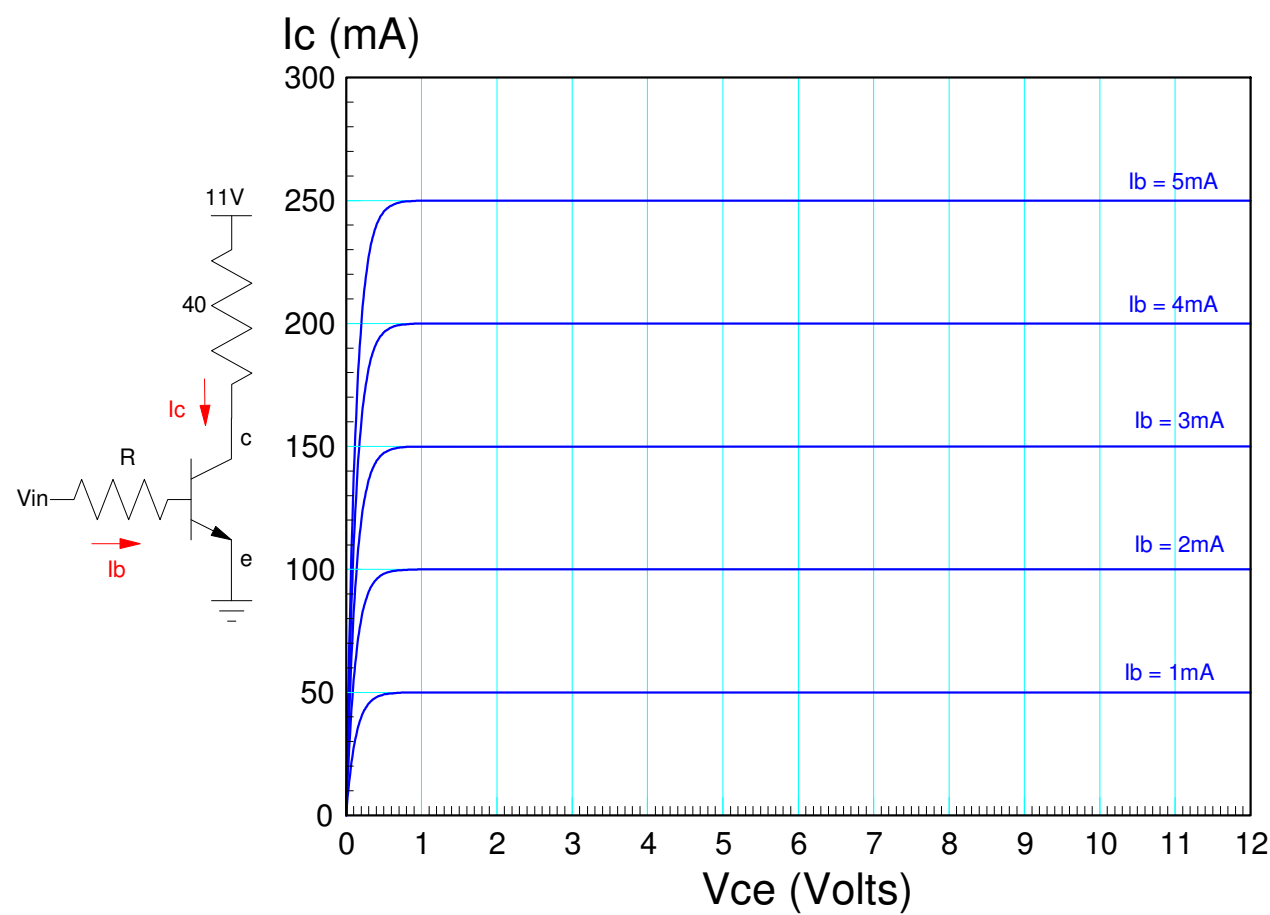
5) The VI characteristics for an NPN transistor are shown below

- Draw the load line for the following circuit
- Show on the load line the operating point (V_{ce} , I_c) when $V_{in} = 4V$ & $10V$.

Assume

- $V_{be} = 0.7V$
- $V_{ce} = 0.2V$ when saturated

R 800 + 100*Mo + Day	Load Line	$V_{in} = 4.0V$	$V_{in} = 10.0V$
	x and y intercept or show on graph	V_{ce} and I_c or show on graph	V_{ce} and I_c or show on graph



6) The voltages for the following circuit are measured (shown below). From these measurements, determine the following:

R 800 + 100*Mo + Day	Ib (mA)	Ic (mA)	Current Gain (beta)	Operating Region off / active / saturated

