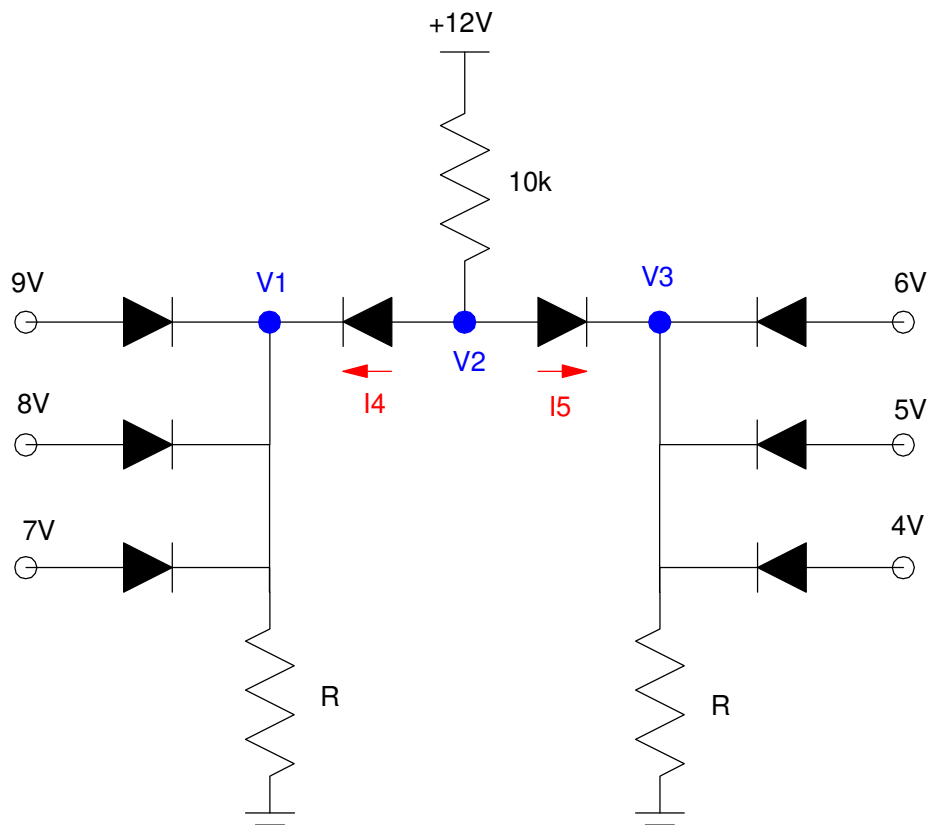# ECE 320 - Quiz #4 - Name _____

Max/Min, Clipper, Transistors. Spring 2022

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

- Assume ideal silicon diodes (Vf = 0.7V)
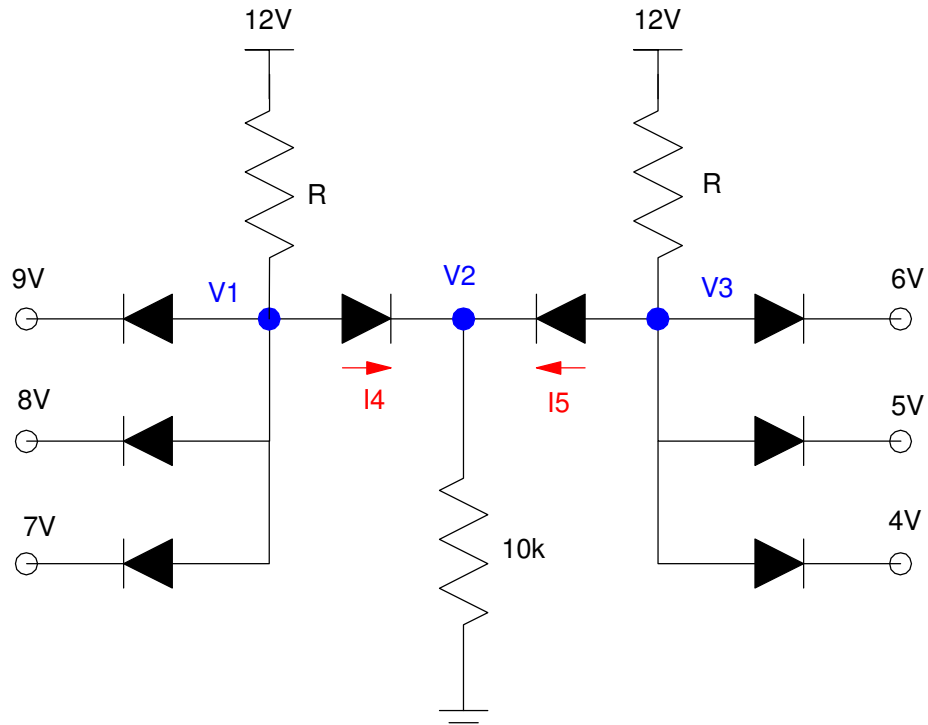- R = 900 + 100 * Birth Month + Birth Day. May 14th for example gives R = 1414 Ohms

R 900 + 100*Mo + Day	V1	V2	V3	I4	I5

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

- Assume ideal silicon diodes (Vf = 0.7V)
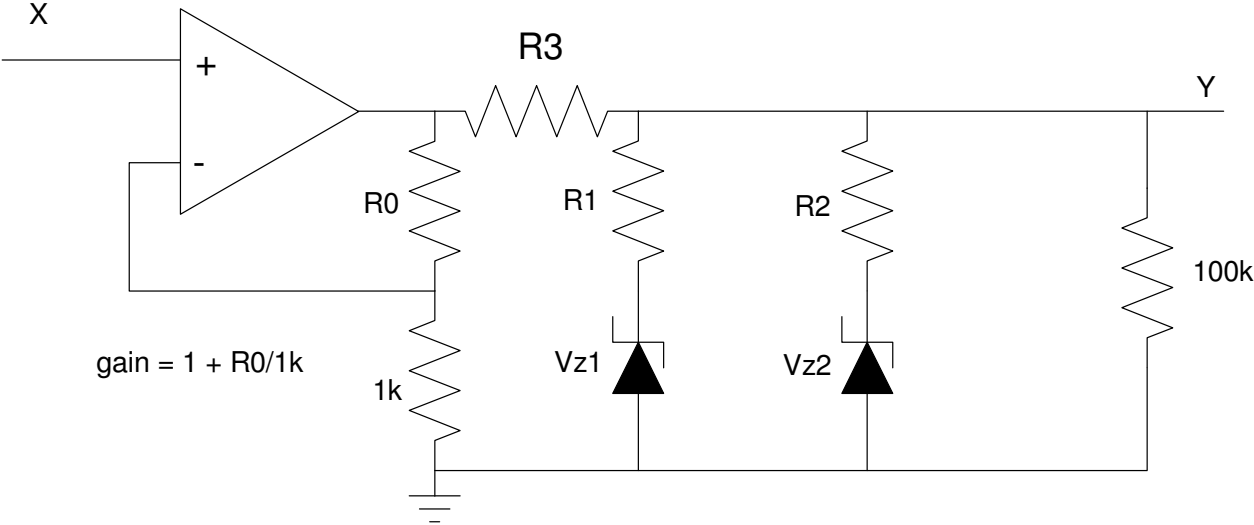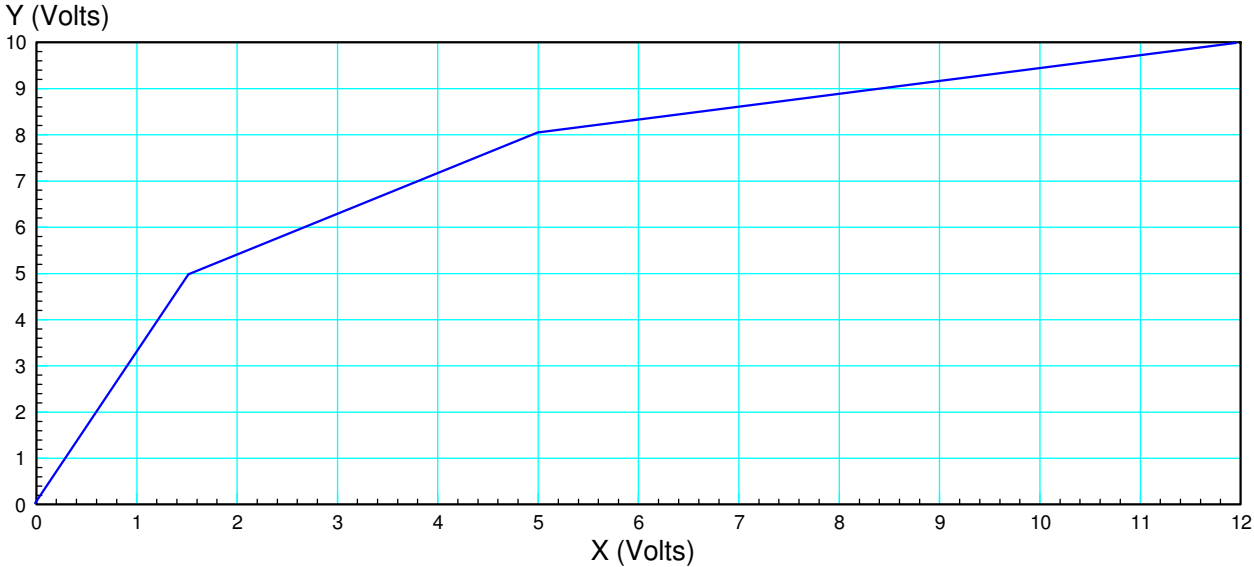- R = 900 + 100 * Birth Month + Birth Day.

R 900 + 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 900 + 100*Mo + Day	R0	Vz1	R1	Vz2	R2

Y (Volts)

X (Volts)

X

R3

Y

R0

R1

R2

100k

gain = 1 + R0/1k

1k

Vz1

Vz2

4) Clipper: Design a circuit to clip the voltage at +8V and -7V

$$y = \begin{cases} +8V & x > 8V \\ x & -7V < x < 8V \\ -7V & x < -7V \end{cases}$$
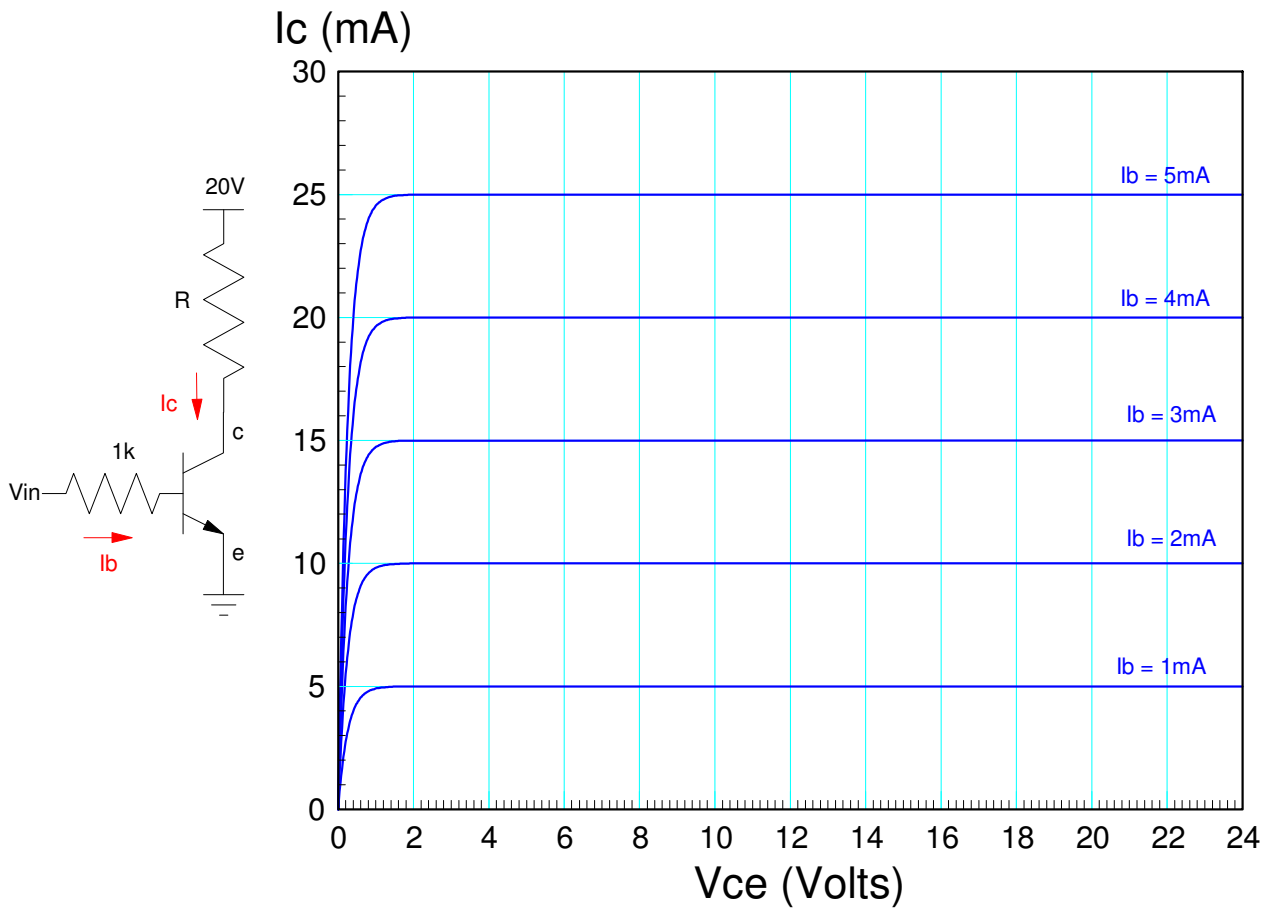
5) The VI characteristics for an NPN transistor are shown below

- Draw the load line for the following circuit
- Show on the load line the operating point (Vce, Ic) when Vin = 2V & 6V.

Assume

- Vbe = 0.7V
- Vce = 0.2V when saturated

R 900 + 100*Mo + Day	Load Line	Vin = 2.0V	Vin = 6.0V
	x and y intercept or show on graph	Vce and Ic or show on graph	Vce and Ic or show on graph

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

R 900 + 100*Mo + Day	Ib (mA)	Ic (mA)	Current Gain (beta)	Operating Region off / active / saturated

20V

Ic

15

6.23V

LED

1.72V

Vin

R

5.00V

0.68V

Ib