ECE 320 - Homework #4

Max/Min Circuits, Clipper Circuits, Transistor Theory. Due Monday, Feb 10th

Max/Min:

1) Determine the voltages and currents for the following max/min circuit. What function does this circuit implement? Y = f(A, B, C, D)

2) Check your results in PartSim (or similar program)



Clipper Circuits:

3) Design a circuit to approximate the following function subject to the following requirements:

- Input: 0.. 10V, capable of 100mA
- Output: 100k resistor
- Relationship: Graph below, +/- 200mV
- 4) Check your design in PartSim



- 5) Design a circuit which meets the following requirements:
 - Input: -10 .. +10V, capable of 100mA
 - Output: 1k resistor
 - Relationship:

$$V_{out} = \begin{cases} +5V & V_{in} > +5V \\ V_{in} & -5V < V_{in} < +5V \\ -5V & V_{in} < -5V \end{cases}$$

Transistors

- 6) Determine the current gain, β , for the transistor show below. Also label the off, active, and saturated regions.
- 7) Draw the load-line and determine the Q-point for
 - Vin = 0V
 - Vin = 3V
 - Vin = 6V

