4) The diagram shown below illustrates the basic structure for a diode logic array and should be used to answer the following questions. Be sure to indicate and verify/justify your assumptions.

A) Place the diodes necessary so that “X” is 0 and “Y” is 1. (10 points)

B) Determine the minimum current rating (maximum allowable current) for the diodes. Be sure to be clear in your analysis. (10 points)

C) Determine the minimum breakdown voltage for the diodes. Be sure to be clear in your analysis. (5 points)

\[
\text{A)} \quad \text{LET ONE INPUT BE LOW (0V)}
\]

\[
\frac{V_{CE} - V_{D off}}{R} = I = \frac{4.3}{5\Omega} = 0.86 \text{ mA}
\]

\[
\text{LOOK AT ALL INPUTS HIGH}
\]

\[
I = \frac{V_{CE} - V_{D off}}{R_1 + R_2} = \frac{4.3}{5 + 5 \Omega} = 0.86 \text{ mA}
\]

\[
\text{MAX CURRENT WOULD BE 8.6 mA}
\]

\[
\text{B)} \quad \text{LOOK AT ONE INPUT HIGH (5V) & ONE INPUT LOW (0V)}
\]

\[
\text{MAX VOLUME DIODE WOULD BE 7.3V}
\]

\[
\text{MAX I = 2.6mA}
\]

\[
\text{MAX REVERSE VOLTAGE IS 5.3V}
\]