In Class Activity: Concentrations in Analytical Chemistry  Name____________________

1) 200 ppb = ________________ ppm = ________________ part-per-thousand

2) 0.4550 grams of NaOH (39.9971 g/mole) in 250.0 mL of water. Use proper significant
digits.

[NaOH] = ___________
Parts-per-thousand = _________________

w/w % = __________

w/v % = __________

3) What is the molarity of a 200.0 ppb solution of Benzene (FW = 78.1121 g/mole) in water?

How many parts per million in a parts-per-billion?

How many ppb are in a ppm?

How many ppm are in a pp-thousand?
4) Crest toothpaste is advertised to have 0.32 % w/w Sodium Fluoride as an active ingredient. What would be the concentration of sodium fluoride in terms of parts-per-million. The molar mass of NaF is 42.0 g/mole.

5) 3000 parts per thousand = __________________ ppm = ________________ ppb

6) Let’s assume that Huskyioc acid dissociates up to 25.00%. If I take 12.50 grams of Huskyioc acid (123.45 g/mole) and dissolve it in 0.5000 liter of water. What would be the analytical concentration and equilibrium concentrations of this acid in units of Molarity?

7) 250 ppm = \( \frac{ug}{Kg} \)

(fill in the missing values and units in the numerator/denominator)

250 ppb = \( \frac{ug}{ng} \)

(fill in the appropriate units with \text{VOLUME} quantities) assume densities are equivalent to water
8) Beer’s law from general chemistry states that \( A = \varepsilon bc \) where \( b = 1 \text{ cm} \), and \( c \) is concentration (in this case ppm), and \( \varepsilon \) is a constant whose units are such that the absorbance (\( A \)) is unitless.

\[ y = 0.3305x + 0.0008 \]
\[ R^2 = 1 \]

\begin{center}
\text{Calibration of Benzene Solutions}
\end{center}

\begin{itemize}
  \item[a)] Arrange Beer’s law to express \( \varepsilon \) as a function of \( A \), \( b \), and \( c \). Using your expression, what are the units of \( \varepsilon \)?
  \item[b)] What value of \( \varepsilon \) can be taken from the linear trendline?
  \item[c)] Calculate the \textbf{Molar} extinction coefficient (\( \varepsilon \)), where \( \varepsilon \) has units which incorporate Molarity.
\end{itemize}