

Chemistry Quiz v/v.

1. Identify the type of intermolecular forces between pairs of following molecules XY where:

- a) $X = H$ and $Y = F$ - Hydrogen bonding.
- Dipole-dipole interactions.
- Dispersion forces.

- b) $X = O$ and $Y = F_2$ - Dispersion force.

- c) $X =$ element from group 1 and Y element from column 17
- ~~London~~ forces.
- ion-dipole force.

2. A balloon has an initial volume of X -litre, the pressure is Y atm and temperature Z K. If the temperature changes to $2Z$ K and pressure changes to $2Y$ atm what is the new volume?

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$V_2 = \frac{P_1 V_1}{T_1} \times \frac{T_2}{P_2}$$

$$= \frac{YX}{Z} \times \frac{2Z}{2Y}$$

$$= \underline{X} \text{ (volume remains constant / does not change).}$$

3. 20 mL of $NaClO$ (bleach) is added to 140 mL of water. What is the % v/v of the solution. How many ppm is this?

$$\% \text{ v/v} = \frac{20 \text{ mL}}{140 \text{ mL}} \times 100 = 14.2857\%$$

How many ppm

$$10^2 = 14.2857$$

$$10^6 = ?$$

$$\frac{14.2857 \times 10^6}{10^2} = \underline{\underline{142857 \text{ ppm}}}$$

Q4. 100g of X (MW = 200g/mol) is added to 100mL of water.
Assuming all of it dissolves, what is the molarity of the solution?

$$\begin{aligned}\text{Molarity} &= \frac{\text{mass}}{\text{molar mass}} \times \frac{1}{\text{Volume (L)}} \\ &= \frac{100}{200} \times \frac{1}{\frac{100 \text{ mL}}{1000}} = \frac{100}{200} \times \frac{1000}{100} \\ &= \underline{\underline{0.05 \text{ M}}} = \underline{\underline{5 \text{ M}}}\end{aligned}$$

5. How much water must be added to 50mL of a 10M solution to dilute it to 2M.

$$\begin{aligned}M_1 V_1 &= M_2 V_2 \\ \frac{10 \text{ M} \times 50 \text{ mL}}{2 \text{ M}} &= V_2 \\ \underline{\underline{250 \text{ mL}}} &= V_2\end{aligned}$$

* For extra credit, calculate the molarity of this solution
MW $\text{NaClO} = 74.5 \text{ g/mol}$.

Q13 Linked to question 3.

$$\begin{aligned}(74.5 \times 1000) \text{ mg/L} &= 1 \text{ M} \\ 142857.14 \text{ mg/L} &= ?\end{aligned}$$

$$\frac{142857.14 \text{ mL} \times 1 \text{ M}}{74.5 \times 1000} = \underline{\underline{1.9175 \text{ M}}}$$

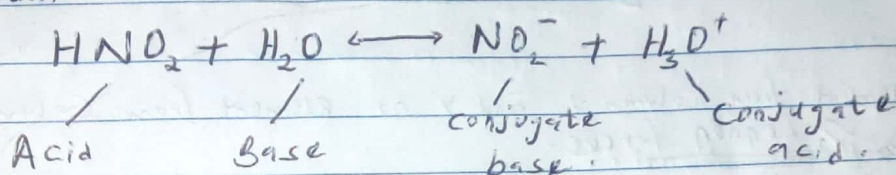
$$\text{ppm} = \text{mg/L}$$

Quiz V

1. A liquid has a pH of 3.2 is it an acid, base or neutral?
 Its an acid.

~~not pH of 0~~

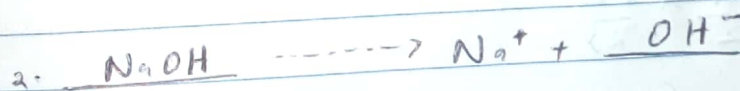
2. Identify the acid, base, conjugate base and acid in the following reaction.



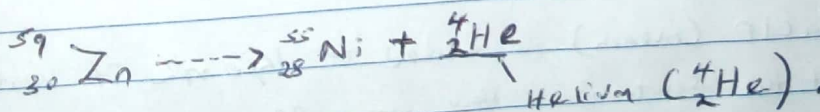
3. A substance has $[\text{H}^+]$ of 10×10^{-5} . What is its pH?

$$\begin{aligned}
 \text{pH} &= -\log[\text{H}^+] \\
 &= -\log[10 \times 10^{-5}] = \underline{\underline{4.0}}
 \end{aligned}$$

4. Fill in the missing blanks in the following buffer reaction.



5. Identify the decay product in the following nuclear decay.



6. If the half life of isotope of X is 30 days, how much of 1024 gm sample will be left after a year (1 month = 30 days),

$$\text{Remaining } N_t = \text{Initial } N_0 \times \left(\frac{1}{2}\right)^{\left(\frac{t}{T_{1/2}}\right)}$$

$$= 1024 \times 0.5^{\left(\frac{12 \times 30}{30}\right)}$$

$$= 1024 \times 0.5^{12}$$

$$= \underline{\underline{0.25 \text{ gm}}}$$