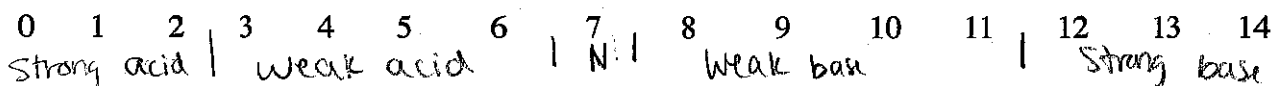


**Acids & Bases Review Sheet – Quantitative Chemistry**

1. **pH Scale.** On the scale below, label the following regions: neutral, strong acid, strong base, weak acid, and weak base.



2. **Scientists:** Arrhenius believed that acids & bases formed ions in solutions. He thought acids formed hydrogen ions and bases formed hydroxide ions. Bronsted-Lowry described acids as proton donors and bases as proton acceptors. Lewis described acids as electron pair acceptors and bases as electron pair donors.

3. Name 3 strong acids. What are their formulas?

Hydrochloric acid HCl, Nitric Acid HNO<sub>3</sub>, Sulfuric acid H<sub>2</sub>SO<sub>4</sub>

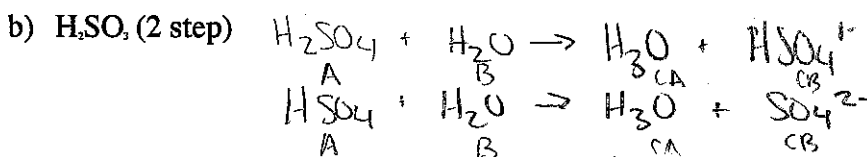
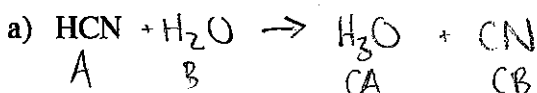
4. **Table – Acids & Bases – List 2 characteristics of each.**

Acids	Bases
a. <u>Tastes Sour</u>	a. <u>Tastes Bitter</u>
b. <u>are corrosive</u>	b. <u>feels slippery</u>

5. What is the difference between weak and strong acids in terms of ion formation?

Weak acids dissociate partially, strong acids dissociate completely

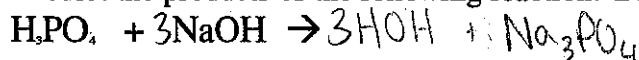
6. Write equations for the ionization of the following acids in water. Be sure to label all acids, bases, conjugate acids, and conjugate bases.



7. Acid + Base → Water + Salt

This is called a Neutralization reaction.

8. **Equation.** Predict the products of the following reaction. Balance the equation if necessary.



9. What is the pH of blood? 7.35-7.45

10. Calculate  $[\text{H}^+]$  for a solution at 25°C that contains  $7.8 \times 10^{-5} \text{ M OH}^-$ . Is the solution acidic or basic?

$[\text{H}^+][\text{OH}^-] = 1.0 \times 10^{-14}$

$[\text{H}^+][7.8 \times 10^{-5}] = 1.0 \times 10^{-14}$

$[\text{H}^+] = 1.3 \times 10^{-10}$

basic

11. What is the pH of the above solution?

$$pH = -\log [H^+] \quad pH = -\log (1.3 \times 10^{-10})$$

$$pH = 9.9 = \text{Weak base}$$

12. The pOH of a solution is 10.2. What is its pH? 3.8

13. Calculate the hydroxide ion concentration in mol/L of a solution with a pOH of 6.8.

$$[OH^-] = 10^{-pOH} \quad \text{Weak base} \quad [OH^-] = 10^{-6.8} \quad [OH^-] = 1.6 \times 10^{-7}$$

14. What is the pH of a solution containing  $7.0 \times 10^{-3}$  M OH<sup>-</sup>?

$$pOH = -\log (OH^-)$$

$$pOH = -\log (7.0 \times 10^{-3})$$

$$pOH = 2.2$$

$$pH + pOH = 14$$

$$pH + 2.2 = 14$$

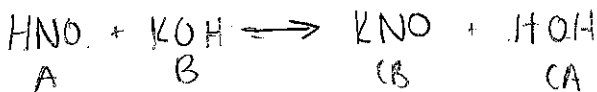
$$pH = 11.8$$

Weak base

15. What piece of laboratory equipment is used specifically for titration?

a buret

16. In the titration of 36.2 mL of HNO<sub>3</sub>, 52.5 mL of 1.3 M KOH is used. What is the concentration (molarity) of the nitric acid?



$$52.5 \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} \times \frac{1.3 \text{ mol KOH}}{1 \text{ L}} \times \frac{1 \text{ mol HNO}_3}{1 \text{ mol KOH}} = .068 \text{ mol HNO}_3$$

$$36.2 \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} = .0362 \text{ L}$$

$$\text{molarity} = \frac{n}{L} = \frac{.068 \text{ mol HNO}_3}{.0362 \text{ L}} = 1.9 \text{ M HNO}_3$$