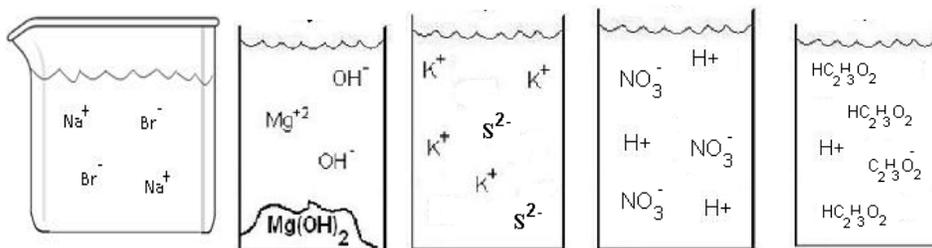


CHM 130 Acids, Bases, and Electrolytes Worksheet

1. Name 3 strong acids and write their formulas. What makes an acid strong?
2. Name 4 weak acids and write their formulas. What makes an acid weak?
3. Name 2 strong bases and write their formulas. What makes a base strong?
4. Name 1 weak base and write its formula. What makes a base weak?
5. Identify the Arrhenius acid and base in the following reactions:
 - a. $\text{HNO}_3(\text{aq}) + \text{KOH}(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l}) + \text{LiNO}_3(\text{aq})$
 - b. $2 \text{HBr}(\text{aq}) + \text{Ca}(\text{OH})_2(\text{aq}) \rightarrow 2 \text{H}_2\text{O}(\text{l}) + \text{CaBr}_2(\text{aq})$
 - c. $\text{HC}_2\text{H}_3\text{O}_2(\text{aq}) + \text{LiOH}(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l}) + \text{LiC}_2\text{H}_3\text{O}_2(\text{aq})$
6. What is the pH for these solutions? Is the solution acidic, basic, or neutral?
 - a. $[\text{H}^+] = 10^{-9}$ pH = _____
 - b. $[\text{H}^+] = 10^{-4}$ pH = _____
 - c. $[\text{H}^+] = 0.0001$ pH = _____
 - d. $[\text{H}^+] = 0.0000000001$ pH = _____
7. What is the definition of a buffer solution?
8. Identify the Bronsted Lowry acid and base in the following reactions:
 - a. $\text{NH}_3(\text{aq}) + \text{HClO}_4(\text{aq}) \rightarrow \text{NH}_4^+(\text{aq}) + \text{ClO}_4^-(\text{aq})$
 - b. $\text{HCl}(\text{aq}) + \text{CH}_3\text{NH}_2(\text{aq}) \rightarrow \text{Cl}^-(\text{aq}) + \text{CH}_3\text{NH}_3^+(\text{aq})$
9. Draw a picture of the following in beakers of water: NaBr , $\text{Mg}(\text{OH})_2$, K_2S , HNO_3 , and $\text{HC}_2\text{H}_3\text{O}_2$.
10. Are the following strong, weak, or non-electrolytes?
 - a. PbSO_4
 - b. $\text{Al}_2(\text{SO}_4)_3$
 - c. $\text{C}_6\text{H}_{12}\text{O}_6$
 - d. SrI_2
 - e. $\text{Cu}(\text{OH})_2$
 - f. CH_3OH
 - g. K_2CrO_4
 - h. $\text{Ni}(\text{NO}_3)_3$
 - i. $\text{Ba}(\text{C}_2\text{H}_3\text{O}_2)_2$
 - j. $\text{Ca}_3(\text{PO}_4)_2$

Answers:

- Name 3 strong acids and write their formulas. What makes an acid strong?
hydrochloric acid HCl, nitric acid HNO₃, sulfuric acid H₂SO₄. Strong means 100% ionized, all the H⁺ ions have broken off the acid molecule in water. It exists as all ions.
- Name 4 weak acids and write their formulas. What makes an acid weak?
hydrofluoric acid HF, phosphoric acid H₃PO₄, carbonic acid H₂CO₃, acetic acid HC₂H₃O₂
Weak means very little ionized like 1-5%. Few H⁺ ions have come off the acid molecule in water. Few ions
- Name 2 strong bases and write their formulas. What makes a base strong?
potassium hydroxide KOH, sodium hydroxide NaOH. Strong means 100% dissociated, all the OH⁻ ions have broken off the base in water. It exists as all ions.
- Name 1 weak base and write its formula. What makes a base weak?
magnesium hydroxide Mg(OH)₂. Weak means 1-5% dissociated. Few ions. Most stays together.
- Identify the Arrhenius acid and base in the following reactions:
 - HNO₃(aq) + KOH(aq) → H₂O(l) + LiNO₃(aq)
acid base
 - 2 HBr(aq) + Ca(OH)₂(aq) → 2 H₂O(l) + CaBr₂(aq)
acid base
 - HC₂H₃O₂(aq) + LiOH(aq) → H₂O(l) + LiC₂H₃O₂(aq)
acid base
- What is the pH for these solutions? Is the solution acidic, basic, or neutral?
 - [H⁺] = 10⁻⁹ pH = 9 basic
 - [H⁺] = 10⁻⁴ pH = 4 acidic
 - [H⁺] = 0.0001 pH = 4 acidic
 - [H⁺] = 0.0000000001 pH = 10 basic
- What is the definition of a buffer solution?
A solution that keeps pH constant, resists a change in pH.
- Identify the Bronsted Lowry acid and base in the following reactions:
 - NH₃(aq) + HClO₄(aq) → NH₄⁺(aq) + ClO₄⁻(aq)
base acid
 - HCl(aq) + CH₃NH₂(aq) → Cl⁻(aq) + CH₃NH₃⁺(aq)
acid base
- Draw a picture of the following in beakers of water: NaBr, Mg(OH)₂, K₂S, HNO₃, and HC₂H₃O₂.



- Are the following strong, weak, or non-electrolytes?

a. PbSO ₄ weak	f. CH ₃ OH non
b. Al ₂ (SO ₄) ₃ strong	g. K ₂ CrO ₄ strong
c. C ₆ H ₁₂ O ₆ non	h. Ni(NO ₃) ₃ strong
d. SrI ₂ strong	i. Ba(C ₂ H ₃ O ₂) ₂ strong
e. Cu(OH) ₂ weak	j. Ca ₃ (PO ₄) ₂ weak