

Chem I Acid Base Quiz Review

Name: _____

1) Label the acid (A), base (B), conjugate acid (CA) and conjugate base (CB) in the following reactions:



2) For the above reactions, draw in the reaction arrows correctly (which direction would be dominant?)

3) Put a star by the strongest acid: benzoic ★ citric formic carbonic

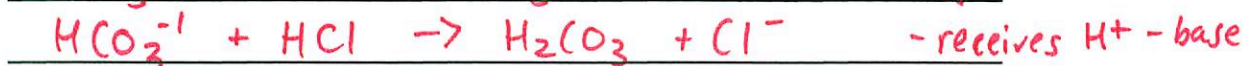
4) Circle any organic acids from #3. *- have -COOH group*

5) Water is a weak acid - what does "weak" mean exactly in this context? $\text{H}_2\text{O} \rightleftharpoons \text{H}^+ + \text{OH}^-$

- H₂O doesn't dissociate in a large percentage, most stays as H₂O

5) Which of these two species could be amphoteric? OH^{-1} or HCO_3^{-1} *- could give or accept H⁺*

6) Write two equations showing the species you chose acting first as an acid, then as a base:



7) Draw Lewis Structures for all of the following reactants and products: $\text{HCN} + \text{OH}^{-1} \rightarrow \text{CN}^{-} + \text{H}_2\text{O}$?



8) Formulas: Write formulas for the following acids:

- a) nitric acid HNO_3 b) chlorous acid HClO_2 c) benzoic acid $\text{C}_6\text{H}_5\text{COOH}$
 d) hydroiodic acid HI e) sulfuric acid H_2SO_4 f) acetic acid CH_3COOH

9) Write products and balance the following Arrhenius neutralization reactions:



10) Find the pH of the following dilute acid and base solutions:

- a) 0.02 M HCl pH = 1.7 *~2* b) 0.75 M NaOH pH = 13.9 c) 0.22 M HCl pH = 0.66

11) Find the $[\text{H}_3\text{O}^+]$ of solutions with the following pH values:

- a) pH = 7.1 $[\text{H}_3\text{O}^+] =$ 7.9×10^{-8} b) pH = 6.5 $[\text{H}_3\text{O}^+] =$ 3.2×10^{-7}

12) Find the pOH of a solution with:

- a) pH = 2.2 pOH = 11.8 b) $[\text{H}_3\text{O}^+] = 6.7 \times 10^{-12}$ pOH = 2.8

13) Label the following as acid (A), base (B) or neutral (N):

a) pH = 3.7 A

b) pOH = 10.0 A
pH = 4

c) $[H_3O^+] = 0.07$ A
pH = 1.2

14) Titration! You have a solution of HCl with an unknown molarity. You titrate this acid with a standard solution of 0.15 M NaOH. You titrate 75.0 mL of the acid with 95.0 mL of the NaOH. Find the molarity of this HCl solution.

EQ with known values
below reactants:



show work: ① mol NaOH = $\frac{0.15 \text{ mol}}{\text{L}} \cdot 0.095 \text{ L} = 0.014 \text{ mol NaOH}$

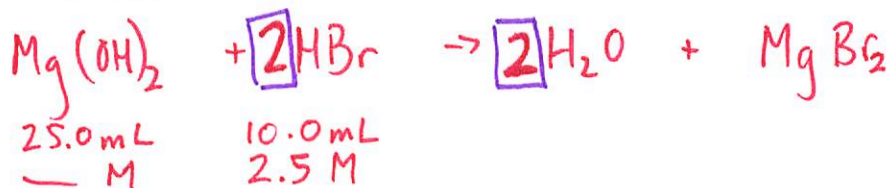
② $0.014 \text{ mol NaOH} \left(\frac{1 \text{ mol HCl}}{1 \text{ mol NaOH}} \right) = 0.014 \text{ mol HCl}$

③ $M = \frac{0.014 \text{ mol HCl}}{0.075 \text{ L HCl}} = 0.19 \text{ M HCl}$

15) Titration, again! You have a solution of $Mg(OH)_2$ with an unknown molarity. You titrate this base with a standard solution of 2.5 M HBr. Find M of $Mg(OH)_2$.

Your data: Mg(OH)₂ used = 25.0 mL
buret start HBr = 7.8 mL
buret end HBr = 17.8 mL > 10.0 mL

EQ with known values
below reactants:



show work:

① moles HBr = $\frac{2.5 \text{ mol}}{\text{L}} (0.010 \text{ L}) = 0.025 \text{ mol HBr}$

② $0.025 \text{ mol HBr} \left(\frac{1 \text{ mol Mg(OH)}_2}{2 \text{ mol HBr}} \right) = 0.0125 \text{ mol Mg(OH)}_2$
 ≈ 0.013

③ $M = \frac{0.013 \text{ mol Mg(OH)}_2}{0.025 \text{ L Mg(OH)}_2} = 0.52 \text{ M Mg(OH)}_2$