**Acids and Bases; Aqueous Ionic Equilibria TEST REVIEW**

Acid vs base properties.

Arrhenius vs Bronsted-Lowry Definition

H+ is same as H3O+

Identify conjugate acid-base pairs. (Strength based on Ka or Kb) amphiprotic/amphoteric substance (both acid and base)

Strong vs weak acids/bases

Autoionization of water (Kw value at 25oC 1.00x 10-14)

pH = -log [H+] 0-14 scale (pOH) pH + pOH =14

STRONG acids/bases are strong electrolytes

WEAK Acids (strength depends on Ka = [H+] [A-]/[HA] Use Ka to calculate initial pH of solution. Find % ionization.

WEAK Bases (strength depends on Kb)

Find Kb from Kw and Ka

The larger the Ka – the stronger the acid (smaller pKa). The stronger the acid the weaker the conj base (and vice versa).

Anions of weak acids (conj bases) react with water to produce OH-.

Cations of weak bases (conj acids) react with water to produce (H+)

Anions/cations from strong acids/bases do NOT hydrolyze. Will a salt form acidic, basic, or neutral solution?

Strength of A-X bond determines the strength of the acid. (weaker bond = stronger acid since it ionizes more easily)

(also affected by stability of the conjugate base) HF is stronger than H2O)

Binary: H-X bond strength decreases as X increases in size (Coulomb’s law) HI strongest group 7 acid

Look at pgs 770-771 for summary. Especially oxyacids.

Carboxylic acids (-COOH)

BUFFERs (mixture of weak acid and CB or weak base and CA) HX ⇋ H+ + A- [A-]/[HA] ratio common ion effect

Know how the components react to resist change in pH as acid or base are added

How to calc pH of buffer using Ka or HH eqn pH = pKa + log [A-]/[HA]

Ideal buffer? Buffer capacity and range?

TITRATION (define)

KNOW shapes of curves SA/SB vs WA/SB vs WB/SA eq. pt. (how to calculate moles, MM, etc), pH?, end pt.

Species in solution at different points

WA/SB id difference in shape, starting location, buffer zone, ½ eq. pt. pH=pka, eq.pt. above 7, indicator choice?,

Species present at different points

Ksp, write expression, solubility in g/100mL or L, molar solubility (find “x” from ICE)

Factors affecting solubility? pH and common ion effect shift??

MC Hints: know how to interpret titration curve diagram; examine pH data of various acids; id buffers; ICE chart calc including % dissociation; acid strength base on structure; acid strength based on Ka; pH of salts; solubility; shifts?

FRQs (#1 is LONG) Weak acid / weak base calculations/justifications

1) How to prepare acid solution of specific concentration? *(Steps/equipment)*

Calc Ka via initial pH*(ICE)* and % diss; Titration: write net ionic, determine unknown conc *(interpret graph use stoich*; Ka from graph, buffer, indicators)

2) Complete the calcs necessary for making a titration curve, and then plot your own curve