1. Rank the following salts in order of decreasing pH of their 0.10 M aqueous solutions:

Na_2SO_3	RbCN
LiF	$Na_2C_2O_4$
KNO_2	K_2CO_3

2. Determine if a solution of NH_4CH_3COO will be acidic basic, or neutral, and include the hydrolysis reactions that occur. Can you predict the approximate pH of this solution?

3. Determine if a 0.10 M solution of K_2HPO_4 will be acidic or basic and include the hydrolysis reaction(s) that occur.

4. Arrange the following 0.10 M aqueous solutions in order of increasing pH:

$NaHSO_3$

$LiHCO_3$

$KHSO_4$

5. You have two solutions: 1 M KF and 1 M HF. Which solution has the greater conductivity? Explain your answer.

6. Without performing any calculations, arrange the following 0.1 M aqueous solutions in order of increasing pH.

RbI	$NaHSO_4$
NH_4Br	$Cr(NO_3)_3$
KCN	Na_3PO_4
Li_2CO_3	$FeCl_3$

ANSWER KEY

1.	Solutions ranked by decreasing pH: **K_2CO_3** **RbCN** **Na_2SO_3** **$Na_2C_2O_4$** **LiF** **KNO_2**	Explanation: **All salts contain an alkali metal ion – all are spectators.** **The anion in each salt is a weak base – find the base on the table of relative strengths, the lower on the table the weak base appears, the stronger it is and therefore the more basic the solution will be.** **CO_3^{2-} is the strongest of the weak bases and it's salt will have the greatest OH^- concentration and the highest pH.**
2.	Prediction? (Acidic, basic or neutral) **NEUTRAL** Hydrolysis Reactions: **$NH_4^+ + H_2O \rightleftharpoons NH_3 + H_3O^+$** **$CH_3COO^- + H_2O \rightleftharpoons CH_3COOH + OH^-$** Approximate pH? **Around 7**	Explanation: **NH_4^+ $K_a = 5.6 \times 10^{-10}$** **$CH_3COO^-$ $K_b = 1.0 \times 10^{-14} / 1.8 \times 10^{-5}$** **$= 5.6 \times 10^{-10}$** **Weak acid and weak base are similar in strength and therefore the solution will be neutral.**

3.	Prediction? (Acidic, basic or neutral) **BASIC** Hydrolysis Reaction(s): **$HPO_4^{2-} + H_2O \rightleftharpoons H_2PO_4^- + OH^-$**	Explanation: **$Kb(HPO_4^{2-}) = 1.6 \times 10^{-7}$** **$Ka(HPO_4^{2-}) = 2.2 \times 10^{-13}$** **Kb > Ka**
4.	Rank : **$HSO_4^- > HSO_3^- > HCO_3^-$**	Comparison of Ka and Kb values: **HSO_3^-: Ka = 1.5×10^{-2} > Kb = 6.7×10^{-13}** **HCO_3^-: Ka = 5.6×10^{-11} < Kb = 2.3×10^{-8}** **HSO_4^-: Ka = 1.2×10^{-2}**
5.	Greater conductivity??? **KF**	Explanation: **KF is a soluble salt, and:** **KF → K^+ + F^- (100% dissociated into ions)** **HF ⇌ H^+ + F^- (slightly dissociated into ions)** **Then 1 M KF contains more ions and has the greater conductivity.**
6.	Rank by increasing pH: **$NaHSO_4$, $FeCl_3$, $Cr(NO_3)_3$, NH_4Br, RbI, KCN, Li_2CO_3, Na_3PO_4**	Explanation: **use the table of relative strengths to determine the order**

NAMES: _____

1.	Solutions ranked by decreasing pH:	Explanation:
2.	Prediction? (Acidic, basic or neutral) Hydrolysis Reactions: Approximate pH?	Explanation:
3.	Prediction? (Acidic, basic or neutral) Hydrolysis Reaction(s):	Explanation:

4.	Rank :	Comparison of Ka and Kb values:
5.	Greater conductivity???	Explanation:
6.	Rank by increasing pH:	Explanation: