- Hydrolysis Worksheet -

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Name _____

This worksheet covers material from class notes and the Textbook pages 144-148

1. Write dissociation equations for each of the following salts, state whether cation hydrolyzes, anion hydrolyzes and whether the salt is acidic, basic or neutral. (20 marks)

a) Salt K_2CO_3 Dissociation Equation _____

Cation (Acid or Neutral) _____ Anion (Base or Neutral) _____

Is salt acidic, basic or neutral? _____

b) Salt $AlBr_3$ Dissociation Equation _____

Cation (Acid or Neutral) _____ Anion (Base or Neutral) _____

Is salt acidic, basic or neutral? _____

c) Salt NH_4ClO_4 Dissociation Equation _____

Cation (Acid or Neutral) _____ Anion (Base or Neutral) _____

Is salt acidic, basic or neutral? _____

d) Salt $CsNO_3$ Dissociation Equation _____

Cation (Acid or Neutral) _____ Anion (Base or Neutral) _____

Is salt acidic, basic or neutral? _____

e) Salt $Cr(NO_3)_3$ Dissociation Equation _____

Cation (Acid or Neutral) _____ Anion (Base or Neutral) _____

Is salt acidic, basic or neutral? _____

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2. State whether each of the following substances are acidic, basic or neutral when mixed with water. (12 marks)

a) $RbNO_3$ _____ b) NH_4Br _____ c) H_2SO_4 _____

d) KNO_2 _____ e) NH_4NO_3 _____ f) NaOH _____

g) NH_3 _____ h) $LiCH_3COO$ _____ i) H_3PO_4 _____

j) CH_3COOH _____ k) $FeBr_3$ _____ l) $Ba(OH)_2$ _____

3. Of the following, circle the one with the ***highest*** pH: (3 marks)

a) i) NH_4^+ ii) HF iii) NH_3 iv) CH_3COOH v) HCI

b) i) PO_4^{3-} ii) SO_3^{2-} iii) $A1^{3+}$ iv) CH_3COO^- v) Cl^-

c) i) NaCl ii) $CrCl_3$ iii) NH_4I iv) CH_3COOH v) H_2S

4. Of the following, circle the one with the ***lowest*** pH: (3 marks)

a) i) NH_4^+ ii) HF iii) NH_3 iv) CH_3COOH v) HCI

b) i) PO_4^{3-} ii) SO_3^{2-} iii) $A1^{3+}$ iv) CH_3COO^- v) Cl^-

c) i) NaCl ii) KCN iii) NH_3 iv) Na_2CO_3 v) $Li_2C_2O_4$

5. Find Ka and Kb of each of the following amphiprotic anions and determine if they act as an acid or a base in water solution. (9 marks)

a) HPO_4^{2-} Ka = _____ Kb = _____ A or B _____

b) $HC_6H_5O_7^{2-}$ Ka = _____ Kb = _____ A or B _____

c) HSO_4^- Ka = _____ Kb = _____ A or B _____

6. Show the structure of the hexaaquochromium ion and explain why it acts as an acid.

Structure: (1 mark)

Explanation: (1 mark)

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7. Write the dissociation equations for each of the following. Determine the Ka for the cation and the Kb for the anion and state whether the salt acts as an acid or a base in water. (12 marks)

a) $(NH_4)_2SO_3$ →

Ka (cation) = _____ Kb (anion) _____ = _____

Salt is _____

b) $Al(NO_2)_3$ →

Ka (cation) = _____ Kb (anion) _____ = _____

Salt is _____

c) $FePO_4$ →

Ka (cation) = _____ Kb (anion) _____ = _____

Salt is _____

8. Define ***hydrolysis***.(1 mark)

9. Write the net ionic equation for the ***predominant hydrolysis reaction*** when each of the following salts is dissolved in water. For some questions, calculations may be needed. (6 marks)

a) NaF Answer _____

b) KNO_2 Answer _____

c) K_2HPO_4 Answer _____

d) NH_4ClO_4 Answer _____

e) $Al(NO_3)_3$ Answer _____
(Use the hydrated form of the aluminum ion.)

f) $LiHCO_3$ Answer _____

10. Use a hydrolysis equation to explain why phosphates (PO_4^{3-}) are used as cleaning agents. (2 marks)

Equation: _____

Explanation: _____

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