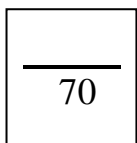


- Hydrolysis Worksheet -



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 _____

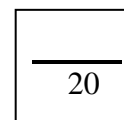
Cation (Acid or Neutral) _____ Anion (Base or Neutral) _____

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? _____



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) $\text{Ba}(\text{OH})_2$ _____

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) HCl
 b) i) PO_4^{3-} ii) SO_3^{2-} iii) Al^{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) HCl
 b) i) PO_4^{3-} ii) SO_3^{2-} iii) Al^{3+} iv) CH_3COO^- v) Cl^-
 c) i) NaCl ii) KCN iii) NH_3 iv) Na_2CO_3 v) $\text{Li}_2\text{C}_2\text{O}_4$

5. Find K_a and K_b 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-} $K_a =$ _____ $K_b =$ _____ A or B _____
 b) $\text{HC}_6\text{H}_5\text{O}_7^{2-}$ $K_a =$ _____ $K_b =$ _____ A or B _____
 c) HSO_4^- $K_a =$ _____ $K_b =$ _____ A or B _____

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

Structure: (1 mark)

Explanation: (1 mark)

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

a) $(\text{NH}_4)_2\text{SO}_3 \rightarrow$

K_a (cation) = _____ K_b (anion) _____ = _____

Salt is _____

b) $\text{Al}(\text{NO}_2)_3 \rightarrow$

K_a (cation) = _____ K_b (anion) _____ = _____

Salt is _____

c) $\text{FePO}_4 \rightarrow$

K_a (cation) = _____ K_b (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) $\text{Al}(\text{NO}_3)_3$ 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: _____