Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Reactions Quiz

Multiple Choice (2 points each)

1) Aqueous potassium chloride will react with which one of the following?

A) calcium nitrate

B) sodium bromide

C) lead nitrate

D) barium nitrate

E) sodium chloride

2) The net ionic equation for formation of an aqueous solution of NiI2 accompanied by evolution of CO2 gas via mixing solid NiCO3 and aqueous hydriodic acid is \_\_\_\_\_\_\_\_\_\_.

A) 2NiCO3 (s) + HI (aq) → 2 H2O (l) + CO2 (g) + 2Ni2+ (aq)

B) NiCO3 (s) + I- (aq) → 2 H2O (l) + CO2 (g) + Ni2+ (aq) + HI (aq)

C) NiCO3 (s) + 2H+ (aq) → H2O (l) + CO2 (g) + Ni2+ (aq)

D) NiCO3 (s) + 2HI (aq) → 2 H2O (l) + CO2 (g) + NiI2 (aq)

E) NiCO3 (s) + 2HI (aq) → H2O (l) + CO2 (g) + Ni2+ (aq) + 2 I- (aq)

3) Which of the following is soluble in water at 25 °C?

A) Fe3 (PO4)2

B) Fe(OH)2

C) Fe(NO3)2

D) FeCO3

E) FeS

4) When aqueous solutions of \_\_\_\_\_\_\_\_\_\_ are mixed, a precipitate forms.

A) NiBr2 and AgNO3

B) NaI and KBr

C) K2SO4 and CrCl3

D) KOH and Ba(NO3)2

E) Li2CO3 and CsI

5) With which of the following will the ammonium ion form an insoluble salt?

A) chloride

B) sulfate

C) carbonate

D) sulfate and carbonate

E) none of the above

6) The net ionic equation for the reaction between aqueous nitric acid and aqueous sodium hydroxide is \_\_\_\_\_\_\_\_\_\_.

A) H+ (aq) + HNO3 (aq) + 2OH- (aq) → 2 H2O (l) + NO3- (aq)

B) HNO3 (aq) + NaOH (aq) → NaNO3 (aq) + H2O (l)

C) H+ (aq) + OH- (aq) → H2O (l)

D) HNO3 (aq) + OH- (aq) → NO3- (aq) + H2O (l)

E) H+ (aq) + Na+ (aq) +OH- (aq) → H2O (l) + Na+ (aq)

7) Which one of the following solutions will have the greatest concentration of hydroxide ions?

A) 0.300 M rubidium hydroxide

B) 0.100 M magnesium hydroxide

C) 0.100 M ammonia

D) 0.100 M beryllium hydroxide

E) 0.100 M hydrochloric acid

8) Which one of the following is a weak acid?

A) HNO3

B) HCl

C) HI

D) HF

E) HClO4

9) Which hydroxides are weak bases?

A) KOH, Ba(OH)2

B) Sr(OH)2, KOH, NaOH, Ba(OH)2

C) KOH, NaOH

D) KOH, NaOH, Ba(OH)2

E) None of these is a weak base.

10) In which reaction does the oxidation number of hydrogen change?

A) HCl (aq) + NaOH (aq) → NaCl (aq) + H2O (*l*)

B) 2 Na (s) + 2 H2O (*l*) → 2 NaOH (aq) + H2 (g)

C) CaO (s) + H2O (*l*) → Ca(OH)2 (s)

D) 2 HClO4 (aq) + CaCO3 (s) → Ca(ClO4)2 (aq) + H2O (*l*) + CO2 (g)

E) SO2 (g) + H2O (*l*) → H2SO3 (aq)

11) In which species does nitrogen have the highest oxidation number?

A) N2

B) NH3

C) HNO2

D) NO2-

E) NaNO3

12) Sodium does not occur in nature as Na (s) because \_\_\_\_\_\_\_\_\_\_.

A) it is easily reduced to Na-

B) it is easily oxidized to Na+

C) it reacts with water with great difficulty

D) it is easily replaced by silver in its ores

E) it undergoes a disproportionation reaction to Na- and Na+

13) Oxidation is the \_\_\_\_\_\_\_\_\_\_ and reduction is the \_\_\_\_\_\_\_\_\_\_.

A) gain of oxygen, loss of electrons

B) loss of oxygen, gain of electrons

C) loss of electrons, gain of electrons

D) gain of oxygen, loss of mass

E) gain of electrons, loss of electrons

14) Which of the following is an oxidation-reduction reaction?

A) Cu (s) + 2AgNO3 (aq) → 2Ag (s) + Cu(NO3)2 (aq)

B) HCl (aq) + NaOH (aq) → H2O (l) + NaCl (aq)

C) AgNO3 (aq) + HCl (aq) → AgCl (s) + HNO3 (aq)

D) Ba(C2H3O2)2 (aq) + Na2SO4 (aq) → BaSO4 (s) + 2NaC2H3O2 (aq)

E) H2CO3 (aq) + Ca(NO3)2 (aq) → 2HNO3 (aq) + CaCO3 (s)

15) Which solution has the same number of moles of NaOH as 50.00 mL of 0.100*M* solution of NaOH?

A) 20.00 mL of 0.200*M* solution of NaOH

B) 25.00 mL of 0.175*M* solution of NaOH

C) 30.00 mL of 0.145*M* solution of NaOH

D) 50.00 mL of 0.125*M* solution of NaOH

E) 100.00 mL of 0.0500*M* solution of NaOH

16) A 0.100 M solution of \_\_\_\_\_\_\_\_\_\_ will contain the highest concentration of potassium ions.

A) potassium phosphate

B) potassium hydrogen carbonate

C) potassium hypochlorite

D) potassium iodide

E) potassium oxide

17) What volume (mL) of a concentrated solution of sodium hydroxide (6.00 M) must be diluted to 200. mL to make a 1.50 M solution of sodium hydroxide?

A) 0.0500

B) 50.0

C) 45.0

D) 800.

E) 0.800

18) What mass (g) of potassium chloride is contained in 430.0 mL of a potassium chloride solution that has a chloride ion concentration of 0.193 M?

A) 0.0643

B) 0.0830

C) 12.37

D) 0.386

E) 6.19

19) What volume (mL) of 0.135 M NaOH is required to neutralize 13.7 mL of 0.129 M HCl?

A) 13.1

B) 0.24

C) 14.3

D) 0.076

E) 6.55

20) What are the spectator ions in the reaction between KCl (aq) and AgNO3 (aq)?

A) K+ and Ag+

B) Ag+ and Cl-

C) K+ and NO3-

D) Ag+ and NO3-

E) K+ only

21) Which of the following are weak electrolytes?

HCl

HC2H3O2

NH3

KCl

A) HCl, KCl

B) HCl, HC2H3O2, NH3, KCl

C) HC2H3O2, KCl

D) HC2H3O2, NH3

E) HCl, HC2H3O2, KCl

22) What is the oxidation number of bromine in the BrO3- ion?

A) -1

B) +1

C) +3

D) +5

E) +7

23) Which element is oxidized in the reaction below?

I- + MnO4- + H+ → I2 + MnO2 + H2O

A) I

B) Mn

C) O

D) H

24) Which element is reduced in the reaction below?

Fe+2 + H+ + Cr2O7-2 → Fe+3 + Cr+3 + H2O

A) Fe

B) Cr

C) O

D) H

AP Questions

#1 write the balanced net-ionic equations for the following reactions:

a) a solution of potassium iodide is added to an acidified solution of potassium dichromate.

b) a solution of sodium hydroxide is added to a solution of ammonium chloride.

c) a strip of magnesium is added to a solution of silver nitrate.

d) solid potassium chlorate is heated in the presence of manganese dioxide as a catalyst.

e) dilute hydrochloric acid is added to a solution of potassium carbonate.

f) sulfur trioxide gas is added to excess water.

g) dilute sulfuric acid is added to a solution of barium chloride.

h) propane is burned completely in air.

i) a solution of potassium permanganate is mixed with an alkaline (basic) solution of sodium sulfite.

#2 In a laboratory class, a student is given three flasks that are labeled *Q*, *R*, and *S*. Each flask contains one of the following solutions: 1.0 *M* Pb(NO3)2, 1.0 *M* NaCl, or 1.0 *M* K2CO3. The student is also given two flasks that are labeled *X* and *Y*. One of these flasks contains 1.0 *M* AgNO3, and the other contains 1.0 *M* BaCl2. This information is sum­marized in the diagram below.

 

(a) When the student combined a sample of the solu­tion *Q* with a sample of *X*, a precipitate formed. A precipitate also formed when samples of solutions *Q* and *Y* are combined.

(i) Identify solution *Q*.

(ii) Write the chemical formulas for each of the two precipitates.

(b) When solution *Q* is mixed with solution *R*, a pre­cipitate forms. However, no precipitate forms when solution *Q* is mixed with solution *S*.

(i) Identify solution *R* and solution *S*.

(ii) Write the chemical formula of the precipitate that forms when solution *Q* is mixed with so­lution *R*.

(c) The identity of solution *X* and solution *Y* are to be determined using the following solutions: 1.0 *M* Pb(NO3)2, 1.0 *M* NaCl, and 1.0 *M* K2CO3.

(i) Describe a procedure to identify solution *X* and solution *Y*.

(ii) Describe the observations that would allow you to distinguish between solution *X* and solution *Y*.

(iii) Explain how the observations would enable you to distinguish between solution *X* and solution *Y*.