CHEM 110: Chapter 4 Practice Test Questions

Multiple Choice

1) A strong electrolyte is one that _____ completely in solution.
A) reacts
B) decomposes
C) disappears
D) ionizes

2) Which of the following are strong electrolytes?
  HCl
  $HC_2H_3O_2$
  NH_3
  KCl

A) HCl, KCl
B) HCl, NH_3, KCl
C) HCl, $HC_2H_3O_2$, NH_3, KCl
D) HCl, $HC_2H_3O_2$, KCl
E) $HC_2H_3O_2$, KCl

3) The net ionic equation for the reaction between aqueous solutions of HF and KOH is _____.
A) $HF + KOH \rightarrow H_2O + K^+ + F^-$
B) $HF + OH^- \rightarrow H_2O + F^-$
C) $HF + K^+ + OH^- \rightarrow H_2O + KF$
D) $H^+ + OH^- \rightarrow H_2O$
E) $H^+ + F^- + K^+ + OH^- \rightarrow H_2O + K^+ + F^-$

4) When aqueous solutions of $AgNO_3$ and KI are mixed, AgI precipitates. The balanced net ionic equation is _____.
A) $Ag^+ (aq) + I^- (aq) \rightarrow AgI (s)$
B) $Ag^+ (aq) + NO_3^- (aq) \rightarrow AgNO_3 (s)$
C) $Ag^+ (aq) + NO_3^- (aq) \rightarrow AgNO_3 (aq)$
D) $AgNO_3 (aq) + KI (aq) \rightarrow AgI (s) + KNO_3 (aq)$
E) $AgNO_3 (aq) + KI (aq) \rightarrow AgI (s) + KNO_3 (s)$

5) The spectator ions in the reaction between aqueous hydrochloric acid and aqueous ammonia are _____.
A) H^+ and NH_3
B) H^+, Cl^-, NH_3, and NH_4^+
C) Cl^- and NH_4^+
D) H^+, Cl^-, and NH_4^+
E) Cl^- only

6) Which of the following are strong acids?

　　HI

　　HNO_3

　　HF

　　HBr

A) HF, HBr

B) HI, HNO_3, HF, HBr

C) HI, HF, HBr

D) HNO_3, HF, HBr

E) HI, HNO_3, HBr

7) Which hydroxides are strong bases?

　　$Sr(OH)_2$

　　KOH

　　NaOH

　　$Ba(OH)_2$

A) KOH, $Ba(OH)_2$

B) KOH, NaOH

C) KOH, NaOH, $Ba(OH)_2$

D) $Sr(OH)_2$, KOH, NaOH, $Ba(OH)_2$

8) Which of these metals is the least easily oxidized?

　　Na

　　Au

　　Fe

　　Ca

　　Ag
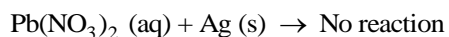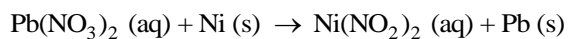
A) Na

B) Au

C) Fe

D) Ca

E) Ag

9) Of the following elements, _____ is the most easily oxidized.

　　oxygen

　　fluorine

　　nitrogen

　　aluminum

　　gold

A) oxygen

B) fluorine

C) nitrogen

D) aluminum

E) gold

10) Based on the equations below, which metal is the most active?

$$Pb(NO_3)_2 \text{ (aq)} + Ni \text{ (s)} \rightarrow Ni(NO_2)_2 \text{ (aq)} + Pb \text{ (s)}$$
$$Pb(NO_3)_2 \text{ (aq)} + Ag \text{ (s)} \rightarrow \text{No reaction}$$
$$Cu(NO_3)_2 \text{ (aq)} + Ag \text{ (s)} \rightarrow \text{No reaction}$$

A) Ni
B) Ag
C) Cu
D) Pb
E) N

11) What is the concentration (M) of a NaCl solution prepared by dissolving 9.3 g of NaCl in sufficient water to give 350 mL of solution?
A) 18
B) 0.16
C) 0.45
D) 27
E) 2.7×10^{-2}

12) How many grams of NaOH (MW = 40.0) are there in 500.0 mL of a 0.175 M NaOH solution?
A) 2.19×10^{-3}
B) 114
C) 14.0
D) 3.50
E) 3.50×10^3

13) There are _____ mol of bromide ions in 0.500 L of a 0.300 M solution of $AlBr_3$.
A) 0.150
B) 0.0500
C) 0.450
D) 0.167
E) 0.500

14) How many moles of K^+ are present in 343 mL of a 1.27 M solution of K_3PO_4 ?
A) 0.436
B) 1.31
C) 0.145
D) 3.70
E) 11.1

15) What are the respective concentrations (M) of Na^+ and SO_4^{2-} afforded by dissolving 0.500 mol Na_2SO_4 in water and diluting to 1.33 L?
A) 0.665 and 0.665
B) 0.665 and 1.33
C) 1.33 and 0.665
D) 0.376 and 0.752
E) 0.752 and 0.376

16) An aqueous ethanol solution (400 mL) was diluted to 4.00 L, giving a concentration of 0.0400 M. The concentration of the original solution was _____ M.
A) 0.400
B) 0.200
C) 2.00
D) 1.60
E) 4.00

17) The molarity (M) of an aqueous solution containing 22.5 g of sucrose $(C_{12}H_{22}O_{11})$ in 35.5 mL of solution is

_____.
A) 0.0657
B) 1.85×10^{-3}
C) 1.85
D) 3.52
E) 0.104

18) How many grams of sodium chloride are there in 55.0 mL of a 1.90 M aqueous solution of sodium chloride?
A) 0.105
B) 6.11
C) 3.21
D) 6.11×10^3
E) 12.2

19) The molarity of a solution prepared by diluting 43.72 mL of 5.005 M aqueous $K_2Cr_2O_7$ to 500 mL is

_____.
A) 57.2
B) 0.0044
C) 0.438
D) 0.0879
E) 0.870

20) The concentration of iodide ions in a 0.193 M solution of barium iodide is _____.
A) 0.193 M
B) 0.386 M
C) 0.0965 M
D) 0.579 M
E) 0.0643 M

21) In a titration of 35.00 mL of 0.737 M H_2SO_4, _____ mL of a 0.827 M KOH solution is required for neutralization.
A) 35.0
B) 1.12
C) 25.8
D) 62.4
E) 39.3

22) A 25.5 mL aliquot of HCl (aq) of unknown concentration was titrated with 0.113 M NaOH (aq). It took 51.2 mL of the base to reach the endpoint of the titration. The concentration (M) of the acid was _____.
A) 1.02
B) 0.114
C) 0.454
D) 0.113
E) 0.227

23) A 31.5 mL aliquot of HNO_3 (aq) of unknown concentration was titrated with 0.0134 M NaOH (aq). It took 23.9 mL of the base to reach the endpoint of the titration. The concentration (M) of the acid was _____.
A) 0.0102
B) 0.0051
C) 0.0204
D) 0.227
E) 1.02

24) A 31.5 mL aliquot of H_2SO_4 (aq) of unknown concentration was titrated with 0.0134 M NaOH (aq). It took 23.9 mL of the base to reach the endpoint of the titration. The concentration (M) of the acid was _____.
A) 0.0102
B) 0.0051
C) 0.0204
D) 0.102
E) 0.227

25) Aqueous solutions of a compound did not form precipitates with Cl^-, Br^-, I^-, SO_4^{2-}, CO_3^{2-}, PO_4^{3-}, OH^-, or S^{2-}. This highly water-soluble compound produced the foul-smelling gas H_2S when the solution was acidified. This compound is _____.
A) $Pb(NO_3)_2$
B) $(NH_4)_2S$
C) KBr
D) Li_2CO_3
E) $AgNO_3$