Name _____ Honors Chemistry ___/___/___

SOL Questions – Chapter 6

Each of the following questions below appeared on an SOL Chemistry Exam. Bubble in the correct answer for each on the **GREEN** side of your scantron.

1. Which of the following is a balanced equation?

a. $C_3H_8(g) + O_2(g) \rightarrow CO_2(g) + H_2O(g)$
b. $C_3H_8(g) + O_2(g) \rightarrow 3CO_2(g) + H_2O(g)$
c. $C_3H_8(g) + 2O_2(g) \rightarrow 3CO_2(g) + 4H_2O(g)$
d. $C_3H_8(g) + 5O_2(g) \rightarrow 3CO_2(g) + 4H_2O(g)$

iron (III) chloride + sodium carbonate → iron (III) carbonate + sodium chloride

2. Which of these is the balanced equation for the reaction described above?

a. $FeCl_3 + Na_2CO_3 \rightarrow Fe_2(CO_3)_3 + NaCl$
b. $2FeCl_3 + 2Na_2CO_3 \rightarrow 3Fe_2(CO_3)_3 + 3NaCl$
c. $2FeCl_3 + 3Na_2CO_3 \rightarrow Fe_2(CO_3)_3 + 6NaCl$
d. $3FeCl_3 + 2Na_2CO_3 \rightarrow 3Fe_2(CO_3)_3 + 6NaCl$

3. Which of the following best represents the reaction between sulfuric acid and calcium hydroxide?

a. $H_2SO_4 + Ca(OH)_2 \rightarrow CaSO_4 + H_2O$
b. $HSO_4 + CaOH \rightarrow CaSO_4 + H_2O$
c. $H_2SO_4 + Ca(OH)_2 \rightarrow CaSO_4 + 2H_2O$
d. $H_2SO_4 + 2Ca(OH)_2 \rightarrow 2CaSO_4 + 3H_2O$

4. Which of the following reactions is a neutralization reaction?

a. $2AgNO_3 + Cu \rightarrow Cu(NO_3)_2 + 2Ag$
b. $KOH + HNO_3 \rightarrow KNO_3 + H_2O$
c. $C + O_2 \rightarrow CO_2$
d. $4Fe(OH)_2 + 2H_2O_2 \rightarrow 4Fe(OH)_3$

5. Which of the following reactions is an example of a single-replacement reaction?

a. $2AgNO_3 + Cu \rightarrow Cu(NO_3)_2 + 2Ag$
b. $NaOH + HCl \rightarrow NaCl + H_2O$
c. $CO_2 \rightarrow C + O_2$
d. $4Fe(OH)_2 + O_2 \rightarrow 4Fe(OH)_3$

6. Which of the following reactions is a decomposition reaction?

a. $S_8 + 8O_2 \rightarrow 8SO_2$
b. $O_2 + 2H_2O \rightarrow 2H_2O_2$
c. $2KClO_3 \rightarrow 2KCl + 3O_2$
d. $2Na + 2AgCl \rightarrow 2NaCl + 2Ag$

7. Which of the following equations is balanced?

a. $H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + H_2O$
b. $CH_4 + Cl_2 \rightarrow CH_2Cl_2 + HCl$
c. $H_2O + MgO \rightarrow Mg(OH)_2$
d. $Al(OH)_3 + H_3PO_4 \rightarrow AlPO_4 + 2H_2O$

8. $Zn + CuSO_4 \rightarrow Cu + ZnSO_4$

Which reaction type *best* describes the reaction above?

a. Combination
b. Decomposition
c. Single replacement
d. Combustion

9. Which of these reactions shows simple chemical decomposition?

a. $H_2 + I_2 \rightarrow 2HI$
b. $2NaCl \rightarrow 2Na + Cl_2$
c. $NaF + HCl \rightarrow HF + NaCl$
d. $I_2 + 2NaCl \rightarrow 2NaI + Cl_2$

$$\_\_ \; AlCl_3(aq) + \_\_ \; Ba(OH)_2(aq) \rightarrow \_\_ \; Al(OH)_3(s) + \_\_ \; BaCl_2(aq)$$

10. When this equation is correctly balanced, the coefficient of the $AlCl_3$ will be —

a. 1
b. 2
c. 4
d. 6

$$3MgO + 2Al \rightarrow ?$$

11. What would be the product(s) of this reaction?
a. $2Mg_3Al_2O_3$ b. $Mg_3Al_2 + 3O_2$ c. $6Mg + Al_3O_2$ d. $3Mg + Al_2O_3$

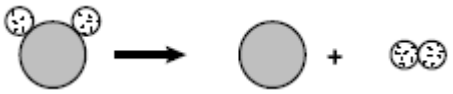
12. Which is an example of a synthesis reaction?
a. $HCl + KOH \rightarrow KCl + H_2O$
b. $Pb(NO_3)_2 + 2HBr \rightarrow PbBr_2 + 2HNO_3$
c. $C + O_2 \rightarrow CO_2$
d. $Mg + H_2SO_4 \rightarrow MgSO_4 + H_2$

13. Very Active Metal + Water → Metal Hydroxide + ?
Which of these completes this reaction?
a. Oxygen b. Hydrogen c. Metal oxide d. Air

$$\_\_\_\_\ H_2O \rightarrow \_\_\_\_\ H_2 + \_\_\_\_\ O_2$$

14. The coefficients of the correctly balanced equation for the reaction illustrated above are —
a. 1, 1, 1 b. 1, 1, 2 c. 2, 1, 2 d. 2, 2, 1

15. $\_AgNO_3 + \_AlCl_3 \rightarrow \_AgCl + \_Al(NO_3)_3$
Which of these sets of coefficients will balance this equation?
a. 3, 3, 2, 1 b. 3, 1, 3, 1 c. 1, 6, 1, 9 d. 9, 3, 3, 3



16. What type of reaction does this illustration represent?
a. Decomposition b. Synthesis c. Single-replacement d. Double-replacement

$$Fe + CuCl_2 \rightarrow FeCl_2 + Cu$$

17. The type of reaction represented by the above equation is —
a. single-replacement b. double-replacement c. synthesis d. decomposition

18. A balanced chemical equation has equal numbers of atoms of each type on both sides of the equation. This illustrates the principle of —
a. conservation of energy b. conservation of mass c. action and reaction d. natural selection

19. Which of these is the general formula for a double-replacement reaction?
a. $A + B \rightarrow AB$
b. $AB + XY \rightarrow BA + YX$
c. $AB + XY \rightarrow AY + XB$
d. $A + B + XY \rightarrow AX + BY$

Aluminum + Sulfuric Acid →
Aluminum Sulfate + Hydrogen Gas

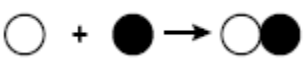
20. Which of the following is the balanced chemical equation for the reaction shown above?
a. $Al + H_2SO_4 \rightarrow Al_2(SO_4)_3 + H_2$
b. $2Al + 3H_2SO_4 \rightarrow Al_2(SO_4)_3 + 3H_2$
c. $2Al + 3H_2SO_4 \rightarrow Al_2(SO_4)_3 + H_2$
d. $2Al + H_2SO_4 \rightarrow Al_2(SO_4)_3 + H_2$

21. Which element naturally occurs as a diatomic molecule?
a. Zn b. C c. K d. H

22. The appropriate model for a decomposition reaction is —

a. 

b. 

c. 

d. 

$$Al + HCl \rightarrow AlCl_3 + H_2$$

23. When the above equation is balanced, the coefficient of the hydrochloric acid will be —

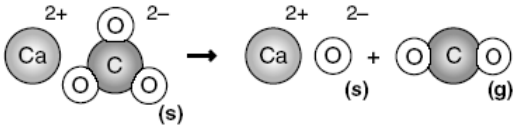
a. 2 b. 3 c. 4 d. 6

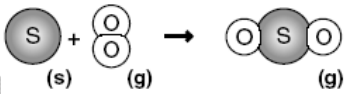
$$Ca(OH)_2 + Al_2(SO_4)_3 \rightarrow CaSO_4 + Al(OH)_3$$

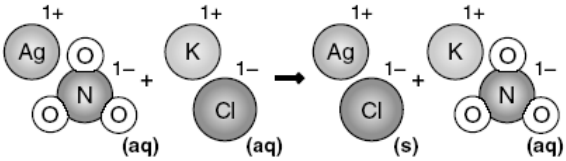
24. When the above equation is balanced, the coefficients in order are —

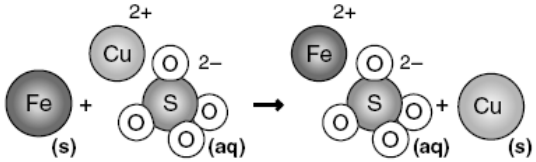
a. 1, 1, 1, 1 b. 2, 1, 1, 2 c. 3, 1, 3, 2 d. 3, 2, 2, 1

25. Which of the following models a synthesis reaction?

a. 

b. 

c. 

d. 

$$Na_2CO_3 + Ca(OH)_2 \rightarrow 2NaOH + CaCO_3$$

26. Which type of reaction is represented above?

a. Single replacement b. Double replacement c. Synthesis d. Decomposition

27. $2O_3$ (g) → 3___ (g)

Which completes the chemical equation above?

a. O_2 b. O_3 c. ClO d. ClO_2

28. Which of the following best represents the reaction between hydrochloric acid and sodium hydroxide?

a. $2HCl + 2NaOH \rightarrow Na(OH)_2 + H_2Cl_2$ b. $HCl_2 + 2Na(OH)_2 \rightarrow 2H_2O + 2NaCl + OH^-$

c. $HCl + NaOH \rightarrow H_2O + NaCl$ d. $2HCl + Na(OH)_2 \rightarrow 2H_2 + Na^+ + Cl^- + O_2$

29. Which half-reaction represents reduction?

a. $Cu^0 \rightarrow Cu^{+2} + 2e^-$ b. $Fe^{+2} \rightarrow Fe^{+3} + 1e^-$ c. $Ag^{+1} + 1e^- \rightarrow Ag^0$ d. $Al^0 \rightarrow Al^{+3} + 3e^-$

$$\underline{?}\ Al + \underline{?}\ HCl \rightarrow \underline{?}\ AlCl_3 + \underline{?}\ H_2$$

30. Which set of coefficients will balance this equation?

a. 1, 3, 1, 1 b. 2, 3, 2, 6 c. 2, 6, 2, 3 d. 3, 6, 3, 2

31. Which of these represents a synthesis reaction?

a. $AgNO_3 + HCl \rightarrow AgCl + HNO_3$
b. $Zn + 2HCl \rightarrow ZnCl_2 + H_2$
c. $N_2 + 3H_2 \rightarrow 2NH_3$
d. $2KClO_3 \rightarrow 2KCl + 3O_2$

$$\_\_Al + \_\_H_2SO_4 \rightarrow \_\_Al_2(SO_4)_3 + \_\_H_2$$

32. When the equation is correctly balanced, the coefficient of H_2SO_4 is —

a. 1
b. 2
c. 3
d. 4

$$CO_2 + H_2O \rightarrow H_2CO_3$$

33. The reaction is which type of chemical reaction?

a. Single replacement
b. Double replacement
c. Synthesis
d. Decomposition

$$4P + 5O_2 \rightarrow 2P_2O_x$$

34. The subscript of oxygen in the product should be —

a. 2
b. 5
c. 10
d. 20

35. $a\ Mg(OH)_2 + b\ HCl \rightarrow c\ MgCl_2 + d\ H_2O$

The coefficients necessary to balance the equation correctly are —

a. a=2, b=2, c=1, d=1
b. a=1, b=1, c=1, d=1
c. a=1, b=2, c=1, d=2
d. a=2, b=1, c=1, d=2

36. Which reaction is correctly balanced?

a. $Fe_4 + CuSO \rightarrow FeSO_4 + Cu$
b. $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$
c. $2Fe + CuSO_4 \rightarrow 2FeSO_4 + Cu$
d. $Fe + 2CuSO_4 \rightarrow 2FeSO_4 + Cu$

37. $Cu + 2AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$

The chemical equation shown is an example of a —

a. single-replacement reaction
b. synthesis reaction
c. decomposition reaction
d. double-replacement reaction

38. $? P + ? Br_2 \rightarrow ? PBr_3$

Which set of coefficients will balance this equation?

a. 3, 1, 1
b. 2, 3, 2
c. 3, 2, 3
d. 2, 6, 2

39. $2Fe(s) + O_2(g) \rightarrow 2FeO(s)$

To which category does this reaction belong?

a. Synthesis
b. Decomposition`
c. Single replacement
d. Double replacement