Name: ____________________________________ Date: ______________

Honors Chem Practice Test Unit 6

1. True or false? The equation $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$ can be interpreted by saying that 1 mol of N_2 reacts with 3 mol of H_2 to form 2 mol of NH_3.

   A) True B) False

2. True or false? A balanced chemical equation is one that has the same number of moles of molecules on each side of the equation.

   A) True B) False

3. The balanced equation $2Cu(s) + O_2(g) \rightarrow 2CuO(s)$ tells us that 5.0 mol of Cu

   A) reacts with 5.0 mol of O_2
   B) produces 5.0 mol of CuO
   C) must react with 160 g of O_2
   D) cannot react with oxygen
   E) produces 10.0 mol of CuO

4. For the reaction

   $$C_2H_4(g) + 3O_2(g) \rightarrow 2CO_2(g) + 2H_2O(g)$$

   if 6.0 mol of CO_2 are produced, how many moles of O_2 were reacted?

   A) 4.0 mol
   B) 7.5 mol
   C) 9.0 mol
   D) 15.0 mol
   E) none of these

5. True or false? A mole ratio is used to convert the moles of a starting substance to the moles of a desired substance.

   A) True B) False

6. Refer to the following equation: $4NH_3(g) + 7O_2(g) \rightarrow 4NO_2(g) + 6H_2O(g)$

   How many moles of ammonia will be required to produce 13.7 mol of water?

   A) 5.48 mol
   B) 13.7 mol
   C) 9.13 mol
   D) 6.85 mol
   E) none of these

7. Refer to the following equation: $4NH_3(g) + 7O_2(g) \rightarrow 4NO_2(g) + 6H_2O(g)$

   How many molecules of NO_2 are produced when 7.19 mol of ammonia is completely reacted?

   A) 28.76
   B) 8.66×10^{24}
   C) 4.33×10^{24}
   D) 331
   E) none of these

8. How many molecules of carbon dioxide will be formed if 4.94 g of propane is burned in the following reaction?

   $$C_3H_8(g) + 5O_2(g) \rightarrow 3CO_2(g) + 4H_2O(g)$$

   A) 8.92×10^{24} molecules
   B) 6.75×10^{22} molecules
   C) 2.70×10^{23} molecules
   D) 2.02×10^{23} molecules
   E) 3.37×10^{23} molecules

9. Calculate the mass of water produced when 8.57 g of methane, CH_4, reacts with an excess of oxygen in the following **unbalanced** reaction.

   $$CH_4(g) + O_2(g) \rightarrow CO_2(g) + H_2O(g)$$

   A) 9.62 g H_2O
   B) 3.09×10^2 g H_2O
   C) 19.2 g H_2O
   D) 0.476 g H_2O
   E) 1.07 g H_2O

10. Consider the reaction

    $$2Fe(s) + 3O_2(g) \rightarrow Fe_2O_3(s)$$

    If 12.7 g of iron(III) oxide (rust) is produced from a certain amount of iron, how many grams of oxygen are needed for this reaction?

    A) 3.82 g
    B) 7.63 g
    C) 1.70 g
    D) 2.54 g
    E) none of these

11. Methane, CH_4, the major component of natural gas, burns in air to form CO_2 and H_2O. What mass of water is formed in the complete combustion of 3.39e3 g of CH_4?

    A) 1.22×10^5 g
    B) 3.81×10^3 g
    C) 1.14×10^4 g
    D) 7.61×10^3 g
    E) none of these

12. How many moles of O_2 are required for the complete reaction of 50.6 g of C_2H_4 to form CO_2 and H_2O?
A) 0.902 mol
B) 3.61 mol
C) 7.22 mol
D) 5.41 mol
E) none of these

13. For the reaction

$$2Cl_2(g) + 4NaOH(aq) \rightarrow 3NaCl(aq) + NaClO_2(aq) + 2H_2O(l)$$

how many grams of NaCl can be produced from 22.5 g of Cl_2 and excess NaOH?
A) 27.8 g NaCl
B) 12.4 g NaCl
C) 18.5 g NaCl
D) 9.27 g NaCl
E) none of these

14. Sodium and water react according to the equation

$$2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_2(g)$$

What number of moles of H_2 will be produced when 4.0 mol Na is added to 2.8 mol H_2O?
A) 1.4 mol B) 5.6 mol C) 2.0 mol D) 2.8 mol E) 8.0 mol

15. How many moles of $SbCl_3$ is formed when 4.00 mol Sb are reacted with 4.70 mol Cl_2 according to the unbalanced equation

$$Sb + Cl_2 \rightarrow SbCl_3$$

A) 7.05 mol $SbCl_3$
B) 4.70 mol $SbCl_3$
C) 3.13 mol $SbCl_3$
D) 4.00 mol $SbCl_3$
E) Cannot be determined based on the information given.

16. Determine the mass of CO_2 produced when 66.9 g of CaO is reacted with 50.0 g of C according to the unbalanced equation

$$CaO + C \rightarrow CaC_2 + CO_2$$

A) 26.3 g CO_2
B) 105 g CO_2
C) 52.5 g CO_2
D) 36.6 g CO_2
E) none of these

17. When NH_3 is prepared from 28 g N_2 and excess H_2, the theoretical yield of NH_3 is 34 g. When this reaction is carried out in a given experiment, only 23 g is produced. What is the percentage yield? (Ignore significant figures for this problem.)
A) 32% B) 45% C) 23% D) 34% E) 68%

18. In the reaction between CO and Fe_3O_4, the theoretical yield in an experiment is calculated to be 47.2 g Fe. When a careless chemistry student carries out the experiment, the actual yield is 34.4 g Fe. Calculate the percentage yield.
A) 72.9%
B) 27.1%
C) 48.6%
D) 36.4%
E) none of these

19. For the reaction

$$2S(s) + 3O_2(g) \rightarrow 2SO_3(g)$$

if 4.78 g of S is reacted with 10.0 g of O_2, how many grams of SO_3 will be produced?
A) 23.9 g
B) 5.97 g
C) 16.7 g
D) 11.9 g
E) none of these

20. For the reaction of C_2H_4*(g)* with O_2*(g)* to form CO_2*(g)* and H_2O*(g)*, what number of moles of CO_2 can be produced by the reaction of 0.480 mol C_2H_4 and 1.00 mol O_2?
A) 1.50 mol
B) 0.960 mol
C) 0.667 mol
D) 1.00 mol
E) none of these

Answer Key - H_Practice Test Unit 6

1. True
2. False
3. B
4. C
5. True
6. C
7. C
8. D
9. C
10. B
11. D
12. D
13. A
14. A
15. C
16. A
17. E
18. A
19. D
20. C