

Name: _____ Period: _____ Date: _____

Ms. Randall Regents Chemistry

Unit 6 Moles and Chemical Reactions Review

- 1) How many oxygen atoms are represented in the formula $Al_2(CO_3)_3$?
- a) 3 b) 9 c) 10 d) 6
- 2) What is the total number of atoms present in 1 mole of $Ca_3(PO_4)_2$?
- a) 8 b) 5 c) 10 d) 13
- 3) What is the total mass of iron in 1.0 mole of Fe_2O_3 ?
- a) 72 g b) 112 g c) 56 g d) 160 g
- 4) What is the gram formula mass of Li_2SO_4 ?
- a) 206 g b) 55 g c) 110 g d) 54 g
- 5) What is the percent composition by mass of sulfur in H_2SO_4 ? [formula mass = 98]
- a) 98% b) 16% c) 65% d) 33%
- 6) A hydrate is a compound with water molecules incorporated into its crystal structure. In an experiment to find the percent by mass of water in a hydrated compound, the following data were recorded:

Mass of test tube + hydrate crystals before heating	25.3 grams
Mass of test tube	21.3 grams
Mass of test tube + anhydrate crystals after heating	22.3 grams

What is the percent by mass of water in the hydrate?

- a) 75% b) 50% c) 8.0% d) 95%
- 7) Which of the following statements explains why mass is lost when a student heats a sample of $BaCl_2 \cdot 2H_2O$ crystals?
- a) water is given off as a gas c) chlorine is given off as a gas
b) the crystals sublime d) the crystals fuse (melt)
- 8) When the equation $H_2S + O_2 \rightarrow H_2O + SO_2$ is completely balanced using the *smallest* whole numbers, the sum of all the coefficients is
- a) 9 b) 11 c) 7 d) 5

9) What is the percent by mass of water in the hydrate $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ [formula mass = 286]?

- a) 26.1% b) 62.9% c) 6.89% d) 214.5%

10) How many grams are there in 2.5 moles of $\text{C}_2\text{H}_5\text{OH}$?

- a) 18 b) 115 c) 46 d) 0.05

11) Which quantity is equivalent to 146 grams of NaCl ?

- a) 1.0 mole b) 2.5 moles c) 2.0 moles d) 1.5 moles

12) When the equation $\text{H}_2 + \text{Fe}_3\text{O}_4 \rightarrow \text{Fe} + \text{H}_2\text{O}$ is completely balanced using the smallest whole numbers, the coefficient of Fe would be

- a) 1 b) 2 c) 3 d) 4

13) When the equation $\text{NaBr} + \text{H}_3\text{PO}_4 \rightarrow \text{Na}_3\text{PO}_4 + \text{HBr}$ is balanced using the smallest whole numbers, the sum of the coefficients will be

- a) 6 b) 8 c) 5 d) 4

14) Given the equation: $2\text{C}_2\text{H}_2 + 5\text{O}_2 \rightarrow 4\text{CO}_2 + 2\text{H}_2\text{O}$

How many moles of oxygen are required to react completely with 1.0 mole of C_2H_2 ?

- a) 2.5 b) 5.0 c) 10 d) 2.0

15) Given the reaction: $2\text{C}_2\text{H}_6 + 7\text{O}_2 \rightarrow 4\text{CO}_2 + 6\text{H}_2\text{O}$

What is the ratio of moles of CO_2 produced to moles of C_2H_6 consumed?

- a) 7 to 2 b) 2 to 1 c) 1 to 1 d) 3 to 2

16) Given the following balanced equation: $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$

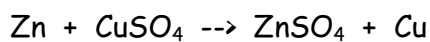
If you have 8 moles of nitrogen, how many moles of NH_3 will you produce?

- a) 16 b) 18 c) 24 d) 2

17) Given the reaction: $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$, what is the total number of moles of hydrogen produced when 4 moles of sodium react completely?

- a) 1 b) 2 c) 3 d) 4

18) What type of reaction best describes the following chemical reaction?



- a) single replacement
b) double replacement
c) decomposition
d) synthesis

19) Which chemical equation best represent a decomposition reaction?

- a) $\text{Cl}_2 + 2\text{KI} \rightarrow 2\text{KCl} + \text{I}_2$
b) $2\text{Al} + 3\text{Cl}_2 \rightarrow 2\text{AlCl}_3$
c) $\text{H}_2\text{CO}_3 \rightarrow \text{H}_2\text{O} + \text{CO}_2$
d) $\text{KCl} + \text{AgNO}_3 \rightarrow \text{KNO}_3 + \text{AgCl}$

20) What is the molecular formula of a compound that has a molecular mass of 54 and an empirical formula of C_2H_3 ?

- a) C_8H_{12}
b) C_6H_9
c) C_4H_6
d) C_2H_3

21) What is the empirical formula of the compound whose molecular formula is P_4O_{10} ?

- a) P_8O_{20}
b) PO_2
c) P_2O_5
d) PO

22) Which of the following is an empirical formula?

- a) H_2O_2
b) H_2O
c) C_2H_2
d) C_4H_8

23) Which represents *both* an empirical and molecular formula?

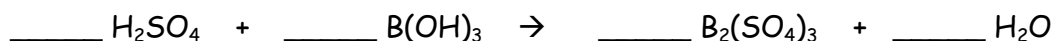
- a) P_2O_5
b) C_3H_6
c) N_2O_4
d) $\text{C}_6\text{H}_{12}\text{O}_6$

For questions 24 and 25, show all work and express your answer in the appropriate units.

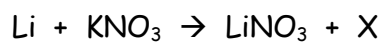
24) Calculate the gram formula mass of ZnSO_4 .

25) Use your answer from 23 to calculate the percent by mass of zinc in ZnSO_4 .

26) Balance the following reaction and reduce to the *lowest* whole number coefficients

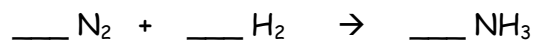


27) Li and KNO₃ according to the following equation:



Write the formula for the missing product X.

Use the chemical equation below to answer questions 28-30.



27) Balance the equation above using the lowest whole number coefficients.

29) How many moles of H₂ are required to produce 6.5 moles of NH₃? Show all work and make sure your answer has the correct number of significant figures and proper units.

30) How many grams of NH₃ are produced if 50.0 grams of N₂ are consumed? Show all work and make sure your answer has the correct number of significant figures and proper units.