

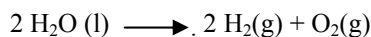
CHEMISTRY 123-01

Practice exam #2

September 14, 2007

PART I: MULTIPLE CHOICE

- An atom of bromine has a mass about four times greater than that of an atom of neon. How many grams of neon will contain the same number of atoms as 1,000 g of bromine?
 - 4 g Ne
 - 250 g Ne
 - 400 g Ne
 - 1,000 g Ne
 - 4,000 g Ne
- The mass of 1.21×10^{20} atoms of sulfur is:
 - 3.88×10^{21} g.
 - 2.00 mg.
 - 32.06 g.
 - 6.44 mg.
 - 2.00×10^{-4} g.
- One mole of iron:
 - is heavier than one mole of lead (Pb).
 - is 77.0 g of iron.
 - is 26.0 g of iron.
 - weighs the same as one mole of lead.
 - is none of these.
- How many moles of Cl atoms are there in 65.2 g CHCl_3 ?
 - 0.548 mol
 - 1.09 mol
 - 3.3×10^{23} mol
 - 1.64 mol
 - 3.0 mol
- An average atom of uranium (U) is approximately how many times heavier than an atom of potassium?
 - 6.1 times
 - 4.8 times
 - 2.4 times
 - 12.5 times
 - 7.7 times
- The element oxygen consists of three naturally occurring isotopes: ^{16}O , ^{17}O , and ^{18}O . The atomic mass of oxygen is 16.0 amu. What can be implied about the relative abundances of these isotopes?
 - More than 50% of all O atoms are ^{17}O .
 - Almost all O atoms are ^{18}O .
 - Almost all O atoms are ^{17}O .
 - The isotopes all have the same abundance, i.e. 33.3%.
 - The abundances of ^{17}O and ^{18}O are very small.
- Which of the following cannot be determined from a balanced chemical equation?
 - The number of moles of reactants and products.
 - The number of molecules of reactants and products.
 - The relative mass of each reactant and product.
 - Whether the reaction will proceed as written.
 - The number of atoms of each element reacting.
- In the reaction given below, how many grams of water are consumed if 2.0 g of hydrogen gas and 16.0 g of oxygen gas are produced?



- a. 2.0 g
- b. 4.0 g
- c. 18.0 g

- d. 20.0 g
- e. 36.0 g

9. In the reaction given below, for every unit of aluminum oxide consumed, how many atoms of aluminum are produced?



- a. 1
- b. 2
- c. 4

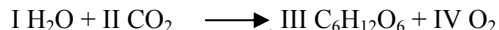
- d. 7
- e. 8

10. The Roman numerals in the reaction given represent the coefficients in the balanced chemical equation. What are the values of the coefficients?



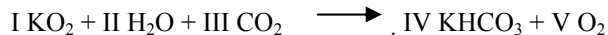
- I II III IV
- a. 2 10 6 4
 - b. 1 10 6 4
 - c. 1 10 3 4
 - d. 1 5 3 4
 - e. 3 5 3 4

11. The Roman numerals in the reaction given represent the coefficients in the balanced chemical equation. What are the values of the coefficients?



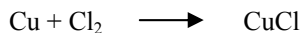
- I II III IV
- a. 6 6 1 6
 - b. 6 6 2 6
 - c. 1 6 1 6
 - d. 3 3 1 3
 - e. 1 3 1 3

12. The Roman numerals in the reaction given represent the coefficients in the balanced chemical equation. What are the values of the coefficients?



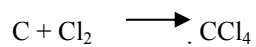
- I II III IV V
- a. 4 4 4 4 3
 - b. 4 2 4 4 3
 - c. 4 4 4 2 3
 - d. 2 2 2 2 3
 - e. 4 2 4 2 3

13. How many grams of CuCl are formed from the complete reaction of 0.750 mol of Cu with excess Cl₂ (Pay attention to stoichiometry!!)?



- a. 32.2 g
- b. 43.6 g
- c. 74.5 g
- d. 101 g
- e. 148.5 g

14. Which statement about the reaction of 10.0 g of carbon with 10.0 g of Cl_2 is true?



- a. The equation, as written, is balanced.
- b. Carbon is the limiting reactant.
- c. Chlorine is the limiting reactant.
- d. There will be 126 g of CCl_4 produced.
- e. There will be 39.5 g of CCl_4 produced.

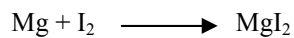
15. What is the maximum possible quantity of product obtained from a chemical reaction called?

- a. limiting reactant
- b. theoretical yield
- c. percent yield
- d. molecular weight of the product
- e. stoichiometric coefficients

PART II: CALCULATION PROBLEMS (Show your work in its entirety. Do not provide just a single number! Pay attention to significant figures!).

16. The complete reaction of 16.12 g of titanium with 23.88 g of chlorine (Cl_2) produces a compound with the formula Ti_xCl_y . What is the empirical formula of the compound?

17. How many grams of MgI_2 are produced by the reaction of 75.0 g of Mg with 75.0 g of I_2 ?



18. Allicin, a sulfur-containing compound found in garlic, is a potent antibacterial agent. A sample of 5.00 mg of allicin was burnt to produce 8.13 mg of CO_2 , 3.95 mg of SO_2 and 2.76 mg of H_2O . The molar mass of allicin is 160 g/mol. What is its molecular formula?
19. A hydrocarbon contains 82.7% carbon and the remainder hydrogen. Determine the empirical formula of the compound.