Chemistry 11

Mole Unit Practice Test

Name:
Date:
Block:

Multiple choice:

_____ 1. The number 10.40 has ___ sig figs:
- A. 1
- B. 2
- C. 3
- D. 4

_____ 2. The number 1200 has ___ sig figs:
- A. 2
- B. 3
- C. 5
- D. 6

_____ 3. Convert this number to scientific notion: 154000
- A. 1.54×10^{5}
- B. 1.54×10^{-5}
- C. 15.4×10^{4}
- D. 154×10^{3}

_____ 4. $Cu_4(AsO_3)_2(CH_3CO_2)_2$ has ___ oxygen atoms.
- A. 2
- B. 3
- C. 8
- D. 10

_____ 5. A student is measuring the molar mass of an object. The unit used would be:
- A. mol/g
- B. g/L
- C. g/mol
- D. g

_____ 6. A student is reporting the molar concentration of a solution. The unit used would be:
- A. mol/L
- B. mol/g
- C. L/mol
- D. g/mol

_____ 7. A student is measuring the volume of an object. All of the following units could be used except:
- A. L
- B. mL
- C. cm^3
- D. g

_____ 8. At the same temperature and pressure, which sample of gas contains the same number of particles as one liter of oxygen, O_2?
- A. one liter of He
- B. three liters of CO_2
- C. two liters of Ne
- D. two liters of H_2

_____ 9. What is the mass of a single molecule of water?
- A. 2.992×10^{-23} grams
- B. 1.00 gram
- C. 6.022×10^{-22} grams
- D. 18.02 grams
- E. 2.992×10^{23} grams

Show your work below:

_____ 10. Another term for molarity is:

A. Concentration
B. Molar mass
C. Molecular formula
D. Moles/gram

_____ 11. The percentage of calcium (by mass) in the molecule $Ca_3Fe_2(SiO_4)_3$ is

A. 7.887 %
B. 21.98 %
C. 23.67 %
D. 37.78 %

Show your work below:

_____ 12. A molecular formula tells us:

A. The actual number of atoms of each element in a compound
B. The lowest ratio of atoms of each element in a compound
C. All possible multiples of an empirical formula
D. The concentration of that compound in a solution

_____ 13. The empirical formula tells us:

A. the actual number of atoms in a compound
B. the concentration of a compound
C. the molar mass of a compound
D. the lowest ratio of each element in a compound

_____ 14. A compound has the empirical formula CH_2Cl and a molecular mass of 99.00 g/mol. The molecular formula is:

A. CH_2Cl
B. $C_2H_4Cl_2$
C. $C_3H_6Cl_3$
D. $C_4H_8Cl_4$

_____ 15. A compound has the molecular formula C_2H_4. The empirical formula is:

A. CH_2
B. C_2H_5
C. C_5H_{10}
D. $C_{10}H_{20}$

Short Answer:

1. How many atoms are in $Ni(H_2O)_2(NH_3)_3Cl_2$?

2. The density of $CCl_{4(l)}$ is 1.59 g/mL. How many atoms are there in 2.50 L of CCl_4?

3. At STP, 1 mole of argon gas has a volume of _____.

4. How many molecules of potassium iodide are in 10.0 g of potassium iodide?

5. What molar concentration of KCl is produced by measuring out 1.00 g KCl and adding water up to 0.350 L of solution?

6. A 0.600 mol sample of an unknown gas has a mass of 52.8 g and contains only carbon and fluorine.
    A. What is the molar mass of this unknown gas?

    B. What is the molecular formula of this unknown gas given that each molecule contains only 1 carbon atom?

7. The molar volume of H_2 at 21.0°C, 100.4 kPa is 24.3 L/mol. Calculate the mass of 0.213 L of H_2 at this temperature and pressure.

8. A solution is made by mixing 100.0 mL of 0.200 M $BaCl_2$ and 150.0 mL of 0.400 M NaCl. What is the concentration of each ion in the final solution?

9. Find the empirical formula for the following compounds:
   a) 15.7% B, 84.3% F

   b) 50.52% C, 5.26% H, 44.22% N