1. Given two formulas representing the same compound:

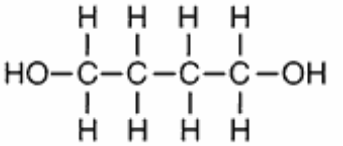
   Formula A CH_3
   Formula B C_2H_6
   Which statement describes these formulas?

   A) Formulas *A* and *B are both empirical.*
   B) Formulas *A* and *B are both molecular.*
   C) Formula *A is empirical, and formula B is molecular.*
   D) Formula *A is molecular, and formula B is empirical.*

2. What is the empirical formula of a compound that has a carbon-to-hydrogen ratio of 2 to 6?

   A) CH_3 B) C_2H_6 C) C_3H D) C_6H_2

3. Given the structural formula:



   What is the empirical formula of this compound?

   A) CH_3O B) C_2H_5O
   C) $C_4H_{10}O_2$ D) $C_8H_{20}O_4$

4. What is the empirical formula for the compound $C_6H_{12}O_6$?

   A) CH_2O B) $C_2H_4O_2$
   C) $C_3H_6O_3$ D) $C_6H_{12}O_6$

5. What is the molecular formula of a compound that has a molecular mass of 54 and the empirical formula C_2H_3?

   A) C_2H_3 B) C_4H_6
   C) C_6H_9 D) C_8H_{12}

6. The empirical formula of a compound is CH_2. The molecular formula of this compound could be

   A) CH_4 B) C_2H_2 C) C_2H_4 D) C_3H_3

7. A compound contains nitrogen and oxygen in the mole ratio of 1:1. The molecular mass of this compound could be

   A) 14 B) 16 C) 30 D) 40

8. The formula C_2H_4 can be classified as

   A) a structural formula, only
   B) a molecular formula, only
   C) both a structural formula and an empirical formula
   D) both a molecular formula and an empirical formula

9. What is the gram-formula mass of $(NH_4)_3PO_4$?

   A) 112 g/mol B) 121 g/mol
   C) 149 g/mol D) 242 g/mol

10. What is the gram formula mass of $Na_2CO_3 \cdot 10H_2O$?

    A) 106 g B) 142 g
    C) 266 g D) 286 g

11. The number of moles of molecules in a 12.0-gram sample of Cl_2 is

    A) $\frac{12.0}{35.5}$ mole B) $\frac{12.0}{71.0}$ mole
    C) 12.0 moles D) 12.0×35.5 moles

12. What is the mass in grams of 2.0 moles of NO_2?

    A) 92 B) 60. C) 46 D) 30.

13. What is the total mass of oxygen in 1.00 mole of $Al_2(CrO_4)_3$?

    A) 192 g B) 112 g
    C) 64.0 g D) 48.0 g

14. What is the gram-molecular mass of a compound if 5 moles of the compound has a mass of 100 grams?

    A) 5 g B) 20 g
    C) 100 g D) 500 g

15. Which quantity is equivalent to 39 grams of LiF?

    A) 1.0 mole B) 2.0 moles
    C) 0.50 mole D) 1.5 moles

16. A substance has an empirical formula of CH_2 and a molar mass of 56 grams per mole. The molecular formula for this compound is

    A) CH_2 B) C_4H_6 C) C_4H_8 D) C_8H_4

17. If the empirical formula for an organic compound is CH_2O, then the molecular mass of the compound could be

A) 135 B) 60 C) 45 D) 15

18. Vitamin C has an empirical formula of $C_3H_4O_3$ and a molecular mass of 176. What is the molecular formula of vitamin C?

A) $C_3H_4O_3$ B) $C_6H_8O_6$
C) $C_9H_{12}O_9$ D) $C_{10}H_8O_3$

19. The density of a gas is 1.43 grams per liter at STP. The mass of 1 mole of this gas is equal to

A) 1.43 g B) 15.7 g
C) 22.4 g D) 32.0 g

20. What is the percent composition by mass of sulfur in the compound $MgSO_4$ (gram-formula mass = 120. grams per mole)?

A) 20% B) 27% C) 46% D) 53%

21. What is the percent composition by mass of nitrogen in NH_4NO_3 (gram-formula mass = 80.0 grams/mole)?

A) 17.5% B) 35.0%
C) 52.5% D) 60.0%

22. I. Gibbs free energy change, ΔG, is negative with all exothermic reactions

BECAUSE

II. exothermic reactions release energy.

A) I is *TRUE*, II is *FALSE*
B) I is *FALSE*, II is *TRUE*
C) I and II are *BOTH FALSE*
D) I and II are *BOTH TRUE* but II *IS NOT* a correct explanation of I
E) I and II are *BOTH TRUE* and II *IS* a correct explanation of I