

**Student Name:****Grade:** 09**Test Name:** November Chemistry for All: Unit 5 - Nomenclature and Formula Stoichiometry**Version:** 1

1. Based on the molecular formula for sucrose,  $C_{12}H_{22}O_{11}$ , calculate the percent by weight of carbon.
  - (a) 12.0%
  - (b) 26.6%
  - (c) 42.1%
  - (d) 51.4%
  
2. Based on the molecular formula for sucrose,  $C_{12}H_{22}O_{11}$ , calculate the percent by weight of oxygen.
  - (a) 11.0%
  - (b) 24.4%
  - (c) 42.1%
  - (d) 51.4%
  
3. Based on the molecular formula for sucrose,  $C_{12}H_{22}O_{11}$ , calculate the percent by weight of hydrogen.
  - (a) 1.0%
  - (b) 6.5%
  - (c) 22.0%
  - (d) 48.9%
  
4. Based on the chemical formula for aluminum sulfate,  $Al_2(SO_4)_3$ , what is the percentage by weight of aluminum?
  - (a) 11.8%
  - (b) 15.8%
  - (c) 36.0%
  - (d) 54.0%

5. Based on the chemical formula for aluminum sulfate,  $\text{Al}_2(\text{SO}_4)_3$ , what is the percentage by weight of sulfur?
- (a) 17.6%
  - (b) 28.1%
  - (c) 32.0%
  - (d) 42.7%
6. Based on the chemical formula for aluminum sulfate,  $\text{Al}_2(\text{SO}_4)_3$ , what is the percentage by weight of oxygen?
- (a) 12.0%
  - (b) 21.3%
  - (c) 56.1%
  - (d) 70.6%
7. Calculate the correct empirical formula of a compound that contains 75% carbon and 25% hydrogen.
- (a)  $\text{CH}_4$
  - (b)  $\text{C}_3\text{H}$
  - (c)  $\text{C}_7\text{H}_3$
  - (d)  $\text{C}_2\text{H}_8$
8. Pure formaldehyde consists of 40.0% carbon, 6.7% hydrogen, and 53.3% oxygen. What is its empirical formula?
- (a)  $\text{C}_4\text{HO}_5$
  - (b)  $\text{C}_5\text{H}_7\text{O}_9$
  - (c)  $\text{C}_2\text{HO}_2$
  - (d)  $\text{CH}_2\text{O}$

9. Which of the following is the correct empirical formula for a compound that is composed of 34.2% sodium, 17.7% carbon, and 47.6% oxygen.
- (a)  $\text{NaCO}_2$
  - (b)  $\text{Na}_3\text{C}_2\text{O}_5$
  - (c)  $\text{Na}_4\text{CO}_4$
  - (d)  $\text{Na}_2\text{C}_2\text{O}_4$
10. Which of the following represents the correct empirical formula for a compound that contains 72% magnesium and 28% nitrogen?
- (a)  $\text{Mg}_2\text{N}_3$
  - (b)  $\text{Mg}_7\text{N}_3$
  - (c)  $\text{Mg}_3\text{N}_7$
  - (d)  $\text{Mg}_3\text{N}_2$
11. Which of the following choices represents the correct empirical formula for a compound that is 29.0% sodium, 40.5% sulfur, and 30.4% oxygen?
- (a)  $\text{Na}_3\text{S}_4\text{O}_3$
  - (b)  $\text{NaSO}_2$
  - (c)  $\text{Na}_2\text{S}_2\text{O}_3$
  - (d)  $\text{Na}_3\text{S}_3\text{O}_4$
12. The simplest formula for butane is  $\text{C}_2\text{H}_5$  and its molecular mass is 58 g/mol. What is the molecular formula of butane?
- (a)  $\text{C}_3\text{H}_6$
  - (b)  $\text{C}_4\text{H}_9$
  - (c)  $\text{C}_4\text{H}_{10}$
  - (d)  $\text{C}_6\text{H}_{15}$

13. A compound with an empirical formula of CH has a molecular weight of 78 g/mol. What is the molecular formula for this compound?
- (a)  $C_4H_4$
  - (b)  $C_5H_5$
  - (c)  $C_6H_6$
  - (d)  $C_7H_7$
14. Fructose has an empirical formula of  $CH_2O$ . Find its molecular formula if its molecular mass is 180.0 g/mol.
- (a)  $C_4H_8O_4$
  - (b)  $C_3H_6O_3$
  - (c)  $C_6H_{12}O_6$
  - (d)  $C_{12}H_{22}O_{12}$
15. A compound has the empirical formula  $NaCO_2$ . If its molecular mass is 134 g/mol, determine its molecular formula.
- (a)  $Na_2C_2O_4$
  - (b)  $Na_3C_3O_6$
  - (c)  $Na_4C_4O_8$
  - (d)  $Na_5C_5O_{10}$
16. The simplest formula for vitamin C is  $C_3H_4O_3$ . Experimental data indicates that the molecular mass of vitamin C is about 180. 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)  $C_{12}H_{16}O_{12}$

17. What is the name for the simple binary compound,  $\text{MgO}$ ?
- (a) Magnesium Oxygen
  - (b) Manganese Oxygen
  - (c) Manganese Oxide
  - (d) Magnesium Oxide
18. What is the name for the simple binary compound,  $\text{K}_2\text{S}$ ?
- (a) Potassium sulfide
  - (b) Potassium (II) sulfide
  - (c) Potassium sulfate
  - (d) Potassium (II) sulfate
19. What is the name of the simple binary compound with the formula,  $\text{BeCl}_2$ ?
- (a) Beryllium chloride
  - (b) Beryllium chlorate
  - (c) Beryllium dichloride
  - (d) Beryllium dichlorate
20. What is the name for the simple binary compound,  $\text{Ca}_3\text{P}_2$ ?
- (a) Tricarbon diphosphide
  - (b) Tricalcium diphosphide
  - (c) Calcium phosphide
  - (d) Carbon phosphide
21. What is the name of the simple binary compound with the formula,  $\text{BN}$ ?
- (a) Boron nitrate
  - (b) Boride nitride
  - (c) Boride nitrate
  - (d) Boron nitride

22. What is the formula for the simple binary compound, calcium bromide?

- (a)  $\text{CaBr}_3$
- (b)  $\text{Ca}_2\text{Br}$
- (c)  $\text{CaBr}$
- (d)  $\text{CaBr}_2$

23. What is the formula for the simple binary compound, gallium chloride?

- (a)  $\text{GaCl}$
- (b)  $\text{GaCl}_2$
- (c)  $\text{GaCl}_3$
- (d)  $\text{Ga}_2\text{Cl}$

24. What is the formula for the simple binary compound, lithium nitride?

- (a)  $\text{LiN}$
- (b)  $\text{LiN}_3$
- (c)  $\text{Li}_3\text{N}$
- (d)  $\text{Li}_3\text{N}_3$

25. What is the formula for the simple binary compound, barium iodide?

- (a)  $\text{BaI}$
- (b)  $\text{BaI}_2$
- (c)  $\text{BaI}_3$
- (d)  $\text{Ba}_2\text{I}$

26. What is the formula for the simple binary compound, magnesium sulfide?

- (a)  $\text{MgSO}_4$
- (b)  $\text{MgS}_2$
- (c)  $\text{MgS}$
- (d)  $\text{Mg}(\text{SO}_4)_2$

27. What is the name of the compound,  $\text{Pb}_2(\text{CO}_3)_3$ ?

- (a) Lead (II) carbonate
- (b) Lead (III) carbonate
- (c) Lead carbonate (II)
- (d) Lead carbonate (III)

28. What is the name of the compound,  $\text{CuCl}_2$ ?

- (a) copper chloride (I)
- (b) copper (I) chloride
- (c) copper (II) chloride
- (d) copper chloride (II)

29. What is the name of the compound,  $\text{BeSO}_3$ ?

- (a) Beryllium sulfate
- (b) Beryllium sulfite
- (c) Beryllium sulfide
- (d) Beryllium sulfoxide

30. What is the name of the compound,  $\text{Fe}_2\text{O}_3$ ?

- (a) Iron oxide
- (b) Iron (II) oxide
- (c) Iron (III) oxide
- (d) Iron oxalate

31. What is the name of the compound,  $\text{Fe}(\text{NO}_3)_2$ ?
- (a) Iron (II) nitrite
  - (b) Iron (III) nitrite
  - (c) Iron (II) nitrate
  - (d) Iron (III) nitrate
32. Choose the formula for the compound, sulfur hexafluoride.
- (a)  $\text{SF}_6$
  - (b)  $\text{S}_6\text{F}$
  - (c)  $\text{S}_7\text{F}$
  - (d)  $\text{SF}_7$
33. Choose the formula for the compound, calcium hydroxide.
- (a)  $\text{CaOH}_2$
  - (b)  $\text{Ca}_2\text{OH}$
  - (c)  $\text{Ca}(\text{OH}_2)$
  - (d)  $\text{Ca}(\text{OH})_2$
34. Choose the formula for the compound, ammonium sulfate.
- (a)  $\text{NH}_4\text{SO}_4$
  - (b)  $\text{NH}_4(\text{SO}_4)_2$
  - (c)  $2\text{NH}_4\text{SO}_4$
  - (d)  $(\text{NH}_4)_2\text{SO}_4$



35. Choose the formula for the compound, diphosphorus pentoxide.
- (a)  $2\text{PO}_5$
  - (b)  $\text{P}_2\text{O}_5$
  - (c)  $2\text{P}_5\text{O}$
  - (d)  $\text{P}_2\text{O}$
36. Draw and name the five structural isomers for  $\text{C}_6\text{H}_{14}$ . (1 point for each correct structure, 1 point for each correct name)
37. Draw and name the three structural isomers for  $\text{C}_5\text{H}_{12}$ . (1 point for each correct structure, 1 point for each correct name)
38. How many moles are there in 53.8 g of magnesium chloride,  $\text{MgCl}_2$ ?
- (a) 5,111 mol
  - (b) 3,201 mol
  - (c) 0.904 mol
  - (d) 0.565 mol
39. How many moles of  $\text{CO}_2$  are there in 454 grams?
- (a) 10.3 mol
  - (b) 16.2 mol
  - (c) 12,712 mol
  - (d) 19,976 mol

40. How many moles are there in 120 grams of potassium, K?
- (a) .325 mol
  - (b) 3.08 mol
  - (c) 2,280 mol
  - (d) 4,680 mol
41. How many moles are there in 72 grams of copper, Cu?
- (a) 0.40 mol
  - (b) 0.88 mol
  - (c) 1.13 mol
  - (d) 2.48 mol
42. How many particles are there in 4.6 grams of sucrose ( $C_{12}H_{22}O_{11}$ )? (1 mol =  $6.02 \times 10^{23}$  particles)
- (a)  $2.8 \times 10^{24}$  particles
  - (b)  $4.5 \times 10^{25}$  particles
  - (c)  $8.1 \times 10^{21}$  particles
  - (d)  $9.5 \times 10^{26}$  particles
43. How many particles are there in 200 grams of  $NaNO_3$ ? (1 mol =  $6.02 \times 10^{23}$  particles)
- (a)  $1.4 \times 10^{24}$  particles
  - (b)  $2.6 \times 10^{23}$  particles
  - (c)  $3.9 \times 10^{24}$  particles
  - (d)  $7.1 \times 10^{25}$  particles

44. How many particles are there in 50.0 g of calcium, Ca? (1 mol =  $6.02 \times 10^{23}$ )
- (a)  $1.3 \times 10^{24}$  particles
  - (b)  $2.1 \times 10^{24}$  particles
  - (c)  $4.8 \times 10^{23}$  particles
  - (d)  $7.5 \times 10^{23}$  particles
45. How many particles are there in 25.0 g of gold? (1 mol =  $6.02 \times 10^{23}$  particles)
- (a)  $1.3 \times 10^{23}$  particles
  - (b)  $2.1 \times 10^{25}$  particles
  - (c)  $4.7 \times 10^{24}$  particles
  - (d)  $7.6 \times 10^{22}$  particles