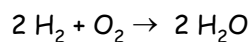


Chemistry Test 3: Moles, Stoichiometry, Balancing, Percent Composition, Empirical & Molecular Formulas

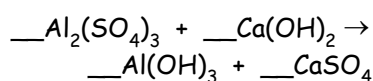
1. What is the percent by mass of hydrogen in NH_3 (formula mass = 17.0)?
- A) 17.6% C) 5.9%
B) 82.4% D) 21.4%

2. Given the reaction:



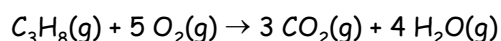
The total number of grams of O_2 needed to produce 54 grams of water is

- A) 36 C) 75
B) 61 D) 48
3. Given the unbalanced equation:



When the equation is completely balanced using the smallest whole number coefficients the sum of the coefficients is

- A) 5 C) 3
B) 9 D) 4
4. Compared to an atom of $^{12}_6\text{C}$, an atom of $^{14}_6\text{C}$ has
- A) more protons C) fewer protons
B) more neutrons D) fewer neutrons
5. Given the reaction:



At STP, what is the total number of liters of CO_2 produced when 5.0 liters of $\text{C}_3\text{H}_8(\text{g})$ burns completely?

- A) 1.0 L C) 3.0 L
B) 5.0 L D) 15 L
6. Which is a property of network solids but *not* molecular solids?
- A) water soluble C) high melting points
B) high malleability D) electrical insulators

7. Which equation is correctly balanced?
- A) $\text{Cu} + \text{H}_2\text{SO}_4 \rightarrow \text{CuSO}_4 + \text{H}_2\text{O} + \text{SO}_2$
B) $\text{NH}_3 + 2\text{O}_2 \rightarrow \text{HNO}_3 + \text{H}_2\text{O}$
C) $\text{Ca}(\text{OH})_2 + 2\text{H}_3\text{PO}_4 \rightarrow \text{Ca}_3(\text{PO}_4)_2 + 3\text{H}_2\text{O}$
D) $\text{CaO} + 2\text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$

8. $\text{Mg}(\text{s}) + 2 \text{HCl}(\text{aq}) \leftrightarrow \text{MgCl}_2(\text{aq}) + \text{H}_2(\text{g})$

What type of reaction is shown above?

- A) single replacement C) double replacement
B) synthesis D) decomposition
9. Which substance will conduct electricity in both the solid phase and the liquid phase?
- A) Ag C) HCl
B) AgCl D) H_2

10. One atomic mass unit (1 amu) is equal to the mass of a carbon-12 atom multiplied by the quantity

- A) $\frac{1}{12}$
B) 1836
C) 12
D) $\frac{1}{1836}$

11. A 4.4 gram sample of a hydrate was heated until the water of hydration was driven off. The anhydrous compound remaining had a mass of 3.3 grams. What is the percentage by mass of water in the hydrate?

- A) 67% C) 25%
B) 75% D) 33%

12. Which sample of O_2 contains a total of 3.01×10^{23} molecules at STP?

- A) 1.00 mole C) 16.0 grams
B) 2.00 moles D) 32.0 grams

13. An 8.24-gram sample of a hydrated salt is heated until it has a constant mass of 6.20 grams. What was the percent by mass of water contained in the original sample?

- A) 14.1% C) 32.9%
B) 75.2% D) 24.8%

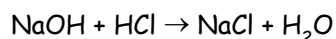
14. What is the mass number of an atom that contains 19 protons, 19 electrons, and 20 neutrons?

- A) 19 C) 58
B) 39 D) 20

15. The electrons in a bond between two iodine atoms (I_2) are shared
- A) equally, and the resulting bond is nonpolar
 - B) unequally, and the resulting bond is nonpolar
 - C) unequally, and the resulting bond is polar
 - D) equally, and the resulting bond is polar

16. When a sodium atom becomes an ion, the size of the atom
- A) increases by losing an electron
 - B) decreases by gaining an electron
 - C) increases by gaining an electron
 - D) decreases by losing an electron

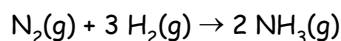
17. Given the balanced equation:



What is the total number of grams of H_2O produced when 116 grams of the product, $NaCl$, is formed?

- A) 54 g
- B) 18 g
- C) 36 g
- D) 9.0 g

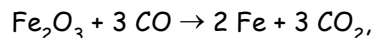
18. Given the reaction



How many liters of ammonia, measured at STP, are produced when 28.0 grams of nitrogen is completely consumed?

- A) 11.2
 - B) 44.8
 - C) 5.60
 - D) 22.4
19. A compound has a molecular mass of 54 and an empirical formula of C_2H_3 . What is the molecular formula of the compound?
- A) C_6H_{10}
 - B) C_5H_8
 - C) C_2H_3
 - D) C_4H_6

20. In the reaction



what is the total number of moles of CO used to produce 112 grams of iron?

- A) 1.0
 - B) 2.0
 - C) 3.0
 - D) 4.0
21. $N_2(g) + 3 H_2(g) \leftrightarrow 2 NH_3(g)$

What type of reaction is shown above?

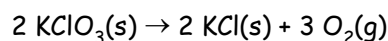
- A) double replacement
 - B) decomposition
 - C) synthesis
 - D) single replacement
22. A compound contains 40% calcium, 12% carbon, and 48% oxygen by mass. What is the empirical formula of this compound?

- A) $CaCO_2$
 - B) CaC_3O_6
 - C) $CaCO_3$
 - D) CaC_2O_4
23. What is the gram formula mass of $(NH_4)_2SO_4$?
- A) 132 g
 - B) 66.0 g
 - C) 94.0 g
 - D) 114 g

24. Which atom has the strongest attraction for electrons?

- A) F
- B) Br
- C) Cl
- D) I

25. Given the reaction:



What is the total number of moles of $KClO_3(s)$ needed to produce 6 moles of $O_2(g)$?

- A) 1
 - B) 2
 - C) 3
 - D) 4
26. What is the empirical formula of a compound with the molecular formula $C_6H_{12}O_6$?
- A) $C_4H_8O_4$
 - B) CH_2O
 - C) $C_2H_4O_2$
 - D) $C_3H_6O_3$
27. Which sample contains the same number of atoms as 24 grams of carbon?
- A) 80. g Ar
 - B) 10. g Ne
 - C) 24 g Mg
 - D) 4.0 g He

41. A substance was found to be a soft, non-conducting solid at room temperature. The substance is most likely
- A) an ionic solid C) a network solid
B) a metallic solid D) a molecular solid
42. What is the total mass in grams of 0.75 mole of SO_2 ?
- A) 16 g C) 32 g
B) 24 g D) 48 g
43. $\text{Ba}(\text{NO}_3)_2(\text{aq}) + \text{Na}_2\text{SO}_4(\text{aq}) \rightarrow 2 \text{NaNO}_3(\text{aq}) + \text{BaSO}_4(\text{s})$
- What type of reaction is shown above?
- A) synthesis C) single replacement
B) double replacement D) decomposition
44. Which is the formula for the compound that forms when magnesium bonds with phosphorus?
- A) Mg_2P C) Mg_2P_3
B) MgP_2 D) Mg_3P_2
45. Given the unbalanced equation:
- $$\underline{\hspace{1cm}} \text{Al}_2(\text{SO}_4)_3 + \underline{\hspace{1cm}} \text{Ca}(\text{OH})_2 \rightarrow \underline{\hspace{1cm}} \text{Al}(\text{OH})_3 + \underline{\hspace{1cm}} \text{CaSO}_4$$
- What is the coefficient in front of the CaSO_4 when the equation is completely balanced with the smallest whole-number coefficients?
- A) 1 C) 3
B) 2 D) 4
46. The percent by mass of aluminum in Al_2O_3 is approximately
- A) 47.1 C) 18.9
B) 52.9 D) 35.4
47. A compound consists of 25.9% nitrogen and 74.1% oxygen by mass. What is the empirical formula of the compound?
- A) N_2O_5 C) NO_2
B) NO D) N_2O
48. An atom that contains 8 protons, 8 electrons, and 9 neutrons has
- A) an atomic number of 16
B) an atomic number of 9
C) a mass number of 17
D) a mass number of 25
49. A compound consists of 40.% sulfur and 60.% oxygen by mass. What is the empirical formula of this compound?
- A) SO C) SO_3
B) SO_2 D) SO_4
50. Which compound has the empirical formula CH ?
- A) C_6H_6 C) C_3H_8
B) CH_4 D) C_2H_4
51. A compound contains 53% Al and 47% O by mass. What is the empirical formula of this compound?
- A) Al_2O_3 C) AlO_2
B) AlO D) Al_3O_2
52. Which type of bonding involves positive ions immersed in a sea of mobile electrons?
- A) ionic C) nonpolar covalent
B) polar covalent D) metallic
53. Which sequence of elements is arranged in order of decreasing atomic radii?
- A) Li, Na, K C) Al, Si, P
B) N, C, B D) Cl, Br, I
54. What is the empirical formula of a compound that contains 28% iron, 24% sulfur, and 48% oxygen by mass?
- A) FeSO_3 C) $\text{Fe}_2(\text{SO}_4)_3$
B) FeSO_4 D) $\text{Fe}_2(\text{SO}_3)_3$
55. Which formula represents a substance that contains covalent bonds?
- A) CO_2 C) LiCl
B) CaCl_2 D) K_2O
56. Which equation illustrates conservation of mass?
- A) $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$ C) $\text{H}_2 + \text{Cl}_2 \rightarrow 2 \text{HCl}$
B) $\text{H}_2 + \text{Cl}_2 \rightarrow \text{HCl}$ D) $\text{H}_2 + \text{O}_2 \rightarrow 2 \text{H}_2\text{O}$
57. What is the percent by mass of sulfur in sulfur dioxide?
- A) 32 C) 67
B) 33 D) 50

58. A sample of a compound contains 24 grams of carbon and 64 grams of oxygen. What is the empirical formula of this compound?

- A) CO_2 C) CO
B) C_2O_2 D) C_2O_4

59. $2 SO_3(g) \leftrightarrow 2 SO_2(g) + O_2(g)$

What type of reaction is shown above?

- A) synthesis C) double replacement
B) decomposition D) single replacement

60. What is the mass of 3.0×10^{23} atoms of neon?

- A) 0.50 g C) 10. g
B) 20. g D) 1.0 g

61. The Group 17 element with the highest electronegativity is

- A) fluorine C) iodine
B) bromine D) chlorine
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Answer Key
Chem T3 mole, stoi, balan [Apr 02, 2014]

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|------------------|------------------|------------------|
| 1. <u> A </u> | 26. <u> B </u> | 51. <u> A </u> |
| 2. <u> D </u> | 27. <u> A </u> | 52. <u> D </u> |
| 3. <u> B </u> | 28. <u> A </u> | 53. <u> C </u> |
| 4. <u> B </u> | 29. <u> B </u> | 54. <u> C </u> |
| 5. <u> D </u> | 30. <u> D </u> | 55. <u> A </u> |
| 6. <u> C </u> | 31. <u> B </u> | 56. <u> C </u> |
| 7. <u> B </u> | 32. <u> B </u> | 57. <u> D </u> |
| 8. <u> A </u> | 33. <u> C </u> | 58. <u> A </u> |
| 9. <u> A </u> | 34. <u> A </u> | 59. <u> B </u> |
| 10. <u> A </u> | 35. <u> C </u> | 60. <u> C </u> |
| 11. <u> C </u> | 36. <u> A </u> | 61. <u> A </u> |
| 12. <u> C </u> | 37. <u> D </u> | |
| 13. <u> D </u> | 38. <u> C </u> | |
| 14. <u> B </u> | 39. <u> D </u> | |
| 15. <u> A </u> | 40. <u> C </u> | |
| 16. <u> D </u> | 41. <u> D </u> | |
| 17. <u> C </u> | 42. <u> D </u> | |
| 18. <u> B </u> | 43. <u> B </u> | |
| 19. <u> D </u> | 44. <u> D </u> | |
| 20. <u> C </u> | 45. <u> C </u> | |
| 21. <u> C </u> | 46. <u> B </u> | |
| 22. <u> C </u> | 47. <u> A </u> | |
| 23. <u> A </u> | 48. <u> C </u> | |
| 24. <u> A </u> | 49. <u> C </u> | |
| 25. <u> D </u> | 50. <u> A </u> | |