

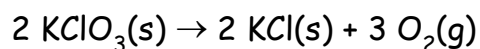
- Which sequence of elements is arranged in order of decreasing atomic radii?
 A) Cl, Br, I C) N, C, B
 B) Al, Si, P D) Li, Na, K
- Which sample of O_2 contains a total of 3.01×10^{23} molecules at STP?
 A) 1.00 mole C) 16.0 grams
 B) 2.00 moles D) 32.0 grams
- Which sample contains the same number of atoms as 24 grams of carbon?
 A) 80. g Ar C) 10. g Ne
 B) 4.0 g He D) 24 g Mg
- $Mg(s) + 2 HCl(aq) \leftrightarrow MgCl_2(aq) + H_2(g)$

 What type of reaction is shown above?
 A) single replacement
 B) double replacement
 C) synthesis
 D) decomposition
- Given the unbalanced equation:

$$\underline{\hspace{1cm}} C_3H_8(g) + \underline{\hspace{1cm}} O_2(g) \rightarrow \underline{\hspace{1cm}} H_2O(g) + \underline{\hspace{1cm}} CO_2(g)$$
 When the equation is completely balanced using smallest whole numbers, the coefficient of O_2 is
 A) 5 C) 3
 B) 2 D) 10
- What is the gram formula mass of $(NH_4)_2SO_4$?
 A) 94.0 g C) 132 g
 B) 114 g D) 66.0 g
- Which compound has the empirical formula CH?
 A) C_2H_4 C) C_6H_6
 B) CH_4 D) C_3H_8
- Which formula represents a substance that contains covalent bonds?
 A) CO_2 C) $CaCl_2$
 B) K_2O D) $LiCl$
- Which quantity is equivalent to 39 grams of LiF?
 A) 1.0 mole C) 0.50 mole
 B) 2.0 moles D) 1.5 moles
- A compound consists of 25.9% nitrogen and 74.1% oxygen by mass. What is the empirical formula of the compound?
 A) NO C) N_2O
 B) N_2O_5 D) NO_2
- The percent by mass of oxygen in $H_2C_2O_4$ is equal to
 A) $\frac{90}{64} \times 100$ C) $\frac{4}{8} \times 100$
 B) $\frac{8}{90} \times 100$ D) $\frac{64}{90} \times 100$
- 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 metallic solid
 B) a network solid D) a molecular solid

13. 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) 25% C) 75%
B) 33% D) 67%
14. Which substance will conduct electricity in both the solid phase and the liquid phase?
- A) AgCl C) H₂
B) HCl D) Ag
15. A compound has a molecular mass of 54 and an empirical formula of C₂H₃. What is the molecular formula of the compound?
- A) C₄H₆ C) C₆H₁₀
B) C₅H₈ D) C₂H₃
16. The electrons in a bond between two iodine atoms (I₂) are shared
- A) unequally, and the resulting bond is polar
B) unequally, and the resulting bond is nonpolar
C) equally, and the resulting bond is nonpolar
D) equally, and the resulting bond is polar
17. Which atom has the strongest attraction for electrons?
- A) Br C) I
B) F D) Cl
18. A compound consists of 40.% sulfur and 60.% oxygen by mass. What is the empirical formula of this compound?
- A) SO C) SO₃
B) SO₂ D) SO₄
19. What is the total number of moles of atoms represented by the formula Al(C₂H₃O₂)₃?
- A) 22 C) 8
B) 11 D) 4
20. One atomic mass unit (1 amu) is equal to the mass of a carbon-12 atom multiplied by the quantity
- A) $\frac{1}{1836}$
B) $\frac{1}{12}$
C) 1836
D) 12
21. Which element forms a diatomic molecule containing a triple covalent bond?
- A) Cl₂ C) O₃
B) N₂ D) H₂
22. An atom that contains 8 protons, 8 electrons, and 9 neutrons has
- A) a mass number of 25
B) a mass number of 17
C) an atomic number of 9
D) an atomic number of 16

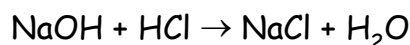
23. Given the reaction:



What is the total number of moles of $\text{KClO}_3(\text{s})$ needed to produce 6 moles of $\text{O}_2(\text{g})$?

- A) 1 C) 3
B) 2 D) 4

24. Given the balanced equation:

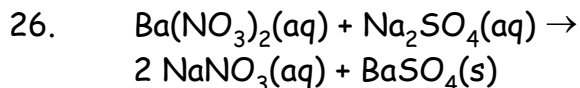


What is the total number of grams of H_2O produced when 116 grams of the product, NaCl , is formed?

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

25. A compound contains 53% Al and 47% O by mass. What is the empirical formula of this compound?

- A) AlO_2 C) Al_3O_2
B) Al_2O_3 D) AlO



What type of reaction is shown above?

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

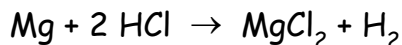
27. What is the total mass in grams of 0.75 mole of SO_2 ?

- A) 16 g C) 32 g
B) 24 g D) 48 g

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

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

29. Given the reaction:



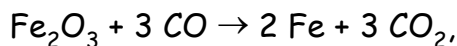
What is the total number of grams of Mg consumed when 0.50 mole of H_2 is produced?

- A) 6.0 g C) 3.0 g
B) 12 g D) 24 g

30. Which equation illustrates conservation of mass?

- A) $\text{H}_2 + \text{Cl}_2 \rightarrow 2 \text{HCl}$ C) $\text{H}_2 + \text{Cl}_2 \rightarrow \text{HCl}$
B) $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$ D) $\text{H}_2 + \text{O}_2 \rightarrow 2 \text{H}_2\text{O}$

31. In the reaction



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

- A) 1.0 C) 3.0
B) 2.0 D) 4.0

32. What is the empirical formula of a compound with the molecular formula $\text{C}_6\text{H}_{12}\text{O}_6$?

- A) CH_2O C) $\text{C}_3\text{H}_6\text{O}_3$
B) $\text{C}_4\text{H}_8\text{O}_4$ D) $\text{C}_2\text{H}_4\text{O}_2$

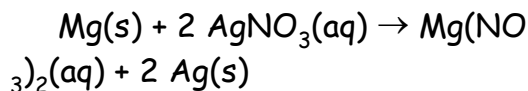
33. What is the gram formula mass of $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$?

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

34. A compound contains 40% calcium, 12% carbon, and 48% oxygen by mass. What is the empirical formula of this compound?

- A) CaC_3O_6 C) CaCO_2
B) CaCO_3 D) CaC_2O_4

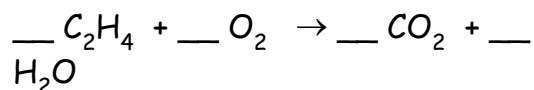
35. Given the reaction:



Which type of reaction is represented?

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

36. When the equation



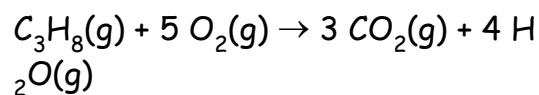
is balanced using smallest whole numbers, what is the coefficient of the O_2 ?

- A) 1 C) 3
B) 2 D) 4

37. What is the percent by mass of hydrogen in NH_3 (formula mass = 17.0)?

- A) 21.4% C) 17.6%
B) 5.9% D) 82.4%

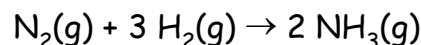
38. Given the reaction:



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

- A) 1.0 L C) 3.0 L
B) 5.0 L D) 15 L

39. Given the reaction



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

- A) 22.4 C) 5.60
B) 11.2 D) 44.8

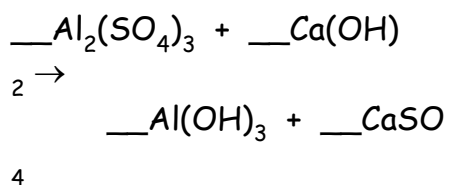
40. Which type of bonding involves positive ions immersed in a sea of mobile electrons?

- A) metallic C) nonpolar covalent
B) ionic D) polar covalent

41. When a sodium atom becomes an ion, the size of the atom

- A) decreases by gaining an electron
B) increases by losing an electron
C) decreases by losing an electron
D) increases by gaining an electron

42. Given the unbalanced equation:



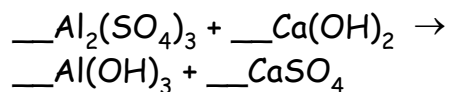
When the equation is completely balanced using the smallest whole number coefficients the sum of the coefficients is

- A) 5 C) 3
B) 9 D) 4

43. The Group 17 element with the highest electronegativity is

- A) fluorine C) iodine
B) bromine D) chlorine

44. Given the unbalanced equation:



What is the coefficient in front of the CaSO_4 when the equation is completely balanced with the smallest whole-number coefficients?

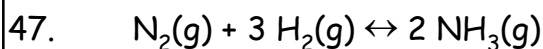
- A) 1 C) 3
B) 2 D) 4

45. What is the empirical formula of a compound that contains 28% iron, 24% sulfur, and 48% oxygen by mass?

- A) FeSO_4 C) FeSO_3
B) $\text{Fe}_2(\text{SO}_3)_3$ D) $\text{Fe}_2(\text{SO}_4)_3$

46. Which is the formula for the compound that forms when magnesium bonds with phosphorus?

- A) MgP_2 C) Mg_2P_3
B) Mg_2P D) Mg_3P_2



What type of reaction is shown above?

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

48. What type of bonding is found in the molecule HBr ?

- A) ionic C) metallic
B) nonpolar covalent D) polar covalent

49. Which is a property of network solids but *not* molecular solids?

- A) electrical insulators
B) high malleability
C) water soluble
D) high melting points

50. 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 C) C_2O_2
B) C_2O_4 D) CO_2

51. What is the percent by mass of sulfur in sulfur dioxide?

- A) 33 C) 32
B) 50 D) 67

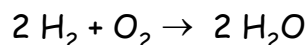
52. The percent by mass of aluminum in Al_2O_3 is approximately

- A) 47.1 C) 52.9
B) 35.4 D) 18.9

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

54. 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) 32.9% C) 24.8%
 B) 14.1% D) 75.2%

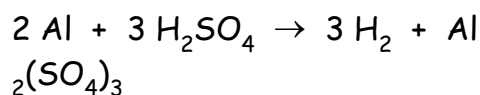
55. Given the reaction:



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

- A) 36 C) 61
 B) 75 D) 48
56. 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

57. Given the reaction:



The total number of moles of H_2SO_4 needed to react completely with 5.0 moles of Al is

- A) 5.0 moles C) 7.5 moles
 B) 9.0 moles D) 2.5 moles

58. $2 \text{SO}_3(\text{g}) \leftrightarrow 2 \text{SO}_2(\text{g}) + \text{O}_2(\text{g})$

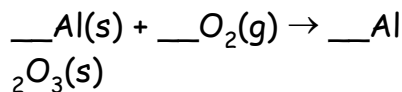
What type of reaction is shown above?

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

59. A compound whose empirical formula is NO_2 could have a molecular mass of

- A) 39 C) 23
 B) 120 D) 92

60. When the equation



is correctly balanced using the smallest whole numbers, the coefficient of $\text{Al}(\text{s})$ is

- A) 1 C) 3
 B) 2 D) 4

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

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

Answer Key
Chem T3 mole, stoi, balan [Apr 02, 2014]

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