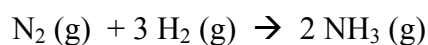


1. Which of the following is NOT a correct chemical formula?
- A. SrBr_2
 - B. CaS_2
 - C. Mg_3N_2
 - D. Na_2O
 - E. AlI_3
2. When the combustion reaction of C_3H_6 is properly balanced with the smallest whole number coefficients possible, the sum of the coefficients (including "one's") is
- A. 12 B. 16 C. 21 D. 23 E. 28
3. Which of the following is the correct formula for cobalt (II) nitrite?
- A. Co_2NO_3
 - B. $\text{Co}(\text{NO}_3)_2$
 - C. Co_2NO_2
 - D. $\text{Co}(\text{NO}_2)_2$
 - E. Co_3N_2
4. Which of the following is correctly paired?
- | <u>Name</u> | <u>Symbol</u> |
|--------------------------------------|------------------|
| A. magnesium (II) ion | Mg^{2+} |
| B. chloride ion | ClO^- |
| C. hydroxide ion | H^+ |
| D. phosphide ion | P^{3-} |
| E. None of these is correctly paired | |
5. The correct name for ClF_3 is
- A. chlorine fluoride
 - B. chlorine (III) fluoride
 - C. chlorine trifluoride
 - D. chlorine trifluorine
 - E. chloro fluoride
6. What is the molar mass of $\text{Fe}_3(\text{PO}_4)_2$.
- A. 102.8
 - B. 357.5
 - C. 245.8
 - D. 268.2
 - E. 326.5

7. What is the %(w/w) of oxygen in $\text{Ca}(\text{NO}_3)_2$?
- A. 58.5
 - B. 66.7
 - C. 9.75
 - D. 42.5
 - E. 96.0
8. Which has the largest %(w/w) sulfur?
- A. iron (II) sulfide
 - B. iron (II) sulfite
 - C. iron (II) sulfate
 - D. all are the same.
9. What is the mass in grams of 0.250 moles of N_2O_4 ?
- A. 23.0
 - B. 45.0
 - C. 92.0
 - D. 128.0
 - E. 368.1
10. How many atoms are in 5.00 grams of C_6H_6 ?
- A. 3.01×10^{24}
 - B. 6.40×10^{-2}
 - C. 6.02×10^{23}
 - D. 3.85×10^{22}
 - E. 4.62×10^{23}
11. A sample of Na_2CO_3 contains 2.50 moles of sodium. How many grams of oxygen are in the sample?
- A. 6.40
 - B. 26.7
 - C. 40.0
 - D. 60.0
 - E. 57.5

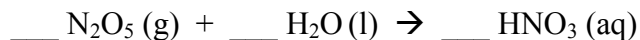
12. Iron has a density of 7.87 g/cm^3 . How many atoms of iron are in a cube that measures 2.00 cm on each side?
- A. 8.48×10^{22}
 - B. 1.70×10^{23}
 - C. 2.12×10^{27}
 - D. 6.02×10^{23}
 - E. 6.79×10^{23}

For questions 13 through 15, use the following balanced chemical equation:



13. If 2.38 moles of $\text{H}_2 (\text{g})$ are reacted with excess $\text{N}_2 (\text{g})$, how many moles of $\text{NH}_3 (\text{g})$ can be formed?
- A. 2.38
 - B. 4.76
 - C. 3.57
 - D. 0.793
 - E. 1.59
14. If 1.28 moles of $\text{N}_2 (\text{g})$ are reacted with 1.56 moles of $\text{H}_2 (\text{g})$, how many moles of $\text{NH}_3 (\text{g})$ can be formed?
- A. 1.04
 - B. 2.56
 - C. 1.28
 - D. 1.56
 - E. 0.347
15. How many grams of $\text{N}_2 (\text{g})$ will completely react with 15.0 grams of $\text{H}_2 (\text{g})$?
- A. 208.0
 - B. 104.0
 - C. 34.6
 - D. 69.4
 - E. 138.7

16. Given the following unbalanced equation:



Including coefficients that are one, what is the sum of the coefficients which correctly balance the equation?

- A. 4 B. 6 C. 8 D. 9 E. 10
17. An average snowflake contains 5.00×10^{-5} grams of H_2O . How many molecules of H_2O does the average snowflake contain?
- A. 3.01×10^{19}
B. 1.67×10^{18}
C. 5.01×10^{18}
D. 6.02×10^{23}
E. 9.29×10^{16}
18. An artificial sweetener has the following composition:

C	57.14%
H	6.16%
N	9.52%
O	27.18%

Its most likely empirical formula is

- A. $\text{C}_5\text{H}_6\text{N}_7\text{O}_2$
B. $\text{C}_{14}\text{H}_{18}\text{N}_2\text{O}_5$
C. $\text{C}_{57}\text{H}_6\text{N}_{10}\text{O}_{27}$
D. $\text{C}_3\text{H}_4\text{N}_4\text{O}_1$
E. $\text{C}_7\text{H}_9\text{N}_1\text{O}_3$
19. A compound having the empirical formula of CH_2N is found experimentally to have a molar mass of 84.1. Its molecular formula must be:
- A. CH_2N B. $\text{C}_2\text{H}_4\text{N}_2$ C. $\text{C}_3\text{H}_6\text{N}_3$ D. $\text{C}_4\text{H}_8\text{N}_4$ E. $\text{C}_5\text{H}_{10}\text{N}_5$

20. Which of the following is an empirical formula?
- A. Na_2S
 - B. $\text{C}_3\text{H}_2\text{O}_4$
 - C. KCl
 - D. NCl_3
 - E. all of these

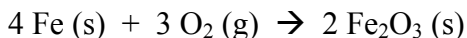
21. A newly discovered element, triskium, has two isotopes with data listed below:

<u>Isotope</u>	<u>Mass (amu)</u>	<u>% abundance</u>
triskium-300	299.985	81.15
triskium-302	302.115	18.85

What is the average atomic mass of triskium?

- A. 300.9
 - B. 301.2
 - C. 301.6
 - D. 302.1
 - E. 300.4
22. Balance the following equation:
- $$\underline{\hspace{1cm}} \text{Fe}_2\text{S}_3 (\text{s}) + \underline{\hspace{1cm}} \text{H}_2 (\text{g}) \rightarrow \underline{\hspace{1cm}} \text{Fe} (\text{s}) + \underline{\hspace{1cm}} \text{H}_2\text{S} (\text{g})$$
- What is the coefficient for $\text{H}_2 (\text{g})$ in the balanced equation?
- A. 1
 - B. 2
 - C. 3
 - D. 4
 - E. 6

23. Given the following balanced equation:



1.18 moles of Fe are reacted with excess O_2 and 64.2 grams of Fe_2O_3 are formed. What is the percent yield of this reaction? (Molar Mass of $\text{Fe}_2\text{O}_3 = 159.7$)

- A. 34.1%
- B. 68.2%
- C. 17.0 %
- D. 40.2 %
- E. 97.4%

24. All of the following are in aqueous solution. Which is incorrectly named?
- A. H_2SO_4 , sulfuric acid
 - B. H_2CO_3 , carbonic acid
 - C. H_3PO_4 , phosphoric acid
 - D. HCN, cyanic acid
 - E. HCl, hydrochloric acid
25. How many moles of water are in one mole of sodium acetate trihydrate?
- A. 1
 - B. 2
 - C. 3
 - D. 4
 - E. 5
26. An instrument (described in the text) which is used to compare the various masses of atoms is called:
- A. a mass analyzer
 - B. a mass comparator
 - C. a mass spectrometer
 - D. a mass densitometer
 - E. an amu detector
27. A newly identified acid is systematically named hydrobranic acid. Which of the following must be true?
- A. Hydrobranic acid contains no hydrogen atoms.
 - B. Hydrobranic acid contains no oxygen atoms.
 - C. Hydrobranic acid contains no bromine atoms.
 - D. Hydrobranic acid contains no carbon atoms.
 - E. Hydrobranic acid contains no sulfur atoms.