Self Assessment B

1 Assume that magnesium consists of three isotopes having the abundance and masses given below. According to these data, calculate the average atomic mass of magnesium.

isotope	abundance	mass
^{24};Mg	78.70%	23.985 amu
^{25}Mg	10.13%	24.986 amu
^{26}Mg	11.17%	25.983 amu

- A) 25.00 amu
- B) 2.431 amu
- C) 2431 amu
- D) 24.31 amu
- E) None of the above.

2 One mole of H_2

- A) contains 6.0×10^{23} H atoms.
- B) contains 6.0×10^{23} H_2 molecules.
- C) contains 1 g of H_2.
- D) is equivalent to 6.02×10^{23} g of H_2.
- E) None of the above.

3 How many oxygen atoms are present in 5.2 g of O_2?

- A) 5.4×10^{-25} atoms
- B) 9.8×10^{22} atoms
- C) 2.0×10^{23} atoms
- D) 3.1×10^{24} atoms
- E) 6.3×10^{24} atoms

4 How many potassium atoms are present in 57.7 g of potassium hexafluoromanganate(IV), K_2MnF_6?

- A) 0.470 atoms
- B) 2.81×10^{23} atoms
- C) 0.233 atoms
- D) 1.41×10^{23} atoms

E) 9.84 x 10^{23} atoms

5 What is the mass of 5.45 x 10^{-3} mol of glucose, $C_6H_{12}O_6$?

A) 0.158 g
B) 982 g
C) 3.31 x 10^4 g
D) 0.982 g
E) None of the above.

6 Determine the mass percent of iron in $Fe_4[Fe(CN)_6]_3$.

A) 45% Fe
B) 26% Fe
C) 33% Fe
D) 58% Fe
E) None of the above.

7 A compound composed of hydrogen and carbon contains 85.7% C and 14.3% H, and has a molar mass of 84 g/mol. What is the molecular formula of the compound?

A) CH_2
B) C_2H_4
C) CH_3
D) C_3H_6
E) C_6H_{12}

8 When it is correctly balanced, the correct coefficients for the equation below are $PCl_3 + H_2O \longrightarrow H_3PO_3 + HCl$

A) 1, 3, 1, 1
B) 1, 3, 1, 3
C) 1, 1, 1, 3
D) 2, 3, 2, 3

9 Hydrochloric acid can be prepared using the reaction described by the chemical equation: $2\ NaCl(s) + H_2SO_4(l) \longrightarrow 2\ HCl(g) + Na_2SO_4(s)$. How many grams of HCl can be prepared from 393 g of H_2SO_4 and 4.00 moles of NaCl?

A) 4.00 g
B) 2.49 g
C) 146 g
D) 284 g
E) None of the above.

10 Calculate the percent yield of iron if 950 g of Fe_3O_4 underwent the reaction shown in the chemical equation below and 533 g of Fe was isolated from the reaction mixture. $Fe_3O_4 (s) + 2\ C(s) \longrightarrow 2\ CO_2 (g) + 3\ Fe(s)$

A) 25.9%
B) 77.5%
C) 56.1%
D) None of the above.

Self Assessment A

1 Determine the number of moles of aluminum in 0.2154 kg of Al.

    A) 1.297×10^{23} mol
    B) 5.811×10^{3} mol
    C) 7.984 mol
    D) 0.1253 mol
    E) 7.984×10^{-3} mol

2 How many phosphorus atoms are there in 2.57 g of P?

    A) 4.79×10^{25}
    B) 1.55×10^{24}
    C) 5.00×10^{22}
    D) 8.30×10^{-2}
    E) 2.57

3 How many grams of acetylsalicylic acid (aspirin, $C_9H_8O_4$) are present in 1.32×10^{-2} mol of $C_9H_8O_4$?

    A) 1.32×10^{-2} g
    B) 2.38 g
    C) 180.2 g
    D) 7.33×10^{-5} g
    E) None of the above.

4 Calculate the percent composition by mass of nitrogen in ammonium nitrate (NH_4NO_3).

    A) 0.175%
    B) 0.350%
    C) 17.5%
    D) 35.0%
    E) 42.5%

5 A compound with a percent composition by mass of 87.5% N and 12.5% H was recently discovered. What is the empirical formula of this compound?

    A) NH_2
    B) N_2H_3

C) NH

D) N_2H_2

E) N_2H

6 What is the coefficient for CO_2 when the following chemical equation is properly balanced using the smallest set of whole numbers? $C_4H_{10} + O_2$ ----> $CO_2 + H_2O$

A) 1

B) 4

C) 6

D) 8

E) 12

7 What mass of copper nitrate would be produced from the complete reaction of 45.6 g of copper, according to the chemical reaction shown below? $Cu + 2 AgNO_3$ ----> $Cu(NO_3)_2 + 2 Ag$

A) 0.72 g

B) 21.1 g

C) 98.7 g

D) 135 g

E) 187 g

8 Calculate the number of moles of H_2O formed when 0.200 mole of $Ba(OH)_2$ is treated with 0.500 mol of $HClO_3$ according to the chemical reaction shown below. $Ba(OH)_2 + 2 HClO_3$ ----> $Ba(ClO_3)_2 + 2 H_2O$

A) 1.00 mol

B) 0.600 mol

C) 0.500 mol

D) 0.400 mol

E) 0.200 mol

9 Ammonia is produced industrially from the reaction of nitrogen and hydrogen. Write the balanced chemical equation for this reaction, and determine the largest mass of NH_3 that could be produced from the reaction of 105 g of N_2 and 15.0 g of H_2.

A) 28.4 g

B) 42.2 g

C) 63.8 g

D) 84.3 g

E) 128 g