CHM151 EXAM 1 Practice Spring 2017 Name: _____

1. The formula mass of zinc acetate trihydrate, $Zn(CH_3COO)_2 \bullet 3H_2O$, is
   A) 162 amu. B) 184 amu. C) 238 amu. D) 286 amu. E) 302 amu.

2. A sample of ammonium phosphite, $(NH_4)_3PO_3$, contains 2.20 mol of hydrogen atoms. The number of moles of oxygen atoms in the sample is
   A) 0.550 mol. B) 2.20 mol. C) 8.80 mol. D) 6.60 mol. E) 3.00 mol.

3. What is the mass in grams of 0.622 mol of glucose, $C_6H_{12}O_6$?
   A) 59.7 g B) 0.00346 g C) 112 g D) 289 g E) 18.7 g

4. How many molecules are there in 2.68 mg of mannose, $C_6H_{12}O_6$, which is a sweet-tasting sugar that has a bitter aftertaste?
   A) 8.07×10^{18} B) 8.96×10^{18} C) 2.25×10^{21} D) 4.04×10^{21} E) 4.45×10^{24}

5. What is the percentage by mass of nitrogen atoms in ammonium phosphate, $(NH_4)_3PO_4$?
   A) 16.4% B) 31.4% C) 28.2% D) 43.6% E) 57.6%

6. Maleic acid contains 41.4% carbon, 3.47% hydrogen, and 55.1% oxygen by mass. A 0.060-mol sample of this compound weighs 5.22 g. What is the molecular formula of maleic acid?
   A) CHO B) $C_2H_2O_2$ C) C_5H_5O D) $C_3H_3O_3$ E) $C_6H_6O_6$

7. $2KHCO_3(s) \longrightarrow K_2CO_3(s) + CO_2(g) + H_2O(l)$
   How many moles of potassium carbonate will be produced if 388 g of potassium hydrogen carbonate are heated?
   A) 3.88 B) 2.81 C) 194 D) 1.94 E) 13.3

8. Elemental sulfur can be converted to sulfur trioxide by reaction with oxygen in the presence of a catalyst. Upon addition of water, sulfuric acid is produced as represented by the equation:
   $S_8(s) + 12O_2(g) + 8H_2O(l) \longrightarrow 8H_2SO_4(l)$
   What mass of sulfur is needed to prepare 261 g of $H_2SO_4(l)$?
   A) 798 g B) 85.3 g C) 10.67 g D) 683 g E) 261 g

9. $2Al(s) + 6HCl(aq) \longrightarrow 2AlCl_3(aq) + 3H_2(g)$
   According to the equation above, how many grams of aluminum are needed to completely react with 4.66 mol of hydrochloric acid?
   A) 4.66 g B) 41.9 g C) 377 g D) 125.7 g E) 56.7 g

10. How many electrons does the ion $^{59}_{27}Co^{2+}$ have?
A) 25 B) 27 C) 29 D) 32 E) 59

11. Which combination of protons, neutrons, and electrons correctly represents a ^{58}Fe nuclide?
A) 58 protons, 26 neutrons, 26 electrons
B) 58 protons, 26 neutrons, 58 electrons
C) 26 protons, 32 neutrons, 58 electrons
D) 26 protons, 32 neutrons, 32 electrons
E) 26 protons, 32 neutrons, 26 electrons

12. How many significant figures should be reported for the difference between 235.9289 mL and 235.57 mL?
A) 1 B) 2 C) 3 D) 5 E) 7

13. The distance between atoms is sometimes given in picometers, where 1 pm is equivalent to 1×10^{-12} m. If the distance between the layers of atoms in a particular compound is given as 324 pm, what is the distance in cm?
A) 3.24×10^{-6} cm
B) 3.24×10^{-8} cm
C) 3.24×10^{-10} cm
D) 3.24×10^{-12} cm
E) 3.24×10^{-14} cm

Answer Key

1. C
2. A
3. C
4. B
5. C
6. D
7. D
8. B
9. B
10. A
11. E
12. B
13. B