Multiple Choice: (4 points each. Put answers in left margin as capital letters.)

1. A block has a temperature of 701 ºC. What is its temperature in Kelvins?
   A) 372  B) 628  C) 701  D) 974  E) 1290

2. How many significant figures are in the answer to the following problem: 4553 + (827 x 1130)?
   A) 1  B) 2  C) 3  D) 4  E) 5

3. Which of the following numbers is inexact?
   A) a decade  B) \( \pi \)  C) the average of the integers 1, 6, and 7.
   D) the number of tires on a car  E) your weight

4. The prefix "micro" in micrometer means to multiply the length in meters by:
   A) \( 10^{-9} \)  B) \( 10^{-6} \)  C) \( 10^{-3} \)  D) \( 10^{-2} \)  E) \( 10^{-1} \)

5. Which pair of elements should have similar properties? (Homework 2.15)
   A) Ba/Pb  B) Bi/N  C) Ca/Mg  D) In/Sn  E) Rb/Sr

6. Which of the following would turn away from a positively charged plate?
   A) alpha rays  B) atoms  C) beta rays  D) gamma rays  E) neutrons

7. The correct number of protons, neutrons, and electrons in \( S^+ \) (S-32) is:
   A) 15p, 16n, 14e  B) 15p, 16n, 16e  C) 16p, 16n, 15e  D) 16p, 15n, 16e  E) 16p, 32n, 17e

8. What is the mass percent of 15 g of NaCl dissolved in 32 g of water?
   A) 4.6%  B) 8.1%  C) 15%  D) 32%  E) 47%

9. Which of the following is false?
   A) The liquid present in largest quantity in a solution is the solvent.
   B) An equilibrium is a situation in which a process and its reverse are occurring simultaneously at equal rates.
   C) Electrolytes are substances that dissociate when dissolved in water.
   D) A precipitate is the solid product of a reaction in liquid solution.
   E) Dilution is process of making a solution less concentrated.
Discussion Questions: (You must show your work to receive credit.)

1. Define: (12 points)

   compound –

   heterogeneous (mixture) –

   isotope –

2. For the 5 transitions below, indicate which is/are chemical and which is/are physical. (5 points)

3. Bromine principally exists in nature as two isotopes: $^{79}\text{Br}$ (80.916 amu, 50.69%) and $^{81}\text{Br}$ (79.918 amu, 49.31%). What is its average atomic mass? (5 points)

4. For the following, give the name or formula where appropriate: (15 points)

   Ca(OH)$_2$ – ozone –

   S$_3$N$_2$ – perchloric acid –

   TiBr$_2$ –
5. Isopropyl alcohol (C\textsubscript{3}H\textsubscript{8}O) is mixed with water to produce a solution that is 35.0% alcohol by volume. How many milliliters of each component are present in 805 mL of this solution? What is its molar concentration? (density\textsubscript{C\textsubscript{3}H\textsubscript{8}O} = 0.7863 g/mL) What would its molar concentration be if 125 mL of water was added to the original solution? (15 points)

6. Carvone, exists in two mirror images forms (similar to your hands). One is the principle flavorant in spearmint, the other caraway. Each contains 80.0% carbon, 9.39% hydrogen, and 10.6% oxygen by mass. Each has a molar mass of about 150 g/mol. What are their empirical and molecular formulae. (You may not work backwards from its molar mass.) (12 points)