Chemistry 141 Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Martin Larter

Quiz 2 (30 points) September 10, 2014

1. (6 points) A new temperature scale has been developed. In the Grossmont temperature scale, water boils at 371oG and freezes at 85oG. Derive an equation relating a reading on this oG scale to a reading on the Celsius scale. If the temperature of a block of copper is 197oG, calculate its temperature in oC?
2. (8 points) Complete the following metathesis reactions, first as complete molecular equations. (Write NR if no reaction occurs.) Then, in the space below, write the balanced, total and net ionic equation. Use subscripts [(s), (aq), (g), etc.] to indicate the phase of each compound or ion.

Conventional (molecular) Equation

\_\_\_Na3PO4 (aq) + \_\_\_FeSO4 (aq) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total Ionic Equation

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Net Ionic Equation

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1. (4 points) A stable element is discovered with an atomic number of 134. There are two naturally occurring isotopes of this element. One has an abundance of 42.63% and a relative atomic mass of 334.907863 amu. The other has a relative atomic mass of 336.916354 amu. Calculate the relative average atomic mass of the element
2. (4 points) The complete symbol for an ion with 34 protons, 45 neutrons, and 36 electrons, would contain the following values.

$$ A= \_\_\_\_ Z= \_\_\_\_ Y= \_\_\_\_ X= \_\_\_\_

1. (6 points) Calculated the number of gold atoms in a solid gold ring with a volume of 1.05 mL. The density of gold is 19.4 g/mL.
2. (6 points) A metal (M) forms a compound with the formula MCl3. If the compound contains 64.43% Cl by mass, what is the identity of the metal?

 **Solubility Rules for Ionic Compounds**

**Compounds containing the following ions are generally *soluble* in water:**

1. **Alkali metal ions and ammonium ion**
2. **Acetate ion**
3. **Nitrate ion**
4. **Halide ions (X) (AgX, Hg2X2, and PbX2 are insoluble exceptions)**
5. **Sulfate ion (SrSO4, BaSO4, and PbSO4, are insoluble exceptions)**

**Compounds containing the following ions are generally *insoluble* in water:**

1. **Carbonate ion (see rule 1 exceptions, which are soluble)**
2. **Chromate ion (see rule 1 exceptions, which are soluble)**
3. **Phosphate ion (see rule 1 exceptions, which are soluble)**
4. **Sulfide ion (CaS, SrS, BaS, and rule 1 exceptions are soluble)**
5. **Hydroxide ion [Ca(OH)2, Sr(OH)2, Ba(OH)2, and rule 1 exceptions are soluble]**