Quiz 2 Version A **Chem. 111_fall 2013/Odago**

Please fill in your names and A00 numbers on the scantron and bubble in the correct answers

1. Identify the spectator ions in the following reaction.
   $Ca^{2+}(aq) + 2NO_3^-(aq) + 2Na^+(aq) + CO_3^{2-}(aq) \rightarrow CaCO_3(s) + 2Na^+(aq) + 2NO_3^-(aq)$
   a) Ca^{2+} and NO_3^-
   b) Ca^{2+} and Na^+
   c) Na^+ and NO_3^-
   d) NO_3^- and CO_3^{2-}
   e) Ca^{2+} and CO_3^{2-}

2. A hydrocarbon, subjected to elemental analysis, was found to contain 90.51% carbon and 9.49% hydrogen by mass. What is the empirical formula of the hydrocarbon?
   a) C_4H_5
   b) $C_{10}H$
   c) $C_{11}H$
   d) C_8H_{10}
   e) CH_4

3. A particular compound contains, by mass, 41.4% carbon, 3.47% hydrogen, and 55.1% oxygen. A 0.050-mol sample of this compound weighs 5.80 g. The molecular formula of this compound is
   a) CHO
   b) C_3H_3O
   c) $C_2H_2O_2$
   d) $C_4H_4O_4$
   e) $C_5H_5O_5$

4. When solutions of barium chloride and sodium sulfate are mixed, the spectator ions in the resulting reaction are
   a) only Ba^{2+}
   b) only SO_4^{2-}
   c) only Na^+
   d) only Cl^-
   e) both Na^+ and Cl^-

5. What is the net ionic equation for the neutralization of sulfuric acid with potassium hydroxide?
   a) $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$
   b) $2H^+(aq) + 2KOH(aq) \rightarrow 2H_2O(l) + 2K^+(aq)$
   c) $H_2SO_4(aq) + 2KOH(aq) \rightarrow 2H_2O(l) + K_2SO_4(aq)$
   d) $H_2SO_4(aq) + 2OH^-(aq) \rightarrow 2H_2O(l) + SO_4^{2-}(aq)$
   e) $H_2S(aq) + 2KOH(aq) \rightarrow 2H_2O(l) + K_2S(aq)$

6. Which one of the following is necessary in order for a metal to be oxidized?
   a) addition of hydrogen
   b) removal of oxygen
   c) removal of electrons
   d) addition of electrons
   e) addition of oxygen

7. The sum of the oxidation numbers of all the atoms in the dichromate ion, $Cr_2O_7^{2-}$, is
   a) –2
   b) 0
   c) +2
   d) +4
   e) +6

8. What is the balanced oxidation half-reaction for the following reaction?
$Cu^{2+}(aq) + Fe(s) \rightarrow Cu(s) + Fe^{2+}(aq)$

   a) $Cu^{2+}(aq) + 2e^- \rightarrow Cu(s)$
   b) $Fe^{2+}(aq) + 2e^- \rightarrow Fe(s)$
   c) $Fe(s) \rightarrow Fe^{2+}(aq) + 2e^-$
   d) $Cu(s) + 2e^- \rightarrow Cu(s)$
   e) $Cu(s) \rightarrow Cu^{2+}(aq) + 2e^-$

9. What is the molarity of hydrochloric acid in a solution containing 65.4 g of HCl (36.46g/mol) in 265 mL of solution?
   a) 247 *M*
   b) 0.00405 *M*
   c) 0.247 *M*
   d) 6.77 *M*
   e) 4.05 *M*

10. $C_3H_8 + 5O_2 \longrightarrow 3CO_2 + 4H_2O$
How many grams of oxygen are required to burn 4.2 g of C_3H_8 (44 g/mol)?

   a) 3.1 g
   b) 72 g
   c) 36 g
   d) 15 g
   e) 52 g
