**Name** _____   **AP Chemistry**

HW 3: Due 11/19/14 Complete both free response questions. One will be graded. Show all work. Box and clearly label all final answers
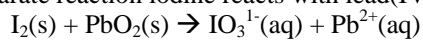
Essay #1

A sample of ore containing the mineral tellurite,TeO_2, was dissolved in acid. The resulting solution was then reacted with a solution of $K_2Cr_2O_7$ to form telluric acid, H_2TeO_4. The unbalanced chemical equation for the reaction is given below.

$$TeO_2(s) + Cr_2O_7^{2-}(aq) + H^+(aq) \rightleftharpoons H_2TeO_4(aq) + Cr^{3+}(aq) + H_2O(l)$$
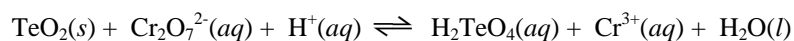
(a) Identify the molecule or ion that is being oxidized in the reaction.

(b) Give the oxidation number of Cr in the $Cr_2O_7^{2-}(aq)$ ion.

(c) Give the oxidation number of Te in the $H_2TeO_4(aq)$ ion.

(d) Balance the chemical equation given above.

In a separate reaction iodine reacts with lead(IV) oxide in an acidic environment.

$$I_2(s) + PbO_2(s) \rightarrow IO_3^{1-}(aq) + Pb^{2+}(aq)$$

(e) Identify the molecule or ion that is the oxidizing agent the reaction.

(f) Balance the chemical equation given above.

Essay #2:
A rigid 6.20 L flask contains a mixture of 3.50 moles of H_2, 1.500 mole of O_2, and sufficient Ar so that the partial pressure of Ar in the flask is 2.00 atm. The temperature is 127°C.
(a) Calculate the total pressure in the flask.
(b) Calculate the mole fraction of H_2 in the flask.
(c) Calculate the density (in g L^{-1}) of the mixture in the flask.
The mixture in the flask is ignited by a spark, and the reaction represented below occurs until one of the reactants is entirely consumed.

$$2 H_2(g) + O_2(g) \rightarrow 2H_2O(g)$$
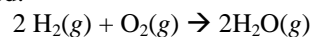
(d) Give the mole fraction of all species present in the flask at the end of the reaction.