Pretest 3.4 for Test 3.4 on June 1, 2

1. Use standard reduction potentials to figure out whether it is safe to pass Ag^+ solution through a copper pipe.

2. Use logic to figure this out:

MnO_4^- reacts with Cl^- to produce chlorine gas and Mn^{+2}.
Cl^- does not react with Br_2

Will MnO_4^- react with Br^-? Show why

3. a) Theoretically why doesn't the curve in a V versus P graph ever cross the x axis?
   b) In reality, what will eventually happen to a gas if you keep increasing its pressure?

4. Draw a molecular representation of $V_1/n_1 = V_2/n_2$.

5.

6. $(NH_4)_2Cr_2O_{7(s)} \rightarrow Cr_2O_{3(s)} + N_{2(g)} + 4\ H_2O_{(g)}$

a) Draw a reaction profile for the above demonstrated reaction. (a match-lit magnesium strip provides the activation energy)
b) How does it react if there's only one mole of one reactant?
c) Why does the lid get stuck to the container hosting the reaction?

<u>Flashbacks Common to both Classes:</u>

6. Given:

1) $CO_{(g)} + H_{2(g)} \rightarrow C_{(graphite)} + H_2O_{(l)}$ $\Delta H = -172$ kJ

2) $C_{(graphite)} + 2H_{2(g)} \rightarrow CH_{4(g)}$ $\Delta H = -74.8$ kJ

3) $H_2O_{(g)} \rightarrow H_2O_{(l)}$ $\Delta H = -40.7$ kJ

Find $CH_{4(g)} + H_2O_{(g)} \rightarrow CO_{(g)} + 3H_{2(g)}$ $\Delta H° = ??$

7. Conditions are making a forest fire even worse: (1) A wind is blowing. (2) it has not rained in the last three weeks. (3) The forest contains Jeffrey Pines, which release heptane, flammable compounds.
Relate each of the three factors to the fire triangle.

8. What normally happens to ideal gas behaviour at very low temperatures and why?

9. During hibernation of a certain animal, the rate of oxygen consumption decreases to 0.5 g/day. Find the average rate of consumption of glucose in moles/h.
$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{energy}$

GreenClass Only Flashback Questions(Reds, see #12-13 for yours)

10. Balance the following redox reaction:

$MnO_4^- + I^- \text{ --> } I_2 + Mn^{2+}$

11. Show how HCO_3^- can act as both an acid and a base. Use water.

Red Class Only Flashback Questions

12. Kidney beans contain the lethal phytohaemaglutin which breaks down and becomes harmless after cooking. Draw a reaction profile for the conversion of phytohaemaglutin into harmless products.

13.

Average Bond Energies (kJ/mol)							
Single Bonds						*Multiple Bonds*	
H—H	432	N—H	391	I—I	149	C = C	614
H—F	565	N—N	160	I—Cl	208	C ≡ C	839
H—Cl	427	N—F	272	I—Br	175	O = O	495
H—Br	363	N—Cl	200			C = O*	745
H—I	295	N—Br	243	S—H	347	C ≡ O	1072
		N—O	201	S—F	327	N = O	607
C—H	413	O—H	467	S—Cl	253	N = N	418
C—C	347	O—O	146	S—Br	218	N ≡ N	941
C—N	305	O—F	190	S—S	266	C ≡ N	891
C—O	358	O—Cl	203			C = N	615
C—F	485	O—I	234	Si—Si	340		
C—Cl	339			Si—H	393		
C—Br	276	F—F	154	Si—C	360		
C—I	240	F—Cl	253	Si—O	452		
C—S	259	F—Br	237				
		Cl—Cl	239				
		Cl—Br	218				
		Br—Br	193				

Estimate the enthalpy of $2\ H_2O \rightarrow 2\ H_2 + O_2$

14. For your final theory exam do not forget to do as many examples as possible from the June exam review center at:

http://www.emsb.qc.ca/laurenhill/science/chemacademy3.html

- **If you run into any problems, I will often be in my room or email me at enricouva@gmail.com with your questions.**
- **Enrichment(quantum chem will be taught on June 29th and 30th)**
- **Finally, in the summer stay in touch with current chem topics at uvachemistry.com**