**Quiz 7**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. The decomposition of carbon dioxide into carbon monoxide and

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| --- | --- |
| Temperature (K) | Kc |
| 1500 | 5.5 x 10-9 |
| 2500 | 4 x 10-1 |
| 3000 | 40.3 |

oxygen gases (15 points):

2 CO 2 (g) 2 CO (g) + O2 (g)

1. Make a linear graph using the following data:

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| T(K) | Kc  | 1/T (1/K) | ln(Kc) |
| 1500 | 5.5E-09 | 0.00067  | -19.02 |
| 2500 | 4.0E-01  | 0.00040 | -0.92  |
| 3000 | 40.3 | 0.00033  | 3.696 |

1. Using points off of your graph, not data points, calculate ΔHºrxn and ΔSºrxn.
2. Aluminum metal is oxidized in aqueous base, with water serving as the oxidizing agent. The products of the reaction are tetrahydroxoaluminate(III), [Al(OH)4]-, and hydrogen gas. Write a balanced net ionic equation for this reaction (5 points):

Al (s) + H­2O (l) [Al(OH)4]- (aq) + H2 (g)

Red: **(**Al (s) + 4 OH- (aq) → [Al(OH)4]- (aq) + 3 e-**) × 2**

+ Ox: **(**2 H­2O (l) + 2 e- → H2 (g) + 2 OH- (aq)**) × 3**

2 Al (s) + 8 OH- (aq) + 6 H­2O (l) + 6 e- → 2 [Al(OH)4]- (aq) + 6 e- + 3 H2 (g) + 6 OH- (aq)

2 Al (s) + 2 OH- (aq) + 6 H­2O (l) → 2 [Al(OH)4]- (aq) + 3 H2 (g)