**Dougherty Valley HS AP Chemistry**

**WORKSHEET #7**

**Thermodynamics – Study Questions**

**Name: Date: Period: Seat #:**

[1] Imagine tossing two coins in the air.

|  |
| --- |
| 1. Predict the distribution of various combinations of heads and tails. |
| 1. What is the probability of the result being two heads? |
| 1. What is the most probable result? |

Now imaging tossing three coins in the air.

|  |
| --- |
| 1. What is the probability of a three heads result? |
| 1. Which system has the highest entropy, the two-coin system or the three-coin system? |

[2] Which one of the following pairs of samples has the higher entropy? Explain why.

|  |
| --- |
| 1. Br2(*l*) or Br2(g) |
| 1. C2H6(g) or C3H8(g) |
| 1. MgO(s) or NaCl(s) |
| 1. KOH(s) or KOH(aq) |

[3] Predict the entropy change for the following processes, explain why:

|  |
| --- |
| 1. O2(g)  2O(g) |
| 1. 2O3(g)  3O2(g) |
| 1. CH4(g) + 2O2(g)  CO2(g) + 2H2O(g) |
| 1. NaCl(s)  Na+(aq) + Cl-(aq) |
| 1. C2H5OH(l)  C2H5OH(g) |
| 1. Ag+(aq) + Cl-(aq)  AgCl(s) |

[4] Of the following reaction,

|  |
| --- |
| 1. which are spontaneous at any temperature: |
| 1. which are never spontaneous regardless of the temperature: |
| 1. which are spontaneous only at a high temperature: |
| 1. which are spontaneous only at low temperature: |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **H** | **S** |
| a. | C8H18(l) + O2(g)  8CO2(g) + 9H2O(g) |  | + |
| b. | N2(g) + 2F2(g)  N2F4(g) |  |  |
| c. | Cl2(g)  2Cl(g) | + | + |
| d. | 2O3(g)  3O2(g) |  | + |
| e. | 2C(s) + 2H2(g)  C2H4(g) | + |  |