Name: _____ Date: _____

AP Chemistry 30 – Lab Activity 13: Spontaneity with Respect to Free Energy

$\Delta G = \Delta H - T\Delta S$ (all variables refer to the system)

1. Burning of ethanol. Place a few drops of ethanol on the lab table and ignite. (be sure to remove all flammable materials from the area)

Balanced Equation:

Sign of ΔH:	Explanation:
Sign of ΔS:	Explanation:
Sign of ΔG:	Spontaneity:

2. Burning magnesium. Place a small piece of magnesium in the burner flame. Do not look directly at the metal!

Balanced Equation:

Sign of ΔH:	Explanation:
Sign of ΔS:	Explanation:
Sign of ΔG:	Spontaneity:

3. Sodium metal and water. Add three drops of phenolphthalein to 100 mL of water in a 250 mL beaker. Place a small piece of Na metal into the water.

Balanced Equation:

Sign of ΔH:	Explanation:
Sign of ΔS:	Explanation:
Sign of ΔG:	Spontaneity:

4. Heating $(NH_4)_2CO_3$. Heat a small amount of $(NH_4)_2CO_3$ in a clean, dry test-tube over a Bunsen burner.

Balanced Equation:

Sign of ΔH:	Explanation:
Sign of ΔS:	Explanation:
Sign of ΔG:	Spontaneity:

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5. Crystallization of sodium thiosulfate. Fill a test-tube ¾ full of sodium thiosulfate and heat until melted. Cool to room temperature. When completely cooled add a few crystals of sodium thiosulfate to the test-tube.

Balanced Equation:

Sign of ΔH:	Explanation:
Sign of ΔS:	Explanation:
Sign of ΔG:	Spontaneity:

6. Dissolving NH_4Cl. Dissolve a small amount (1.00 g) of NH4Cl into about 50 mL of water.

Balanced Equation:

Sign of ΔH:	Explanation:
Sign of ΔS:	Explanation:
Sign of ΔG:	Spontaneity: