Semester 2 Final Free Response Questions

Your class will select **three** questions **from the following set** that you must answer. You will also have to answer **two additional questions** that will **not** be **provided to you prior to the test date**. Your answer to each question is worth a maximum of ten points each.

Remember – You MUST restate the question when answering, and write COMPLETE sentences with proper punctuation.

1. The only certain way in which to speed up a chemical process is to increase the temperature. Explain what an increase in temperature does at the ***molecular*** level and how this increases the reaction rate.

2. Examine the data table provided at the right. Which of the reactions ***could*** be used as a source of fuel? Which of those would be the ***best*** source of fuel? Justify your answer.

	Bond Energy kJ	
Reaction	Reactants	Products
1	7,652	5,320
2	4,893	10,279
3	2,968	1,085
4	6,211	7,046
5	9,738	3,764

3. It is a well-established fact that water molecules have strong attractions for one another. Name the type of bonding that occurs between water molecules. Draw a sketch of at least four water molecules, and show these intermolecular forces using dotted lines.

4. Imagine that you are stranded in the wilderness in winter time. The only available water is snow, and you do not have a stove or fire with which to melt it. You decide to eat the snow to quench your thirst. Where is the energy coming from to melt the snow as you eat it? Why might consuming the snow actually DECREASE your long-term chances of survival?

5. You are trying to make a sugar water solution, but even after 5 hours the sugar just won't dissolve. Describe at least two things you could do increase the solubility of the sugar. Would these same techniques work if you were trying increase the solubility of a gas? Why or why not?

6. Determine the molarity of the solutions in the table at the right (*Show your work*). Write a sentence that puts the solutions in order from least concentrated to most concentrated. Does having more solute mean that a solution will be more concentrated? Why or why not?

Solute	Mass of solute (g)	Volume of solution (L)
NaOH	40	100
BeF_2	47	10
CO_2	22	1

7. A sealed container contains one mole of a gas. What will happen to the pressure inside the container if another mole of a different gas is added to the container, but the temperature and volume do not change? Explain your answer in terms of kinetic molecular theory.

8. The boiling point of pure water at sea level is 100°C. The boiling point of water at the top of Mt. Whitney (the mountain, not the high school) is 87°C. At 14,505 feet in elevation, Mt. Whitney is the tallest mountain in the United States outside of Alaska. Explain why water boils at a lower temperature at higher altitude.