

## **The notes for experiments Q and R.**

### **By 5 p.m. on November 5 have completed:**

Report submitted to Crowdmark (**10 marks**). Include report pages (R-15 to R-17), Observation sheets for Experiment Q (Q-11 to Q-14), observations for Experiment R (R-11 to R-12). Attach the plot of  $\ln(K_{eq})$  vs  $1/T$  (see page R-12, question 2). Examine the data to determine the scale for each axis. Choose a scale such that the maximum area of the sheet is covered, e.g. expand the y-axis by using “Min” and “Max” squares for the vertical axis. Graph must include: descriptive title, axis labels (with units, where appropriate, and linear trendline and equation of the line.

Quiz for Experiments Q and R on Blackboard (**10 marks**)

### **To do well on the lab report (focusses on Experiment Q):**

For question 1, write out the net ionic equation (page R-1, equation 1) and calculate  $Q$  for the moment at which the solutions are mixed but reaction has not started yet ( $t = 0$  sec). Hint: at  $t = 0$  sec, how much product is there?

For question 2, use your understanding of equilibria and how adding reactant or product can shift the reaction, effecting  $Q$ .

For question 3, use question 2 on Q-6 and the interactive equilibria on Q-3.

For questions 4, 5, 6, use your observations from experiment Q, Table 1 to determine if the reaction is endothermic or exothermic based on the color of the solution. Hint: Let's assume that our reaction is exothermic and heat is a product. In this case if you put the reaction mixture in hot water, you would be increasing amount of product. In which way the equilibrium would shift and how this would affect the amount of product and intensity of color of the solution?

**To do well on the observations:**

Use the corresponding documents from this folder.

**To do well on the quiz (focusses on Experiment R):**

1. Study “Practice questions for exp. R”. Be comfortable with manipulating

$$\ln(K_{\text{eq}}) = -\frac{\Delta H^\circ}{R} \left( \frac{1}{T} \right) + \frac{\Delta S^\circ}{R}$$

Convert  $\Delta H^\circ$  from kJ/mol to **J/mol**!

2. Know how to find  $\Delta H$  and  $\Delta S$  from  $y = mx + b$ .
3. Know how  $K_{\text{eq}}$  changes with temperature for endothermic and exothermic reactions.