

The test will mainly focus on material in Chapters 11 and 13. (Skip chapt 12). The midterm exam will include multiple choice questions. Students need to bring scantrons. **BE PREPARED TO DO CALCULATIONS WITHOUT A CALCULATOR.** No “cheat sheets” are allowed. Violations may result in an immediate “F” for the class. A logarithm table may be supplied as needed. Whenever we can, numbers will most likely be rounded off to make calculations easier. (for example, $R = 10 \text{ kJ/mol-K}$ instead of 8.314 J/mol-K .)

Study your lecture notes, group quizzes and homework assignments. The test will be patterned like the last one. Test yourselves by doing problems similar to the homework under time constraints. The following topics are mentioned to help focus your review. A review session will be announced.

Chapter 11 Liquids, solids and materials

- 1) Be able to do calculations involving the Clausius-Clapeyron equation: predict the vapor pressure at a temperature given what it was at another temperature. (you would be given the H_v in kJ). Know how to interpret P vs T graphs of vapor pressure.
- 2) Know how to calculate relative humidity.
- 3) Know how to draw (and use) the heating curve, and the phase diagram. (make sure you know the difference). Describe all the areas, points and lines in the Phase Diagram. Distinguish between water and the substances and what the implications of this for the bioecology.
- 4) Know all the various unique properties of water.
- 5) Be able to do problems involving crystals: determining density, atomic radius or %occupancy or SC, BCC, FCC cubic unit cells.
- 6) Describe the electron energy levels in metals, semiconductors and insulators and how they result in the observed properties of these metals. What are n-type semiconductors? Read up on ceramics, glasses and optical fibers.

Chapter 13 Chemical Kinetics

- 1) Know how to calculate reaction rate. Determine the reaction rate for the following reaction: $2A + 3B \rightarrow 5C + 1/2 D$. Given: D appears at a rate of $.1 \text{ M/s}$. Determine also the rates of disappearance of A and B.
- 2) Determine the rate law from the initial rates given in a table. Try problem solving practice 13.3(page618).
- 3) know how to determine the order of a reaction (if the type: $A \rightarrow B$) . Use a graphical result to determine k. Or, use half life to determine k.
- 4) Reaction mechanism and the rate law it predicts. Practice. Know about “molecularity” of a reaction.

5) Use Arrhenius equation to determine activation energy given the k for 2 temperatures. Do it from a graph of $\ln k$ vs $(1/T)$.

6) Describe the effect of catalysts on the energy of activation. Calculate the the E_a resulting from the presence of a catalyst by analyzing the reaction rate with and without the catalyst.