CHEM 102   Dr. Williamson   EXAM II   SPRING 2017

You should be successful on Exam II, if you can do the following in addition to
the skills from CHEM 101 and Exam I:

KINETICS - Unit 14, Sections 1-6

1. Give the rate of reaction in terms of reactant and product concentration variations
2. Calculate aver. rate, given $[\ ]_i$, $[\ ]_f$, t_f, and t_i
3. Calculate instantaneous rate from a graph of $[\ ]$ vs. time
4. Explain the factors that affect rxn rates.
5. Explain the meaning of "rate constant" & state the units
6. Determine the rate law and overall order from experimental results (vv)
7. Calculate rate, rate constant, or reactant conc. given rate law + 2 of these
8. Calculate $[A]$, $[A]_o$, k, or t given 3 of 4
9. Explain & calculate relationship between $t_{1/2}$ & k for zero, 1st, and 2nd order rxn
10. Use graphing to determine zero, 1st, or 2nd order
11. Find Ea, ΔE from energy profile & define each
12. Use collision theory to explain temperature & concentration dependence
13. Describe the effects of a catalyst on energy requirements
14. Use the Arrhenius equation to relate activation energy to changing temp. & rate constants
15. ID elementary step, overall rxn, and rate determining step
16. Derive Rate law given elementary steps & their speeds or overall rxn
17. ID a catalyst and an intermediate in a mechanism

EQUILIBRIUM –Unit 15, Sections 1-4

1. Describe chemical equilibrium
2. Describe & Write the equilibrium constant expression for a balanced equation.
3. Calculate K using equilibrium concentrations or pressures (vv)
4. Convert between Kp and Kc
5. Find the equilibrium constant for 1 equation by comparing it to another equation
6. Calculate K given inital concentration and 1 equilibrium concentration
7. Determine if an equilibrium has been reached, conditions at equilibrium, or the direction of the equation.
8. Calculate Q and compare it to a given K to determine the direction of the equil.
9. Use K and initial concentrations to find the equilibrium concentrations
10. Explain and Calculate how changes in conc, temp, & pressure effect equilibrium
11. Calculate K from ΔG **Unit 19.3c and 19.3d**

ACIDS & BASES –Unit 16, Sections 1-3

1. ID general properties of acidic and basic solution and calculate electrolyte ion concentration
2. Describe Arrhenius, Bronsted, and Lewis theories
3. ID and describe weak, strong, and nonelectrolytes
4. ID Bronsted acids, bases, and conjugate acid-base pairs and their strengths
5. Predict the strength of binary and ternary acids