**CHEM 102 Recitation Ch 14 Name**

**Q1.** Consider the following reaction: **4PH3(g) 🡪 P4(g) + 6H2(g)**

If **H2** is formed at the rate of 0.168 M/s, at what rate is **P4**will be produced? (0.028 M/s)

**Q2.** The rate constant for t he reaction **2A 🡪 B** is **7.5 x 10−3 s−1** at 110°C. How long (in seconds) will it take for [A] to decrease from 1.25 *M* to 0.71 *M*? (75 sec)

**Q3.** For the reaction: **cyclopropane 🡪 propene**

the rate constant is 1.10×10-4 s-1 at 470 °C and 5.70×10-4 s-1 at 500 °C. Determine the activation energy for this reaction. (R = 0.08261 L.atm/mol.K; R = 8.314 J/mol.K). (262 kJ/mol)

**Q4.** The rate law for the reaction **H2O2 + 2H+ + 2I- 🡪 I2 + 2H2O** is rate = k[H2O2][I-].

The following mechanism has been suggested.

(I) H2O2 + I- → HOI + OH-

(II) OH- + H+ → H2O

(III) HOI + H+ + I- → I2 + H2O

The rate-determining step is most likely:

**a)** (I) **b)** (II) **c)** (III) **d)** both (I) and (III)

**Q5.** If the reaction **2HI 🡪 H2 + I2** is second order, which of the following will yield a linear plot?

**a)** ln[H2] vs. time **b)** 1/[HI] vs. time **c)** [HI] vs. time

**d)** ln[HI] vs. time **e)** 1/[HI] vs. 1/T

**Q6.** The decomposition of ethanol (**C2H5OH**) on an alumina (Al2O3) surface

**C2H5OH(g) 🡪 C2H4(g) + H2O(g)**

was studied at 600 K. Concentration versus time data were collected for this reaction, and a plot of **[C2H5OH]** versus time resulted in a straight line with a slope of -4.00 x 10-5 mol/L**.** s.

1. Determine the rate law, the integrated rate law, and the value of the rate constant
2. If the initial concentration of **C2H5OH** was 1.25 x 10-2 *M*, calculate the half-life
3. How much time is required for all the 1.25 x 10-2 *M* **C2H5OH** to decompose?