CH 117 General Chemistry II

SI Mock Exam I

**Part 1: Multiple Choice**

1. Which of the following would NOT increase the **rate** of reaction for the following reaction. 

 a. Decreasing the pressure

 b. Increasing the temperature

 c. Placing a catalyst in the reaction

 d. Increasing the concentration of N2(g)

 e. All answer choices would increase the rate

2. Calculate the Average Rate of **Reaction** for the following reaction

Zn + 2 HCl → ZnCl2 + H2 from 0 to 2 seconds if the concentration of [HCL] was initially .386 M and .145 M at t=2.

 a. 1.93 M/s

b. 1.93 moles/s

c. .241 M/s

d. .1205 M/s

e. .1205 moles/s

3. The half-life for decomposition of radium-223 is 11.4 days. How long would it take for a sample of radium-223 to decompose to 9% of the original amount?

 a. 40 days

 b. 112 days

 c. 35 seconds

 d. 40 seconds

 e. 112 seconds

4. The following reaction occurs in a single step reaction. Which rate law expression best represents the reaction? 

 a. Rate= k [OH-]

 b. Rate= k [(CH3)3CBr]

 c. Rate= k [(CH3)3CBr]2

 d. Rate= k [(CH3)3CBr] [OH-]

 e. Rate= k [(CH3)3CBr]2[OH-]

5. 2. A reaction is 10 times faster at 50 C than at 25 C. Find the Ea of the reaction?

 a. 64 kj

 b. 47.6 kj

 c. 73.6 kj

 d. 32 kj

 e. 104.4 kj

6. What is Kp for Ni (s) + 4 CO (g) 🡨🡪 Ni (CO)4 (g) at 600K, if Kc= 5.02 \* 108.

a. 42

 b. 156

 c. 9.8\*106

 d. 5.02\*106

e. 4.38\*10-9

7. 1. Which of the following would **increase** the amount of Ni(CO)4 if the system is at equilibrium. Ni (s) + 4 CO (g), 🡨🡪 Ni(CO)4

 a. decrease the volume of the container

 b. removing some Ni (s) (but not all)

 c. adding Ni (s)

 d. removing CO gas

 e. adding helium

8. For the reaction 2 AgCl (s) 🡨🡪 2 Ag+ (aq) + 2 Cl- (aq), Kc = 3.1\*1019. What is Kc if the reaction is written 2 Ag+ (aq) + 2 Cl- (aq) 🡨🡪 2 AgCl (s)

 a. 3.1 \* 1019

 b. 5.6\*109

 c. 7.5\*10-8

d. 9.6\*1038

 e. 1.8 \* 10-10

9. The Rate constant of a reaction is measured to be .456 M-2yr-1. What is the overall order of the reaction?

 a. zero

 b. first

 c. second

 d. third

 e. fourth

10. For the equilibrium reaction 2A + B2 🡨🡪 2C, ∆H is -55kj/mol at 25 C. which way would the reaction shift at equilibrium if temperature was increased to 75 C in the reaction.

a. Left

b. Right

c. Reaction would not shift

d. The Keq at 75 C is necessary to determine the shift direction e.

e. The Keq at 25 C is necessary to determine the shift direction

11. For a second order reaction, k is 2\*10-2 M-1s-1. What percentage of the reactant is left after 10 seconds?

 a. .21 %

 b. 4.76 %

 c. 5.26%

 d. 33.33%

 e. 45.6%

**Part 2: Short Answer**

12. The equilibrium constant for NO + NO3 🡨🡪 2NO2 is 2.5 \* 103. If you start with .5 M of NO, .5 M of NO3, and .5 M of NO2, explain which direction would the reaction be expected to shift? (Indicate proper units)

 b. Write the equilibrium expression.

 c. Fine the equilibrium concentration of all NO, NO3,­­ and NO2.

13. Consider the reaction

NO(g) + O2(g) 🡨🡪 NO3(g) (fast)

(2) NO3(g) + NO(g) → 2 NO2(g) (slow)

a. Write the overall reaction equation.

b. If there is a catalyst, what is it?

c. What are the intermediates?

d. Write the rate law equation of the reaction.