Unit 10 Review – Accelerated Chemistry Name _____Pd:_____

1. What is a reaction rate and what units are used with reaction rates?

2. What is the collision theory?

3. List the factors that affect the rate of a reaction. Explain how each factor affects the rate.

A

B

C

D

E

4. Draw a reaction diagram for an exothermic reaction and label the following: reactants, products, activation energy, activated complex.

5. For the reaction $3\ ClO^-(aq) \rightarrow ClO_3^-(aq) + 2\ Cl^-(aq)$ doubling the concentration of ClO^- quadruples the initial rate of formation of ClO_3^-. What is the rate expression for the reaction?

6. The reaction $C_6H_5N_2Cl\ (aq) + H_2O\ (l) \rightarrow C_6H_5OH\ (aq) + N_2\ (g) + HCl\ (aq)$ is first order in $[C_6H_5N_2Cl]$ and zero order in $[H_2O]$. What is the rate expression?

7. For the reaction A + B → AB , the following data was obtained:
   a. Write the rate expression for the reaction.

Trial	Initial [A]	Initial [B]	Initial Rate mol/L*min
1	0.480 M	0.190 M	0.350
2	0.480 M	0.380 M	0.350
3	0.240 M	0.190 M	0.087

8. What 2 factors will drive a reaction to completion?

a) _____

b) _____

9. Describe a reversible reaction. Give an example.

10. Describe dynamic equilibrium. Give an example.

11. At equilibrium how do the forward and reverse reaction rates compare? The forward rate _____ the reverse rate.

12. State Le Chatelier's Principle.

13. What are the 3 possible stresses we can apply to a system at equilibrium?

a) _____ b) _____ c) _____

14. Use the reaction ($2SO_{2(g)} + O_{2(g)} \leftrightarrow 2SO_{3(g)}$ + heat) to determine what will happen (shift left/right, no change) if the following stresses are applied:

a. SO_2 is added _____ b. Volume is increased _____ c. Heat is added _____

15. What is the general formula for the equilibrium constant, K_{eq}?

16. What does the value of K_{eq} tell a chemist about a reaction if....
If the value of K_{eq} is greater than 1 .....

If the value of K_{eq} is less than 1 ....

17. Write the equilibrium constants for these reversible reactions – ALL CHEMICALS ARE GASES:

a. $2A + B \leftrightarrow C + 3D$ b. $NO + O_2 \leftrightarrow NO_3$ c. $CO_2 + H_2 \leftrightarrow CO + H_2O$

18. Calculate K_{eq} for reaction **17a** if the equilibrium concentrations are: [A]=0.100M, [B]=0.230M, [C]=1.17M, & [D]=2.19M.

19. The equilibrium constant in **17b** is .025. If [NO] = .36 M and $[O_2]$ = .21 M, what is the equilibrium concentration of NO_3?

20. If K_{eq} in **17c** is 6.37×10^{-3}, $[CO_2]$ = 0.037M, $[H_2]$ = 0.28M, and [CO] = 0.084M, calculate $[H_2O]$.

21. Describe K_{sp}.

22. What is the generic formula for K_{sp}? _____

23. Write the expression for K_{sp} for the following sparingly soluble salts:

$PbBr_2$ _____ $Ca_3(PO_4)_2$ _____

24. Calculate the Ksp of $CaSO_4$ if a saturated solution has a concentration of 1.58×10^{-4}.

25. The solubility product constant of BaCO3 is 2.6×10^{-9}. Calculate the solubility (in mol/L) of $BaCO_3$.

25. The solubility product constant of Ag2CrO4 is 1.1×10^{-12}. Calculate the [Ag+] in a solution of Ag_2CrO_4 at equilibrium.