Chemistry 122 Exam Review (II)

1. Identify the conjugate acid-base pairs in each equation.
2. NH4+(aq) + OH-(aq) → NH3(aq) + H2O(l)
3. HBr(aq) + H2O(l) → H3O+(aq) + Br-(aq)
4. The products of an acid-base reaction are H3O+ and SO42-. Write a balanced equation for the reaction and identify the conjugate acid-base pairs.
5. Write the Lewis structure for phosphorous trichloride (PCl3). Is PCl3 a Lewis acid, a Lewis base, or neither?
6. Write ionization equations and constant expressions for each acid.
7. HClO2
8. HNO2
9. Given the expression Ka = [AsO43-][H3O+]/[HCN], write the balanced equation for the corresponding reaction.
10. Write an equation for a base equilibrium in which the base in the forward reaction is PO43- and the base in the reverse reaction is OH-.
11. The concentration of either the [H+] ion or the [OH-] ion is given for four aqueous solutions at 298K. For each solution, calculate [H+] or [OH-]. State whether the solution is acidic, basic or neutral.
12. [H+} = 1.0 x 10-12 mol/L
13. [OH-] = 1.0 x 10-7 mol/L
14. [OH-] = 3.5 x 10-3 mol/L
15. [H+] = 4.0 x 10-5 mol/L
16. Calculate the pH of solutions having the following ion concentrations at 298K.
17. [H=] = 5.5 x 10-2mol/L
18. [H=] = 3.0 x 10-6 mol/L
19. [OH-] = 8.2 x 10-6 mol?l
20. Calculate [H-] and [OH-] in each of the following solutions.
21. Milk, pH = 6.50
22. Lemon juice pH = 2.37
23. Milk of magnesia pH = 10.50
24. Household ammonia pH = 11.90
25. Calculate the Ka for the following acids using the given information.
26. 0.220M solution of H3AsO4 = pH = 1.50
27. 0.0400M solution of HClO2, pH = 1.80
28. What is the molarity of a nitric acid solution if 43.33mL of 0.1000M KOH solution is needed to neutralize 20.00mL of the acid solution?
29. Draw the structures of the following branched chain alkanes.
30. 2,3-dimethyl-5-propyldecane
31. 3,4,5-triethyloctane
32. 1-ethyl-3-propylcyclopentane
33. 1,2,2,4-tetramethylcyclohexane
34. 2-3-dimethyl-2-butene
35. Draw the structures of cis-3-hexene and trans-3-hexene.
36. Draw the structure of 1,4-dimethylbenzene.