Name:

K_a or K_b values can be found in your textbook. Report all numerical answers to correct digits/ sig figs

1.	What are the conjugate acids for each of the bases?				
	a) CN ⁻	b) OH ⁻			
	c) (CH ₃) ₂ NH	d) HPO4 ²⁻			
2.	What are the conjugate bases of the following acids?				
	a) HIO ₂	b) NH4 ⁺			
	c) H₃O⁺	d) CH ₃ CH ₂ COOH			

3. Fill in the missing items in the following Table:

	Acid	Base	¥	Conjugate Acid	Conjugate Base
(A)	CH₃COOH	H ₂ O	¥		
(B)	NH3	H ₂ O	¥		
(C)			,	HF	ОН⁻
(D)	H ₂ O		\rightarrow		I_
(E)	C₅H₅NH⁺	H ₂ O	¥		

4. Fill in the missing information in the following table

	[H ⁺]	[OH ⁻]	рН	рОН	Acid, Base or Neutral
(A)	1.0x10 ⁻³ M				
(B)		4.5x10 ^{−8} M			
(C)			9.45		
(D)				1.33	

- 5. Calculate the pH of the following aqueous solutions.
- a) 0.0035 M calcium hydroxide

b) 4.5 grams of HCl(g) bubbled into water to make 100. mL of solution.

c) 1.00 M HClO₄(aq)

6. From the equilibrium concentrations given, calculate K_a for the weak acid: CH₃CO₂H

 $[H_3O+] = [CH_3CO_2^-] = 1.34 \times 10^{-3} M;$

 $[CH_3CO_2H] = 9.866 \times 10^{-2} M$

7. What is the pH and percent ionization of a 0.55 M solution of Nitrous acid?

8. Calculate the pH of pure water at 50.0 °C. (look up the K_w at this Temperature!)

10. What is the pH and percent ionization of a .15 M solution of $C_6H_5NH_2$ (aq)?

11. The pH of a 0.20 *M* solution of HF is 1.92. Determine K_a for HF from this information.

12. Phenyl acetic acid ($HC_8H_7O_2$ - a weak acid) is one of the substances that accumulates in the blood of people with phenylketonuria, a condition that can cause mental retardation and even death. A 0.085 M solution of $HC_8H_7O_2$ has a pH of 2.86. Calculate the K_a and pK_a of $HC_8H_7O_2$.

13. Pick the stronger acid from each of the following pairs

a) CH₃CH₂OH	or	CH₃COOH
b) HClO	or	HBrO
c) H₃PO₄	or	$H_2PO_4^{2-}$
d) H ₂ SO ₃	or	H_2SO_4
e) NH4+	or	NH_3
f) SO4 ²⁻	or	HSO4 ⁻
g) H ₂ S	or	H₂O

14. Determine K_a for hydrogen sulfate ion, HSO₄⁻, if in a 0.10 *M* solution, the acid is 29% ionized.

 15. Write the hydrolysis reactions that will occur when then each of the following salts is added to water: NaBr, Na₂CO₃, NH₄NO₃, NaF, and C₅H₅NHCI. (Don't forget to remove the spectator ions.)
Predict whether each solution will be acidic, basic, or neutral in each case.

(A)

(B)

(C)

(D)

(E)

16. Calculate the ionization constant for each of the following acids or bases from the ionization constant of its conjugate base or conjugate acid:

(a) HTe⁻ (as a base)

(b) (CH₃)₃NH⁺

(c) HAsO₄²⁻ (as a base)

(d) $C_6H_5NH_3^+$

(e) HSO₃[−](as a base)

17. Rank from most acidic to most basic:(you will need the Ka and Kb values)KCNNaOHHCNNH3HNO3NH4NO3

Most acidic

Most basic

18. Calculate the pH of a 0.10 M solution of NaClO.

19. Determine whether aqueous solutions of the following salts are acidic, basic, or neutral and calculate the pH.

(a) .15 M FeCl $_3$

(b) .750 M K₂CO₃

(c) .100 M NH₄Br

(d) 1.0 M KClO₄