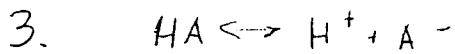


Worksheet III

1. $[H_3O^+] = K_a \frac{[acid]}{[salt]}$ adding water decreases both acid and salt concentration
 buffer solution \uparrow weak acid
 so pH does not change appreciably.

2. $[H_3O^+] = 1.8 \times 10^{-5} \frac{[acid]}{[salt]}$ if $[acid] = [salt]$ then $[H_3O^+] = 1.8 \times 10^{-5}$
 pH = 4.74



I 0.100 M

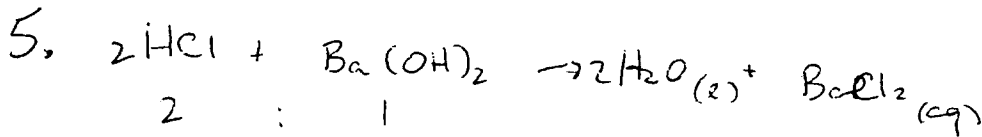
C -20% +20% +20%

E 0.080 M 0.020 0.020

$$K_a = \frac{[H^+][A^-]}{[HA]} = \frac{(0.020)^2}{0.080} = 5.0 \times 10^{-3}$$

4. methyl orange and. thymolphthalein

	3.0	6.0	12.0
	red	yellow	yellow
	colorless	colorless	blue } green.



100.0 mL \times 0.20 M HCl \rightarrow 20.0 mmol H^+

300.0 mL \times 0.050 M $Ba(OH)_2 \times 2 \rightarrow$ 30.0 mmol OH^-

10.0 mmol OH^- in excess $[OH^-] = \frac{10.0 \text{ mmol}}{100 + 300} = 0.025 \text{ M}$

pOH = 1.60

pH = 12.40

6. "Normal" rain water contains dissolved CO_2 .

$\text{CO}_2 + \text{H}_2\text{O} \leftrightarrow \text{H}_2\text{CO}_3$ (which is acidic) $\leftrightarrow \text{H}^+ + \text{HCO}_3^-$
dissolved CO_2 in the air forms an acidic H_2CO_3 sol'n with rain water.

7. HCl and NH_3 (strong acid / weak base)

8. CH_3COOH and NaOH (weak acid / strong base)

9. NH_3

10. $\text{NaOH} + \text{HCl}$.

$$\text{mol H}^+ = 25.0 \text{ mL} \times 1.0 \text{ M} = 25.0 \text{ mmol} = \text{mol OH}^- = \text{mol NaOH}$$

$$\text{grams NaOH} = 2.50 \times 10^{-2} \text{ mol} \times 40 \text{ g/mol} = 1.0 \text{ g}$$

$$\% \text{ composition} = \frac{1.0 \text{ g}}{10.0 \text{ g}} \times 100 = 10.0\%$$