

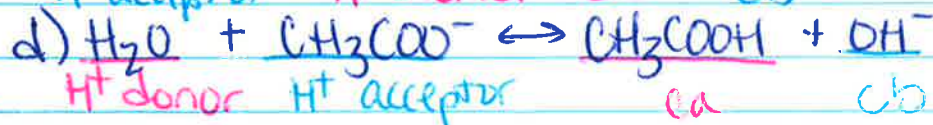
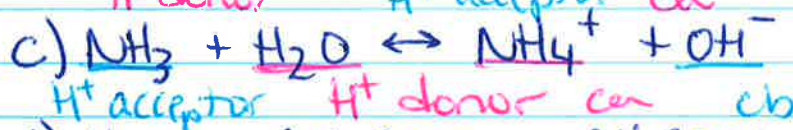
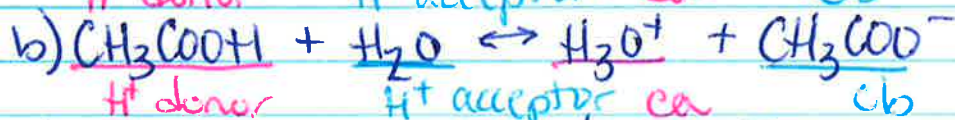
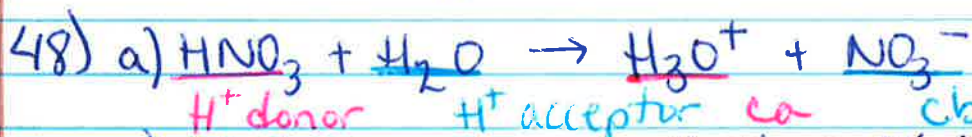
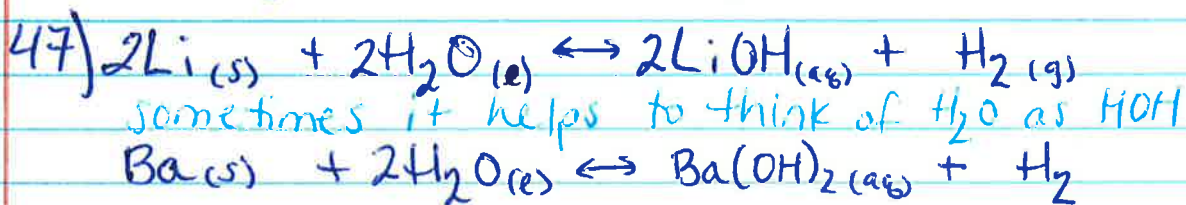
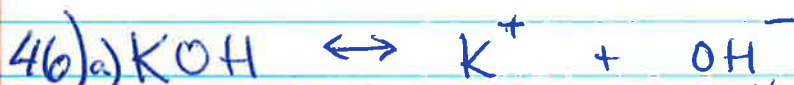
Acid/Base Review

Infer

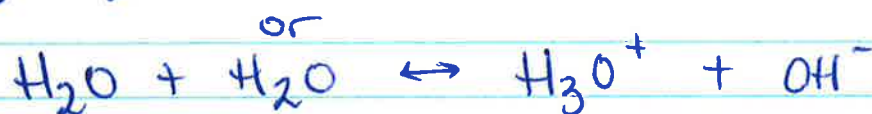
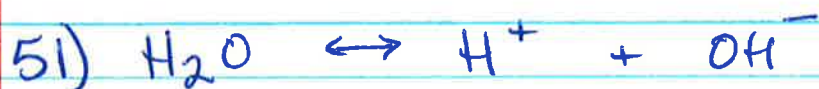
Pg 625-626 #44-49, 51-58, 60, 62-71, 74-76, 78-82

44) Acids ionize to give hydrogen (or hydronium) ions in solution. Bases ionize to give hydroxide ions in solution.

45) a) Ca(OH)_2	arrhenius	base
b) HNO_3	arrhenius	acid
c) KOH	arrhenius	base
d) $\text{C}_2\text{H}_5\text{COOH}$	arrhenius	acid
e) HBr	arrhenius	acid
f) H_2SO_4	arrhenius	acid



49) label conjugate acid & conjugate base
ca cb



52) pure H_2O = neutral = pH of 7

$[H^+] = 1.0 \times 10^{-7}$

$[OH^-] = 1.0 \times 10^{-7}$

53) $pH = -\log [H^+]$

54) $pH = -\log [1.0 \times 10^{-7}]$
 $pH = 7$

55) a) $[H^+] = 1 \times 10^{-2} M$ $pH = -\log [1 \times 10^{-2}]$

$pH = 2$

~~basic~~ acidic

b) $[OH^-] = 1 \times 10^{-2} M$ $pOH = -\log [1 \times 10^{-2}]$

$pOH = 2$

$14 - 2 = 12$

$pH = 12$ basic

c) $[OH^-] = 1 \times 10^{-8} M$

$pOH = -\log [1 \times 10^{-8}]$

$pOH = 8$

$14 - 8 = 6$

$pH = 6$ acidic

56) a) $pH = 4.00$ $[H^+] = 1 \times 10^{-4}$ $[OH^-] = 1 \times 10^{-10}$

b) $pH = 8.00$ $[H^+] = 1 \times 10^{-8}$ $[OH^-] = 1 \times 10^{-6}$

c) $pH = 12.00$ $[H^+] = 1 \times 10^{-12}$ $[OH^-] = 1 \times 10^{-2}$

57) a) $[H^+] = 2.4 \times 10^{-6} M$ $pH = -\log [2.4 \times 10^{-6}]$

$pH = 5.62$

b) $pH = 13.20$ $[H^+] = \text{antilog} (-pH)$

$[H^+] = \text{antilog} (-13.20)$

$[H^+] = 6.3 \times 10^{-14}$

strong or weak look @ K_a values
 58) on a chart. low #s are weak

- a) NaOH strong base
- b) HCl strong acid
- c) NH_3 weak base
- d) H_2SO_4 strong acid

60) "Strong" relates to their dissociation constants, K_b , which are very high. Their concentration in saturated solution is low because of their low solubility.

62) Acid + base $\rightarrow$ a salt + water

- 63) a) $\text{HNO}_3 + \text{KOH} \rightarrow \text{H}_2\text{O} + \text{KNO}_3$
- b) $2\text{HCl} + \text{Ca}(\text{OH})_2 \rightarrow 2\text{H}_2\text{O} + \text{CaCl}_2$
- c) $\text{H}_2\text{SO}_4 + \text{NaOH} \rightarrow \text{H}_2\text{O} + \text{NaHSO}_4$
 then $\text{NaHSO}_4 + \text{H}_2\text{O} \rightarrow \text{SO}_4^{2-} + \text{H}_3\text{O}^+ + \text{Na}^+$

64) The indicator changes color

65) NaOH molarity? 20.00 mL NaOH

a) 28.0 mL of 1.00 M HCl

$$.028 \text{ L HCl} \times \frac{1 \text{ mol HCl}}{1 \text{ L}} \times \frac{1 \text{ mol NaOH}}{1 \text{ mol HCl}} = .028 \text{ mol HCl}$$

$$= 1.4 \text{ M NaOH}$$

b) 17.4 mL of 1.00 M H_3PO_4

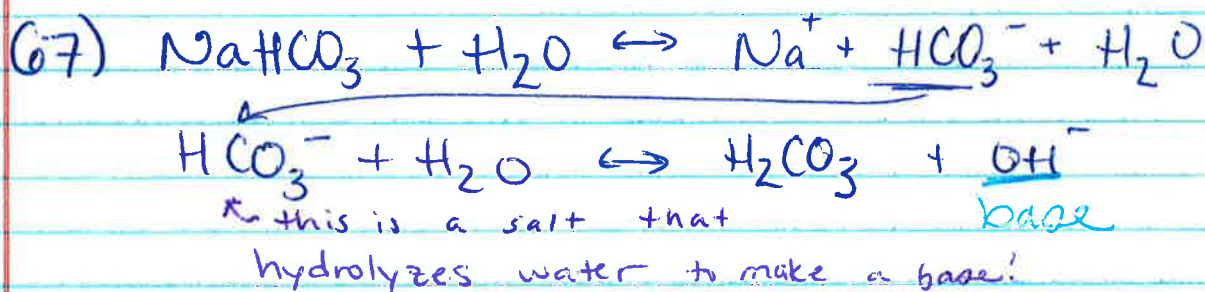
$$.0174 \text{ L} \times \frac{1 \text{ mol H}_3\text{PO}_4}{1 \text{ L}} \times \frac{3 \text{ mol NaOH}}{1 \text{ mol H}_3\text{PO}_4} = .0522 \text{ mol}$$

$$= 2.61 \text{ M NaOH}$$



triprotic acid! All 3 H^+ will be donated!

(66) "hydrolyze water" this means that the salt created from an acid base reaction will also react with water. Salts with a cation from a weak base and an anion from a strong acid, or with a cation from a strong base and an anion from a weak acid

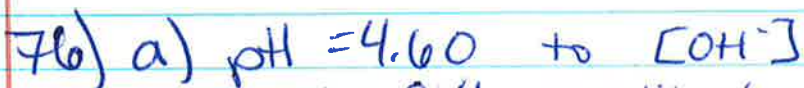
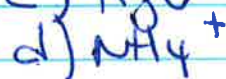
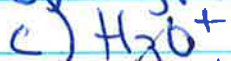
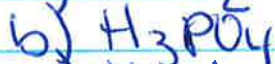
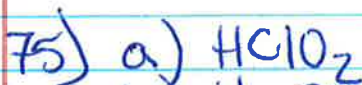
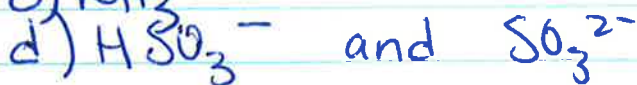


(68) Weak acid anions accept protons from H_2O , increasing the pH of the solution (more basic). Weak base cations donate protons to water, decreasing the pH (more acidic).

(69) Don't worry about this one!

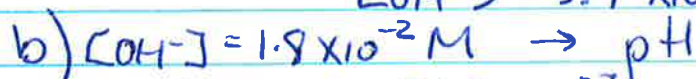
(70) Eventually the buffer capacity of the buffer is exceeded and the pH will change significantly with the addition of a strong acid or base.

(71) Yes! acids like acetic acid (vinegar) dissolve well but ionize poorly.



$$\text{pOH} = 9.4 \quad \text{antilog}(-\text{pH}) = [\text{OH}^-]$$

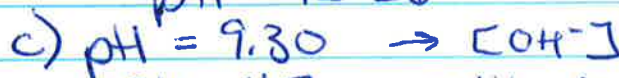
$$[\text{OH}^-] = 3.9 \times 10^{-10} \sim 4 \times 10^{-10} \text{ M}$$



$$\text{pOH} = -\log[1.9 \times 10^{-2}]$$

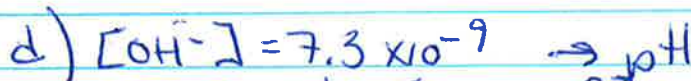
$$\text{pOH} = 1.74$$

$$\text{pH} = 12.26$$



$$\text{pOH} = 4.7 \quad \text{antilog}(-4.7) = 1.99 \times 10^{-5}$$

$$\sim 2 \times 10^{-5} \text{ M}$$



$$\text{pOH} = -\log[7.3 \times 10^{-9}]$$

$$\text{pOH} = 8.13$$

$$\text{pH} = \cancel{14.00} 5.86$$



BLB

BLA

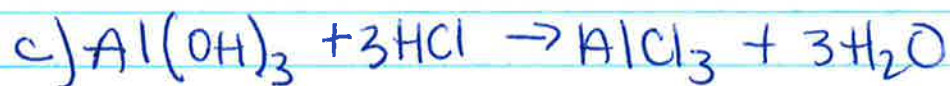


BLA

BLB



- 79) a) HSO_4^-
b) CN^-
c) OH^-
d) NH_3



- 82) a) shift to the left
b) shift to the right