81. (b) $10^{-7} NHCl$ means $(H^{+}) = 10^{-7} M$

$pH = -\log(H^{+}), pH = 7$

82. (c) $pH = 2$; $pH = -\log \rightleftarrows [H^{+}]$; $\mathbf{2 = -\log \quad [H^{+}]}$

$\mathbf{[H^{+}] = 10^{-2} = 0.01N}$

83. (b) pH does not change on addition of some concentration of HCl.

84. (b) Solution of CH_3COONa on addition to acid shows a decrease in dissociation of acid due to common ion effect. To decrease in $[H^{+}]$ or increase pH.

85. (c) $pH + pOH = 14$; $pH = 14 - pOH$; $pH = \mathbf{14 - 6 = 8}$.

86. (b) $[H^{+}]_{I} = 10^{-5}$ $[H^{+}]_{II} = 10^{-2}$

Thus increase in $[H^{+}] = \frac{10^{-2}}{10^{-5}} = 1000$ times

87. (a) The HCl is a strong acid and they lose easily H^{+} in solution.

88. (a) $X^{-} + H_2O \rightleftharpoons OH^{-} + HX$

$K_b = \frac{[OH^{-}][HX]}{[X^{-}]}$

$HX \rightleftharpoons H^{+} + X^{-}$

$K_a = \frac{[H^{+}][X^{-}]}{[HX]}$

$\therefore K_a \times K_b = [H^{+}][OH^{-}] = K_w = 10^{-14}$

Hence $K_a = 10^{-4}$

Now as $[X^{-}] = [HX], pH = pK_a = 4$.

90. (d) Buffer solution is formed. So the pH will not change.

91. (b) Na_2CO_3 when react with water form strong base and weak acid. So its aqueous solution is basic.

92. (c) $K_w = [H_3O^+][OH^-]$

Concentration of H_3O^+in distilled water= $\mathbf{1 \times 10^{-6}}$ *mol/l.*

Now $[H_3O^+] = [OH^-]$

$K_w = [1 \times 10^{-6}] \times [1 \times 10^{-6}] = 1 \times 10^{-12}$.

93. (a) $[OH^-] = 10^{-1}M; pOH = 1$

$\boldsymbol{pH + pOH = 14\ ;\ pH = 14 - 1 = 13}$.

94. (a) Maximum *pH HClO* is a weak acid all of these. So that the salt of weak acid is also weak.

95. (c) As the solution is acidic $pH < 7$. This is because $[H^+]$ from $H_2O[10^{-7}]$ cannot be neglected in comparison to $10^{-12}M$.

96. (b) [Normal salt + acidic salt] is a buffer solution.

97. (b) 100 *ml* of $\frac{M}{10}$*NaOH* = 50*ml* of $\frac{M}{5}$*NaOH*. They exactly neutralise 50 *ml* $\frac{N}{5}$*HCl*. Hence *pH* of resulting solution = 7.

98. (b) $M_1 = 6.0M$ of *HCl* ; $V_1 =?$

M_2=0.30 *M* is H^+concentration in solution.

$V_2 = 150\ ml$ of solution.

$M_1V_1 = M_2V_2$; $6.0 \times V_1 = .30 \times 150$

$V_1 = \frac{.30\times150}{6} = 7.5ml.$

99. (b) $pH = 3$, $[H^+] = 10^{-3}M$

$\because [H^+] = \sqrt{K \times c}$

$[\mathbf{10^{-3}}]^2 = \boldsymbol{K} \times \boldsymbol{c}$; $\frac{[10^{-6}]}{0.1} = \boldsymbol{K} = \mathbf{10^{-5}}$

100. (b) When ratio of concentration of acid to salt is increased pH decrease.