121. (d) $pH + pOH = 14, pH = 4.0$

$pOH = 14 - pH$; $\boldsymbol{pOH = 14 - 4.0 = 10.0}$

122. (b) $pH = 0$ means $[H^+] = 10^o = 1M$. Hence solution is strongly acidic.

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

124. (d) $H_3O^+ \rightleftharpoons OH^- + H_2$

$pOH + pH = 14$; $\boldsymbol{7 + 7 = 14; [H^+] + [OH^-] = 10^{-14}}$

$\boldsymbol{10^{-7} + 10^{-7} = 10^{-14}}$; $\boldsymbol{[OH^-] = 10^{-7}}$ *gm ion/l.*

125. (b) Acidic

Explanation (Word-Friendly):

pH < 7 → Acidic solution

Example: HCl, vinegar, lemon juice.

pH = 7 → Neutral

Example: Pure water.

pH > 7 → Basic (alkaline)

Example: NaOH, soap water.

126. (b) When $pH = 2$, $[H^+] = 10^{-2}M$

127. (a) $[OH^-]$ ion conc.$= 0.05\frac{mol}{l} = 5 \times 10^{-2}\frac{mol}{l}$

$\boldsymbol{pOH = -log \quad [OH^-] = -log \quad [5 \times 10^{-2}]}$

$\boldsymbol{pOH = 1.30; pH + pOH = 14}$

$\boldsymbol{pH = 14 - pOH = 14 - 1.30 = 12.7}$

128. (c) When $pH = 3$, then $[H^+] = 10^{-3}M$

after that we increased the pH from 3 to 6 then $[H^+] = 10^{-6}M$ means reduced 1000 times.

129. (b) CO_2 is acidic oxide which on dissolution in water develops acidic nature.

130. (d) If pH of any solution is 2.

Then $[H^+] = 10^{-2}M$

If pH of any solution is just double then $pH = 4$ and $[H^+]$ will be 10^{-4}.

131. (c) A strong acid is not used to make a buffer.

132. (d) $pH = 1$ means $[H^+] = 10^{-1}M$

Hence $[H_2SO_4] = \frac{10^{-1}}{2} = \frac{1}{20} = 0.05M$

133. (c) The pH of blood is 7.4 due to presence of bicarbonates ions

134. (c) As the solution is acidic, $pH < 7$. This is because $[H^+]$ from $H_2O[10^{-7}]$ cannot be neglected in comparison to 10^{-8}

135. (a) pH will decrease because $[OH^-]$ increased due to this pOH is decreased.

136. (c) $[H^+] = 6 \times 10^{-4}M$

$pH = -\log\ [H^+] = -\log\ [6 \times 10^{-4}] = 3.22$.

137. (c) $0.01MHCl = 10^{-2}M[H^+], pH = 2$.

138. (c) Because buffer solution have a constant pH.

139. (c) $10^{-6}MHCl = 10^{-8}M[H^+]$. Also from H_2O

$[H^+] = 10^{-7}M$

Total $[H^+] = 10^{-7} + 10^{-8} = 10^{-7}[1 + 0.1] = 10^{-7}[1.1]$

Hence $pH = 7 - 0.0414 = 6.96$.

140. (b) $10^{-10}MHCl = 10^{-10}M[H^+]$. But $pH \neq 10$ because solution is acidic. This is because $H^+$from $H_2O(10^{-7}M)$ cannot be neglected.

Total $[H^+] = 10^{-7} + 10^{-10}$

$= \mathbf{10^{-7}} + (\mathbf{1} + \mathbf{10^{-3}}) = \mathbf{10^{-7}}(\mathbf{1.001})$

That is why $pH = 7$ (slightly less than 7)