

(#8-3)
CHEMISTRY
PH and pOH

$\begin{aligned} \text{pH} + \text{pOH} &= 14 \\ -\log[\text{H}^+] &= \text{pH} \\ 10^{-\text{pH}} &= [\text{H}^+] \\ [\text{H}^+][\text{OH}^-] &= 1.0\text{E}-14 \end{aligned}$
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1. What is the range of pH. *0-14*
2. Is it possible to have a pH greater or smaller than 14 and 0 respectively? *yes, but only on paper*
3. Which pH is basic and which is acidic? *0-7 - B 14*

(math)
or altering temp.

In the following questions, calculate the pH from the concentrations of [H₃O⁺]. Indicate acidic or basic.

- | <u>[H₃O⁺]</u> | ...to... | <u>pH</u> |
|---|----------|----------------|
| 4. 1.0 | | <i>0</i> |
| 5. 0.1 | | <i>1</i> |
| 6. 0.01 | | <i>2</i> |
| 7. 0.001 | | <i>3</i> |
| 8. What is the [H ₃ O ⁺] at neutral? | | <i>1.0 E-7</i> |
| 9. What is the [OH ⁻] at neutral? | | <i>1.0 E-7</i> |

In the following calculate the concentration of H₃O⁺ from the pH.

- | <u>pH</u> | ...to... | <u>H₃O⁺</u> |
|-----------|----------------|-----------------------------------|
| 10. 7 | | <i>1.0 E-7</i> |
| 11. 2 | <i>0.01 M</i> | |
| 12. 3.5 | <i>0.00316</i> | |

Calculate the pOH from the following pH.

- | <u>pH</u> | ...to... | <u>pOH</u> |
|-----------|----------|------------|
| 13. 12 | | <i>2</i> |
| 14. 1 | | <i>13</i> |

Calculate the pOH from the following concentrations of H₃O⁺.

- | <u>H₃O⁺</u> | ...to... | <u>pOH</u> |
|-----------------------------------|-------------------|-------------|
| 15. [1.05 E-16 M] | <i>15.9 or 14</i> | |
| 16. [2.5 E-6 M] | | <i>5.60</i> |
| 17. [1.5 E-12 M] | <i>11.8</i> | |
| 18. [0.001M] | <i>4</i> | |

Calculate the pH from the following concentrations of OH⁻
are the following solution Acidic/basic/neutral?

19. [2.99 E -6M] OH⁻ *B → 8.47*
20. [1.23 E -8M] OH⁻ *A → 7.9 → 6.08*
21. [9.99 E -11M] H₃O⁺ *B → 10.0*
22. [0.001M] H₃O⁺ *A → 3*

23. Student hypothesis: A person's stomach is extremely acidic and therefore there is no hydroxide ions in the stomach.

False. $\frac{\text{H}^+}{\text{OH}^-}$
*Just means more [H⁺] > [OH⁻]
OH⁻ always present*