

NAME
CHEMISTRY
PH and pOH

$$\begin{aligned} \text{pH} + \text{pOH} &= 14 \\ -\log[\text{H}^+] &= \text{pH} \\ 10^{-\text{pH}} &= [\text{H}^+] \\ [\text{H}^+][\text{OH}^-] &= 1.0\text{E-}14 \end{aligned}$$

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? *no*
3. Which pH is basic and which is acidic? *Above 7-14 > below 7-0*

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 E-15 M] | | 15 | B - does not exist |
| 5. [2.5 E-4 M] | | 3.60 |) A |
| 6. [1.1 E-2 M] | | 1.96 | |
| 7. [0.01M] | | 3 | |

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

- | <u>pH</u> | ...to... | <u>H₃O⁺</u> | |
|-----------|----------|-----------------------------------|----------------------|
| 8. 7 | | 1 x 10 ⁻⁷ | neutral |
| 9. 2 | | 1 x 10 ⁻² |) A |
| 10. 3.5 | | 3.16 x 10 ⁻⁴ | |
| 11. 14 | | 1 x 10 ⁻¹⁴ | - B |
| 12. 15? | | 1 x 10 ⁻¹⁵ | - B - does not exist |

Calculate the pOH from the following pH.

- | <u>pH</u> | ...to... | <u>pOH</u> | |
|-----------|----------|------------|---|
| 13. 12 | | 2 | B |
| 14. 1 | | 13 | A |
| 15. 9 | | 5 | B |
| 16. 2.5 | | 11.5 | A |

Calculate the pH for the following pOH.

- | <u>pOH</u> | ...to... | <u>pH</u> | |
|------------|----------|-----------|---|
| 17. 12 | | 2 | A |
| 18. 2.4 | | 11.6 | B |
| 19. 9.8 | | 4.2 | A |
| 20. 2.5 | | 11.5 | B |

Calculate the pOH from the following concentrations of H₃O⁺.

- | <u>[H₃O⁺]</u> | ...to... | <u>pH</u> | <u>pOH</u> | |
|-------------------------------------|----------|-----------|------------|--------------------|
| 21. [1.05 E-16 M] | | 16.0 | -2 | B - does not exist |
| 22. [2.5 E-6 M] | | 5.60 | 8.40 | A |
| 23. [1.5 E-12 M] | | 11.8 | 2.18 | B |
| 24. [0.001M] | | 4 | 10 | A |

Calculate the pH from the following concentrations of OH⁻

- | <u>[OH⁻]</u> | ...to... | <u>pOH</u> | <u>pH</u> | |
|-------------------------|----------|------------|-----------|---|
| 29. [2.99 E-6M] | | 5.5 | 8.5 | B |
| 30. [1.23 E-8M] | | 7.9 | 6.1 | A |
| 31. [9.99 E-11M] | | 10.0 | 4.0 | A |
| 32. [0.01M] | | 3 | 11 | B |

NAME
CHEMISTRY
PH and pOH II

$$\begin{aligned} \text{pH} + \text{pOH} &= 14 \\ -\log[\text{H}^+] &= \text{pH} \\ 10^{-\text{pH}} &= [\text{H}^+] \\ [\text{H}^+][\text{OH}^-] &= 1.0\text{E-}14 \end{aligned}$$

In the following calculate the pH from the concentrations of $[\text{H}_3\text{O}^+]$. Indicate acidic or basic.

Use A or B

- | $[\text{H}_3\text{O}^+]$ | ...to... | pH | |
|--------------------------|----------|-----|---|
| 1. [1.0 E-10 M] | | 10 | B |
| 2. [1.5 E-4 M] | | 3.8 | A |
| 3. [8.9 E-2 M] | | 1.1 | A |
| 4. [1.0M] | | 0 | A |

In the following calculate the concentration of H_3O^+ from the pH.

- | pH | ...to... | H_3O^+ | |
|---------|----------|------------------------|-----|
| 5. 5 | | 5.1×10^{-5} |) A |
| 6. 2.5 | | 6.32×10^{-3} | |
| 7. 5.4 | | 7.4×10^{-6} | |
| 8. 11 | | 8.1×10^{-11} |) B |
| 9. 14.9 | | 9.13×10^{-15} | |
- does not exist

Calculate the pOH from the following pH.

- | pH | ...to... | pOH | |
|----------|----------|-----|-----|
| 10. 12.8 | | 1.2 |) B |
| 11. 10 | | 4 | |
| 12. 8.3 | | 5.7 | |
| 13. 5.2 | | 8.8 | A |

Calculate the pH for the following pOH.

- | pOH | ...to... | pH | |
|-----------|----------|-------|-----|
| 14. 12.7 | | 1.3 |) A |
| 15. 7.4 | | 6.6 | |
| 16. 13.8 | | 0.2 | |
| 17. 15.55 | | -1.55 | |

Calculate the pOH from the following concentrations of H_3O^+ .

- | H_3O^+ | ...to... | pH | pOH | |
|------------------------|----------|------|------|---|
| 18. [8.4 E-12 M] | | 11.1 | 2.9 | B |
| 19. [3.5 E-4 M] | | 3.5 | 10.5 | A |
| 20. [5.5 E-11 M] | | 10.3 | 3.7 | B |
| 21. [1M] | | 1 | 13 | A |

Calculate the pH from the following concentrations of OH^-

- | OH^- | ...to... | pH | |
|----------------|----------|-----|-----|
| 29. [1.28 E-6] | | 8.1 | B |
| 30. [1.2 E-8] | | 6.1 |) A |
| 31. [1.9 E-11] | | 3.3 | |
| 32. [.000001] | | 8 | B |