

What is the pH Scale?

Worksheet

$\text{pH} = \log[\text{H}]$, where $[\text{H}]$ is the molar concentration of hydrogen ions. Similarly, $\text{pOH} = \log[\text{OH}]$. In aqueous solution: $\text{pH} + \text{pOH} = 14$ at 25C.

$$\text{pH} = \log[\text{H}]; \text{pOH} = \log[\text{OH}]; \text{pH} + \text{pOH} = 14$$

Questions

1. If $[\text{H}] = 10 \text{ M}$, what is pH?
A) 5
B) 5
C) 9
D) 14
2. A solution has $\text{pH} = 3$. Is it acidic or basic?
A) Acidic
B) Neutral
C) Basic
D) Cannot determine
3. If $\text{pOH} = 2$, what is pH?
A) 2
B) 12
C) 12
D) 7
4. Which solution is more acidic: pH 2 or pH 4?
A) pH 2
B) pH 4
C) Same acidity
D) Cannot compare
5. Calculate pH of a solution with $[\text{H}] = 0.01 \text{ M}$.
6. Calculate $[\text{H}]$ from $\text{pH} = 11$.
7. A solution has $\text{pOH} = 3$. Calculate pH and $[\text{H}]$.
8. Define: What does pH measure?
9. Define: pH formula?
10. Define: Relationship between pH and pOH?

Answer Key

1. A) $5 - \text{pH} = \log(10) = (5) = 5$.
2. A) Acidic - $\text{pH} < 7$ is acidic.
3. B) $12 - \text{pH} = 14 - \text{pOH} = 14 - 2 = 12$.
4. A) $\text{pH} 2$ - Lower $\text{pH} =$ more acidic. $\text{pH} 2$ is 100 times more acidic than $\text{pH} 4$ (2-unit difference = $10 = 100$).
5. $\text{pH} = \log[\text{H}] = \log(0.01) \text{pH} = \log(10) = (2) = 2$
6. $\text{pH} = \log[\text{H}] \text{pH} = 11 = \log[\text{H}] \log[\text{H}] = 11 [\text{H}] = 10 \text{ M} = 1 \cdot 10 \text{ M}$
7. $\text{pH} + \text{pOH} = 14 \text{pH} = 14 - 3 = 11 \text{pH} = \log[\text{H}] \text{pH} = 11 = \log[\text{H}] [\text{H}] = 10 \text{ M}$
8. How acidic or basic a solution is, from 0 (most acidic) to 14 (most basic), with 7 neutral.
9. $\text{pH} = \log[\text{H}]$, where $[\text{H}]$ is hydrogen ion concentration in mol/L.
10. $\text{pH} + \text{pOH} = 14$ in aqueous solution at 25C.

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