

Acid Strength and Conjugate Base Stability

Chemistry · Practice Test · 15 Questions

1. As the pK of an acid increases, what happens to its strength?

- A) Increases
- B) Decreases
- C) Stays the same
- D) Becomes neutral

2. What is the primary factor to consider when identifying the most acidic proton in a molecule?

- A) The number of hydrogen atoms
- B) The electronegativity of the atom bonded to hydrogen
- C) The stability of the negative charge on the conjugate base
- D) The presence of double bonds

3. Which of the following factors contributes to the stabilization of a negative charge on a conjugate base, thereby increasing the acidity of the parent acid?

- A) Electron-donating groups
- B) Resonance
- C) Increased atomic radius in a group
- D) Decreased S-character in hybridization

4. According to the text, acidity increases when moving in which direction across a row of the periodic table?

- A) Right to left
- B) Left to right
- C) Up to down
- D) Down to up

5. How do inductive effects from electron-withdrawing groups influence the acidity of an acid?

- A) They decrease acidity.
- B) They have no effect on acidity.
- C) They increase acidity.
- D) They make the acid neutral.

6. What is the effect of increased S-character in the hybridization of the atom carrying a negative charge on the conjugate base, in terms of acidity?

- A) It decreases acidity.
- B) It has no effect on acidity.
- C) It increases acidity.
- D) It makes the acid a stronger base.

7. In the given structural comparison, which proton is identified as the most acidic?

- A) Ha
- B) Hb
- C) Hc
- D) All are equally acidic

8. Why is Hc considered the most acidic proton in the provided example?

- A) The negative charge is on a carbon atom.
- B) The negative charge is stabilized by resonance and located on oxygen.
- C) The conjugate base has no stabilization.
- D) The hybridization is sp^3 .

9. Compared to Ha and Hb, why is the conjugate base of Hc more stable?

- A) The charge is on carbon.
- B) The charge is on oxygen and stabilized by resonance.
- C) There is no resonance stabilization.
- D) The electronegativity of oxygen is lower than carbon.

10. Which of the following is NOT listed as a factor that can stabilize the charge on a conjugate base and increase acidity?

- A) Type of element
- B) Inductive effects
- C) Steric hindrance
- D) Hybridization effects

11. The text states that the acidity increases down a column of the periodic table. This is related to which factor?

- A) Hybridization
- B) Resonance
- C) Inductive effects
- D) Type of element

12. If a conjugate base is resonance stabilized, what is the effect on the acidity of the parent acid?

- A) Acidity decreases.
- B) Acidity remains unchanged.
- C) Acidity increases.
- D) The parent acid becomes a strong base.

13. In the comparison of H_a , H_b , and H_c , which proton is the least acidic?

- A) H_a
- B) H_b
- C) H_c
- D) Cannot be determined from the text

14. The hybridization of the atom carrying the negative charge on the conjugate base for H_a is described as:

- A) sp
- B) sp^2
- C) sp^3
- D) Not specified

15. What does the notation 'A?' represent in the context of an acid 'HA'?

- A) The acid itself
- B) The conjugate base of the acid
- C) A proton
- D) A neutral molecule