Weak Acids Quiz Answer Key PDF

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Which weak acid is commonly found in citrus fruits?

A. Hydrochloric acid
B. Formic acid
C. Citric acid ✓
D. Acetic acid

What are the characteristics of buffer solutions containing weak acids? (Select all that apply)

A. They resist changes in pH ✓
B. They are made with strong acids
C. They contain a weak acid and its conjugate base ✓
D. They can only be used in laboratory settings

Which of the following is NOT a use of weak acids?

A. Food preservation
B. Industrial cleaning
C. Explosive manufacturing ✓
D. pH buffering in biological systems

Which of the following is a characteristic of weak acids?

A. Complete dissociation in water
B. Low degree of ionization ✓
C. High pH value
D. Strong electrolyte

What is the main component of vinegar?

A. Citric acid
B. Hydrochloric acid
C. Acetic acid ✓
D. Sulfuric acid

What factors affect the strength of a weak acid? (Select all that apply)

A. Temperature ✓
B. Concentration of the acid ✓
C. Acid dissociation constant (Ka) ✓
D. Color of the acid

Which statements are true about the equilibrium of weak acids in solution? (Select all that apply)

A. It involves complete dissociation of the acid
B. It establishes a balance between undissociated acid and ions ✓
C. It is represented by the Ka value ✓
D. It results in a pH of exactly 7

Which of the following is true about the pKa of a weak acid?

A. It is always greater than 7
B. It indicates the acid's color
C. It is the pH at which half of the acid is dissociated ✓
D. It is unrelated to the acid's strength

Which of the following are examples of weak acids? (Select all that apply)

A. Hydrochloric acid (HCl)
B. Acetic acid (CH_3COOH) ✓
C. Carbonic acid (H_2CO_3) ✓
D. Citric acid ($C_6H_8O_7$) ✓

In which of the following applications are weak acids used? (Select all that apply)

A. Food preservation ✓
B. pH buffering in biological systems ✓

C. Explosive manufacturing
D. Cleaning agents ✓

Which of the following acids is considered a weak acid?

A. Hydrochloric acid (HCl)
B. Sulfuric acid (H2SO4)
C. Acetic acid (CH3COOH) ✓
D. Nitric acid (HNO3)

What is the pH range typically associated with weak acids?

A. 0 to 2
B. 2 to 4
C. 4 to 7 ✓
D. 7 to 14

What does the acid dissociation constant (Ka) indicate about a weak acid?

A. Its molecular weight
B. Its solubility in water
C. Its strength ✓
D. Its color

Describe the role of weak acids in biological systems.

Weak acids, such as carbonic acid and acetic acid, are important in biological systems as they help maintain pH homeostasis and serve as buffers to resist changes in acidity or alkalinity, which is vital for various metabolic processes.

Discuss the industrial applications of weak acids and their importance.

Weak acids, such as acetic acid, citric acid, and lactic acid, are widely used in industries for food preservation, as flavor enhancers, in pharmaceuticals for drug formulation, and in chemical manufacturing as pH regulators and reactants.

Explain why weak acids do not completely dissociate in water.

Weak acids only partially dissociate in water, establishing an equilibrium between the undissociated acid and its ions, which prevents complete dissociation.

Which reactions involve weak acids? (Select all that apply)

A. Neutralization with bases ✓

B. Formation of buffer solutions ✓

C. Complete dissociation in water

D. Reaction with metals to produce hydrogen gas ✓

How does the Henderson-Hasselbalch equation help in calculating the pH of a buffer solution?

The Henderson-Hasselbalch equation is expressed as pH = pKa + log([A-]/[HA]), where [A-] is the concentration of the base form and [HA] is the concentration of the acid form, enabling the calculation of pH in buffer solutions.

What is the significance of the acid dissociation constant (Ka) in determining the strength of a weak acid?

The significance of the acid dissociation constant (Ka) in determining the strength of a weak acid is that it measures the degree of ionization of the acid in solution; a larger Ka value indicates a stronger weak acid.

How does the concept of percent ionization relate to the strength of a weak acid?

The percent ionization of a weak acid increases as the strength of the acid increases, indicating a greater degree of dissociation in solution.