



## pH Properties of Buffer Solutions AP Chemistry Laboratory #19

### Introduction

One of the most important applications of acids and bases in chemistry and biology is that of buffers. A buffer solution resists rapid changes in pH when acids and bases are added to it. Every living cell contains natural buffer systems to maintain the constant pH needed for proper cell function. Many consumer products are also buffered to safeguard their activity. What are buffers made of? How do buffers maintain the delicate pH balance needed for life and health?

### Concepts

- Buffer
- Weak acid–weak base
- Conjugate acid–base pair
- Dissociation constant
- Ideal buffer

### Background

The ability of buffers to resist changes in pH when acid or base is added is a result of their chemical composition. All buffers contain a mixture of a conjugate acid–base pair; either a weak acid (HA) and its conjugate base ( $A^-$ ), or a weak base (B), and its conjugate acid ( $BH^+$ ). Weak acids and weak bases both dissociate slightly in water (Reactions 1 and 2).



These reactions are reversible and both the weak acid and its conjugate base or the weak base and its conjugate acid are present in solution.

The equilibrium constant expressions for these dissociation reactions are:

$$K_a = \frac{[H_3O^+][A^-]}{[HA]} \quad \text{Equation 1}$$

$$K_b = \frac{[OH^-][BH^+]}{[B]} \quad \text{Equation 2}$$

Buffers control pH because the two buffering components, either HA and  $A^-$  or B and  $BH^+$ , are able to neutralize both acids and bases added to the solution.



# Ph Properties Of Buffer Solutions Answer Key

**SJ Ball**



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Voet's Principles of Biochemistry, Global Edition Donald Voet, Judith G. Voet, Charlotte W. Pratt, 2018-01-11 Voet's Principles of Biochemistry Global Edition addresses the enormous advances in biochemistry particularly in the areas of structural biology and bioinformatics It provides a solid biochemical foundation that is rooted in chemistry to prepare students for the scientific challenges of the future New information related to advances in biochemistry and experimental approaches for studying complex systems are introduced Notes on a variety of human diseases and pharmacological effectors have been expanded to reflect recent research findings While continuing in its tradition of presenting complete and balanced coverage this Global Edition includes new pedagogy and enhanced visuals that provide a clear pathway for student learning

Fundamentals of Biochemistry Donald Voet, Judith G. Voet, Charlotte W. Pratt, 2016-02-29 Voet Voet and Pratt's Fundamentals of Biochemistry 5th Edition addresses the enormous advances in biochemistry particularly in the areas of structural biology and Bioinformatics by providing a solid biochemical foundation that is rooted in chemistry to prepare students for the scientific challenges of the future While continuing in its tradition of presenting complete and balanced coverage that is clearly written and relevant to human health and disease Fundamentals of Biochemistry 5e includes new pedagogy and enhanced visuals that provide a pathway for student learning

Reagent Chemicals American Chemical Society, American Chemical Society. Committee on Analytical Reagents, 2006 Reagent Chemicals 10 Edition was published in book form in September 2005 with the specifications official from January 1 2006 This Web edition duplicates the printed book It contains exactly the same information as the book but incorporates electronic features such as hypertext links that enhance its usability

**Polymer Gels** Vijay Kumar Thakur, Manju Kumari Thakur, 2018-08-07 This book addresses a range of synthesis and characterization techniques that are critical for tailoring and broadening the various aspects of polymer gels as well as the numerous advantages that polymer gel based materials offer It presents a comprehensive collection of chapters on the recent advances and developments in the science and fundamentals of both synthetic and natural polymer based gels Topics covered include synthesis and structure of physically chemically cross linked polymer gels polymeric nanogels gel formation through non covalent cross linking molecular design and characterization polysaccharide based polymer gels synthesis characterization and properties modified polysaccharide gels silica based polymeric gels as platforms for the delivery of pharmaceuticals gel based approaches in genomic and proteomic sciences emulgels in drug delivery and organogels The book provides a cutting edge resource for researchers and scientists working in various fields involving polymers biomaterials bio nanotechnology and functional materials

**Journal of the Chemical Society** Chemical Society (Great Britain), 1927 **Journal of the Chemical Society**, 1924 *The Planter and Sugar Manufacturer*, 1927

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