

## SBI 4UI

### Introduction to Acid-Base Balance- ANSWERS

1. What is acid-base balance?  
*Acid-base balance refers to the mechanisms that are in place in the body to regulate the concentration of  $H^+$  ions in body fluids. It is the concentration of  $H^+$  ions that changes pH. Our body systems work within a certain pH range.*
2. What is a buffer? How do buffers work? Give an example of a buffer.  
*A buffer is a weak acid/base system designed to prevent large changes in pH or resists changes in acidity of a solution. It works by storing (binding) the  $H^+$ . The base part contains a negative ion which can "soak up" free  $H^+$  ions. If pH is too high, some of the acid may ionize, releasing free  $H^+$  ions.  
An example of a buffer system is the carbonic acid/bicarbonate system in our body.*
3. What are metabolic acids?  
*Metabolic acids result from our diet, usually in the form of sulfuric, phosphoric, and organic acids. They do not arise from  $CO_2$ .*
4. What role do the kidneys play in acid-base balance?  
*The kidneys may release  $H^+$  ions from the body in the urine and reabsorb more  $HCO_3^-$  into the body to compensate for an increase in acidity that may occur.*
5. What is acidosis?  
*Acidosis refers to plasma pH being more acidic than normal. ( $pH < 7.4$ )*
6. What is alkalosis?  
*Alkalosis refers to plasma pH being more basic than normal ( $pH > 7.4$ )*
7. How does the body compensate for elevated or decreased  $CO_2$  levels?  
*If  $CO_2$  is elevated this will result in lower blood pH due to an increase in free protons from the  $H_2CO_3$  that is produced. This also stimulates the medulla oblongata in the brain to increase the rate of respiration to compensate.  
If  $CO_2$  is decreased, then there are fewer  $H^+$  ions around which triggers an excretion of  $HCO_3^-$  by the kidney. More carbonic acid may ionize to compensate, thereby decreasing the pH.*
8. What are metabolic disturbances?  
*Metabolic disturbances refer to non-metabolic acid-base disturbances. This may occur in renal failure and in diabetes where acidosis is common. Metabolic alkalosis may occur when there is vomiting of HCl from the stomach.*