

CHAPTER 4

ACID BASES AND SALTS

2-mark questions:

1. State differences between acids and bases.

Answer:

Acids	Bases
Acids are sour in taste	Bases are bitter in taste
Acids turn blue litmus paper into red color	The base does not change the color of blue litmus paper
Acids does not change the color of the red litmus	Bases turn red litmus paper to blue color
Acids do not change the color of turmeric	Bases turn turmeric to red

2. Ammonia is found in many household products, such as window cleaners. It turns red litmus blue. What is its nature?

Answer:

The answer is it is basic in nature.

3. Name the source from which litmus solution is obtained. What is the use of this solution?

Answer:

Litmus solution is extracted from lichens. Litmus solution is used as an indicator to find acidic and basic nature of a solution.

4. Is the distilled water acidic/basic/neutral? How would you verify it?

Answer:

Distilled water is neutral in nature, and this can be tested by using red and blue litmus paper. In either of the cases, color remains unchanged.

5. Describe the process of neutralization with the help of an example.

Answer:

Neutralization is a reaction between an acid and a base. Here, both acids and bases get neutralized. For example, when sodium hydroxide (NaOH) is added to hydrochloric acid (HCl), sodium chloride (NaCl) and water (H₂O) are obtained.



5. Blue litmus paper is dipped in a solution. It remains blue. What is the nature of the solution? Explain.

Solution:

The above solution may be neutral or basic in nature as both will not change the color of the blue litmus paper.

6. Differentiate between acids and bases based on their taste and the effect on litmus paper.

Answer:

Difference between acids and bases:

Acids have a sour taste, while bases taste bitter and feel soapy.

Acids turn blue litmus paper red, and bases turn red litmus paper blue.

Acids release hydrogen ions (H^+), while bases release hydroxide ions (OH^-).

Acids react with metals to produce hydrogen gas, while bases do not.

5-mark questions:

1. Dorji has a few bottles of soft drinks in his restaurant. But, unfortunately, these are not labelled. He has to serve the drinks on the demand of customers. One customer wants an acidic drink, another wants a basic drink, and the third one wants a neutral drink. How will Dorji decide which drink is to be served to whom?

Answer:

Dorji can taste a few drops out of soft drinks bottles; the acidic solution is sour in taste, the basic solution is bitter in taste, and the neutral solution has no taste. Along with tasting, Dorji can use litmus paper to test the nature of the soft drinks. He should use blue litmus paper to test the acidic solution. Dorji has to put a drop of solution on blue litmus. If it turns red, then the solution will be acidic in nature.

Similarly, he can use red litmus paper to test the basic solution. He has to put a drop of solution on red litmus. If it turns blue, then the solution will be basic in nature.

2. Explain why

(a) An antacid tablet is taken when you suffer from acidity

(b) Calamine solution is applied on the skin when an ant bites.

(c) Factory waste is neutralized before disposing it into the water bodies.

Answer:

1. The antacid tablet contains base-like milk of magnesia, which neutralizes the acid produced in the stomach. Hence, it is used while suffering from acidity.
2. When ant bites, it injects formic acid inside the skin. Calamine consists of Zinc carbonate which is basic in nature. Hence, calamine neutralizes the effect of formic acid to bring relief for the affected person.
3. Factory wastes are acidic in nature which may cause harm to aquatic life. Hence, they are neutralized by using a base before disposing it into the water bodies.

3. Three liquids are given to you. One is hydrochloric acid, another is sodium hydroxide, and the third is a sugar solution. How will you identify them? You have only turmeric indicator.

Answer:

The following steps are taken to test the given liquids:

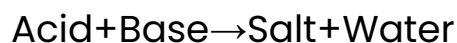
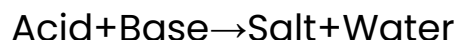
- Put a drop of provided liquid on the turmeric indicator. The solution that changes the color of the indicator to red is sodium hydroxide, which is basic in nature.
- Now, to make two mixtures, add a drop of sodium hydroxide on the other two liquids individually.
- The drop of each combination added to the turmeric indicator one after another.

- The mixture that changes the indicator to red color includes a neutral solution of sugar.
- While the mixture contains hydrochloric acid that has been neutralized by the addition of sodium hydroxide, which does not show any color change in the indicator.

4. Describe the process of neutralization with the help of an example. Discuss the role of indicators in identifying acidic, basic, and neutral solutions. Also, explain the practical applications of neutralization reactions in everyday life.

Answer:

Neutralization is a chemical reaction that occurs when an acid reacts with a base, resulting in the formation of salt and water. This process is often accompanied by the release of heat. The general equation for neutralization is:



Example: Hydrochloric acid (HCl) + Sodium hydroxide (NaOH) → Sodium chloride (NaCl) + Water (H₂O)

Role of Indicators:

Indicators are substances that change color in the presence of acidic, basic, or neutral solutions. Examples include litmus, turmeric, and phenolphthalein. Litmus turns red in the presence of acids and blue in the presence of bases. Turmeric changes its

color with the change in pH, and phenolphthalein turns pink in basic solutions.

Practical Applications:

Indigestion:

Excessive stomach acid causing indigestion can be treated by antacids, which are bases. They neutralize the excess acid.

Ant Bites:

When an ant injects formic acid into the skin, neutralization can occur by applying substances like baking soda to relieve the pain.

Soil Treatment:

Agricultural soils are treated with bases like lime to neutralize acidity and with organic matter to neutralize basicity, ensuring optimal plant growth.

Factory Wastes:

Acidic industrial wastes are neutralized before disposal to prevent harm to aquatic life in water bodies.

5.Fill in The Blanks

- 1.Litmus is extracted from _____.
2. The reaction between an acid and a base is known as _____. In this process, _____ and _____ are produced.
3. _____ is a natural indicator that turns dark pink in the presence of acidic solutions and green in the presence of basic solutions.
- 4.In soil treatment, _____ is added to neutralize acidic soil, while _____ is added for basic soil.
5. _____ is applied on the skin when an ant bites to neutralize the effect of the injected acidic liquid.

Answer:

- 1.Litmus is extracted from **lichens**.
- 2.The reaction between an acid and a base is known as **neutralization**. In this process, **salt** and **water** are produced.
- 3.**China rose** is a natural indicator that turns dark pink in the presence of acidic solutions and green in the presence of basic solutions.
- 4.In soil treatment, **lime** is added to neutralize acidic soil, while organic matter is added for basic soil.
- 5.**Calamine** solution is applied on the skin when an ant bites to neutralize the effect of the injected acidic liquid.

6. Mark 'T' if the statement is true and 'F' if it is false.

- (i) Nitric acid turns red litmus blue. (T/F)**
- (ii) Sodium hydroxide turns blue litmus red. (T/F)**
- (iii) Sodium hydroxide and hydrochloric acid neutralize each other and form salt and water. (T/F)**
- (iv) Indicator is a substance which shows different colors in acidic and basic solutions. (T/F)**
- (v) Tooth decay is caused by the presence of a base. (T/F)**

Solution:

- i) False
- ii) False
- iii) True
- iv) True
- v) False

7. Consider the following statements:

- (a) Both acids and bases change color of all indicators.**
- (b) If an indicator gives a color change with an acid, it does not give a change with a base.**
- (c) If an indicator changes color with a base, it does not change color with an acid.**

(d) Change of color in an acid and a base depends on the type of the indicator.

Which of these statements are correct?

(i) All four

(ii) a and d

(iii) b, c and d

(iv) only d

Answer:

(iv) Only d is correct

Summary:

In the chapter on "Acids, Bases, and Salts," various concepts related to the properties and uses of acids and bases are explored. The taste of substances such as curd, lemon juice, and vinegar is discussed, and it is explained that they taste sour due to the presence of natural acids. Bases, on the other hand, are described as substances with a bitter taste and soapy feel.

The chapter introduces indicators, such as litmus and turmeric, which change color in the presence of acidic or basic substances. The process of neutralization is explained, highlighting that when acids and bases react, they form salt and water with the evolution of heat. Examples of everyday applications of neutralization, such as in indigestion relief and ant bites, are discussed.

Natural indicators like litmus and turmeric are demonstrated for testing the nature of substances. The significance of distinguishing between acidic, basic, and neutral solutions in various contexts, including agriculture and environmental impact, is emphasized.

The chapter concludes by presenting questions for self-assessment, including two-mark and five-mark questions, as well as fill-up exercises to reinforce the concepts discussed.

If there's a specific aspect, you'd like more details on or any particular question you want to explore, feel free to let me know!