

DON BOSCO HIGH SCHOOL PANJIM

LESSON 2 EXPLORING SUBSTANCES ACIDS BASES AND NEUTRAL

1. What are acids? Write any three properties of acids.

Answer:

Acids are substances that usually have a sour taste and produce hydrogen ions when dissolved in water.

Properties:

- They turn blue litmus paper red.
 - They have a sour taste (but should never be tasted in the laboratory).
 - They react with bases to form salt and water.
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2. What are bases? Mention three characteristics of bases.

Answer:

Bases are substances that produce hydroxide ions in water.

Characteristics:

- They turn red litmus paper blue.
 - They feel soapy or slippery to touch.
 - They react with acids to form salt and water.
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3. What is a neutral substance? Give three examples.

Answer:

A neutral substance is neither acidic nor basic. It does not change the colour of red or blue litmus paper.

Examples:

- Distilled water
 - Common salt solution
 - Sugar solution
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4. What is a salt? How is it formed?

Answer:

A salt is a compound formed when an acid reacts with a base during a chemical

reaction called **neutralization**.

For example:

Hydrochloric acid + Sodium hydroxide → Sodium chloride + Water

5. What is an indicator? Why are indicators important?

Answer:

An indicator is a substance that changes colour depending on whether a solution is acidic, basic, or neutral. Indicators help us identify the nature of unknown substances without tasting or touching them, making experiments safer.

6. What is litmus? From where is it obtained?

Answer:

Litmus is a natural indicator obtained from **lichens**, which are simple organisms growing on rocks and tree trunks. It is available as red and blue litmus paper and helps identify acids and bases.

7. Explain the action of litmus paper on acids, bases, and neutral substances.

Answer:

- In an **acid**, blue litmus turns red.
 - In a **base**, red litmus turns blue.
 - In a **neutral solution**, there is no change in the colour of either red or blue litmus paper.
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8. Why is turmeric called a natural indicator?

Answer:

Turmeric is called a natural indicator because it is obtained from the turmeric plant and changes colour in the presence of bases. It remains yellow in acidic and neutral solutions but turns reddish-brown in basic solutions.

9. Describe the colour changes shown by turmeric in acidic, basic, and neutral solutions.

Answer:

- **Acidic solution:** Yellow (no change)
 - **Basic solution:** Reddish-brown
 - **Neutral solution:** Yellow (no change)
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10. How is China rose indicator prepared?

Answer:

China rose indicator is prepared by soaking or boiling the petals of China rose (hibiscus) flowers in warm water. The coloured solution obtained acts as a natural indicator.

11. What colour changes does China rose indicator show?

Answer:

- **Acidic solution:** Dark pink or magenta
 - **Basic solution:** Green
 - **Neutral solution:** Little or no noticeable colour change
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12. Why should acids and bases not be identified by tasting or touching?

Answer:

Many acids and bases are corrosive and can cause burns or injuries. Therefore, they should never be tasted or touched directly. Indicators should be used to identify them safely.

13. What is neutralization? Explain with an example.

Answer:

Neutralization is a chemical reaction in which an acid reacts with a base to form salt and water.

Example:

Hydrochloric acid + Sodium hydroxide → Sodium chloride + Water

14. Name four common acidic substances used at home.

Answer:

- Lemon juice
- Vinegar
- Tamarind
- Curd

These substances contain natural acids.

15. Name four common basic substances found at home.

Answer:

- Soap solution
 - Baking soda solution
 - Toothpaste
 - Lime water
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16. Which acid is present in the following?

- a) Lemon
- b) Vinegar
- c) Tamarind

Answer:

- Lemon – **Citric acid**
 - Vinegar – **Acetic acid**
 - Tamarind – **Tartaric acid**
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17. What would happen if blue litmus paper is dipped into lemon juice? Explain.

Answer:

Blue litmus paper will turn red because lemon juice contains citric acid and is acidic in nature.

18. A student dips red litmus paper into soap solution. What observation will be made? Why?

Answer:

The red litmus paper turns blue because soap solution is basic in nature.

19. A turmeric paper remains yellow after being dipped into a liquid. What can you conclude?

Answer:

The liquid may be acidic or neutral because turmeric changes colour only in the presence of bases.

20. How can you use both turmeric and litmus to identify an unknown solution?

Answer:

- If blue litmus turns red, the solution is acidic.
 - If red litmus turns blue and turmeric turns reddish-brown, the solution is basic.
 - If neither indicator changes colour, the solution is likely neutral.
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21. Differentiate between acids and bases.

Acids	Bases
Turn blue litmus red	Turn red litmus blue
Usually sour	Usually bitter (never taste)
Produce hydrogen ions	Produce hydroxide ions
Example: Vinegar	Example: Soap solution

22. Differentiate between natural and synthetic indicators.

Natural Indicators	Synthetic Indicators
Obtained from plants or lichens	Made in laboratories
Example: Litmus, turmeric, China rose	Example: Phenolphthalein, methyl orange

23. Why is distilled water considered neutral?

Answer:

Distilled water is considered neutral because it is neither acidic nor basic. It does not change the colour of red or blue litmus paper.

24. Complete the table.

Substance	Nature	Litmus Test	Turmeric Test	China Rose Test
Lemon juice	Acidic	Blue → Red	Yellow	Dark pink
Soap solution	Basic	Red → Blue	Reddish-brown	Green
Distilled water	Neutral	No change	Yellow	No significant change
Vinegar	Acidic	Blue → Red	Yellow	Dark pink
Baking soda solution	Basic	Red → Blue	Reddish-brown	Green

25. Why are indicators useful in science laboratories?

Answer:

Indicators help scientists safely identify whether a substance is acidic, basic, or neutral without tasting or touching it. They are essential in experiments, testing unknown solutions, and studying chemical reactions such as neutralization.

Higher-Order Thinking Questions

1. **Why does turmeric not change colour in acidic solutions but changes colour in basic solutions?**

Answer: Turmeric contains a natural pigment called curcumin, which reacts only with bases, causing it to change from yellow to reddish-brown.

2. **A solution does not change the colour of red or blue litmus paper. Can you conclude that it is neutral? Explain.**

Answer: It is likely neutral, but to be certain, another indicator or a pH test can be used to confirm its nature.

3. **Why are natural indicators preferred for classroom experiments?**

Answer: They are safe, inexpensive, eco-friendly, and can be prepared easily from natural materials such as turmeric or China rose petals.