



ACIDS AND THEIR PROPERTIES

Answer all the questions below and then check your answers.

1. Which of the following is a common characteristic of all acids?

- a) They taste bitter.
- b) They turn red litmus paper blue.
- c) They produce hydrogen ions (H^+) in solution.
- d) They have a slippery feel.

2. What is the pH range of acidic solutions?

- a) less than 7
- b) more than 7
- c) 0-7
- d) 1-14

3. Which of the following is a strong acid?

- a) Hydrochloric acid (HCl)
- b) Citric or ethanoic acid
- c) Acetic acid
- d) Carbonic acid

Fill in the Gaps to complete the sentences below:

4. Fill in the gaps:

- Acids have a pH less than ____.
- When acids dissolve in water, they release _____ ions.
- The reaction between an acid and a base is called _____.

5. Match the acid with its common use:

Acid	Common Use
Hydrochloric acid	Used in car batteries
Sulfuric acid	Used in vinegar
Nitric acid	Used in fertilizers
Acetic acid	Used in cleaning products

6. What is a weak acid and provide an example.
7. Describe the process of neutralisation with an example.
8. What is the role of indicators in chemistry? Give an example of an indicator used to test for acids.
9. Why are strong acids better conductors of electricity than weak acids?

10. How is carbonic acid (H_2CO_3) formed from carbon? Describe and write equations for the chemical reactions involved.
11. Phosphoric acid (H_3PO_4) can be prepared by burning the non-metal phosphorus in water to form phosphorus pentoxide (P_2O_5). This oxide is then dissolved in water to form phosphoric acid. Write word and symbolic equations for these two reactions which will show how phosphoric acid is formed from phosphorus.
12. Describe the formation of nitric acid from nitrogen. Describe the key reactions?
13. Why do non-metal oxides typically form acidic solutions when dissolved in water?

Answers

1. Which of the following is a common characteristic of all acids?

- a) They taste bitter.
- b) They turn red litmus paper blue.
- c) They produce hydrogen ions (H^+) in solution.
- d) They have a slippery feel.

Answer: c) They produce hydrogen ions (H^+) in solution.

2. What is the pH range of acidic solutions?

- a) less than 7
- b) more than 7
- c) 0-7
- d) 1-14

Answer: a) less than 7

3. Which of the following is a strong acid?

- a) Hydrochloric acid (HCl)
- b) Citric or ethanoic acid
- c) Acetic acid
- d) Carbonic acid

Answer: a) Hydrochloric acid (HCl)

Fill in the Gaps to complete the sentences below:

4. Fill in the gaps:

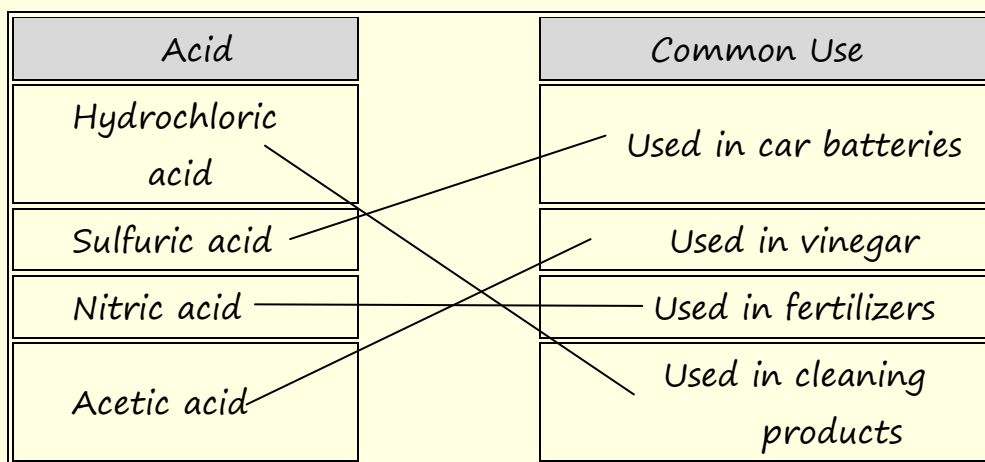
- Acids have a pH less than ____.
- When acids dissolve in water, they release _____ ions.
- The reaction between an acid and a base is called _____.

Answers:

- Acids have a pH less than 7.
- When acids dissolve in water, they release hydrogen (H^+) ions.
- The reaction between an acid and a base is called neutralisation.

5. Match the acid with its common use:

Acid	Common Use
Hydrochloric acid	Used in car batteries
Sulfuric acid	Used in vinegar
Nitric acid	Used in fertilizers
Acetic acid	Used in cleaning products



6. What is a weak acid and provide an example.

Answer: A weak acid is one that only partially ionizes in solution, meaning it does not completely dissociate into its ions. An example of a weak acid is acetic acid (CH_3COOH).

7. Describe the process of neutralisation with an example.

Answer: Neutralisation is the chemical reaction between an acid and a base to produce a salt and water. For example, the reaction between hydrochloric acid (HCl) and sodium hydroxide (NaOH) is:



8. What is the role of indicators in chemistry? Give an example of an indicator used to test for acids.

Answer: Indicators are substances that change colour in response to changes in pH, allowing them to be used to test for the presence of acids or bases. An example of an indicator is litmus paper, which turns red in acidic conditions and blue in basic conditions.

9. Why are strong acids better conductors of electricity than weak acids?

Answer: Strong acids are better conductors of electricity because they fully ionise in solution that is 100% of the molecules break up to form ions, producing a higher concentration of ions. These ions are charge carriers that enable the flow of electric current. In contrast, weak acids only partially ionise in water, resulting in fewer ions and thus lower conductivity.

10. How is carbonic acid (H_2CO_3) formed from carbon? Describe and write equations for the chemical reactions involved.

Answer: Carbonic acid (H_2CO_3) is formed from carbon through the following steps:

Burning Carbon: Carbon (C) is burned in the presence of oxygen (O_2) to produce carbon dioxide (CO_2).



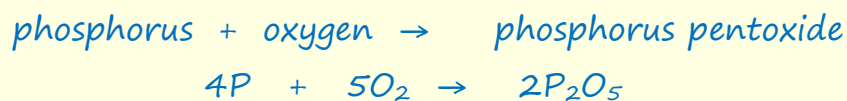
Dissolving in Water: Carbon dioxide is then dissolved in water to form carbonic acid.



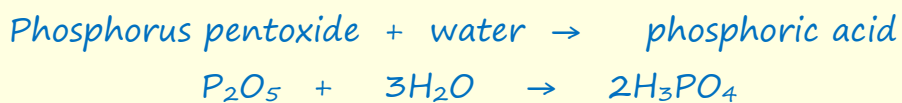
11. Phosphoric acid (H_3PO_4) can be prepared by burning the non-metal phosphorus in water to form phosphorus pentoxide (P_2O_5). This oxide is then dissolved in water to form phosphoric acid. Write word and symbolic equations for these two reactions which will show how phosphoric acid is formed from phosphorus.

Answer: Phosphoric acid (H_3PO_4) can be prepared by the following steps:

Burning Phosphorus: Phosphorus (P) is burned in the presence of oxygen (O_2) to produce phosphorus pentoxide (P_2O_5).



Dissolving in Water: Phosphorus pentoxide is then dissolved in water to form phosphoric acid.



12. Describe the formation of nitric acid from nitrogen. Describe the key reactions?

Answer: Nitric acid (HNO₃) is formed from nitrogen through the following steps:

Formation of Nitrogen Dioxide:

Nitrogen (N₂) reacts with oxygen (O₂) at high temperatures to form nitrogen dioxide (NO₂).

Dissolving in Water: Nitrogen dioxide is then dissolved in water to form nitric acid.

13. Why do non-metal oxides typically form acidic solutions when dissolved in water?

Answer: Non-metal oxides typically form acidic solutions when dissolved in water because they release hydrogen ions (H⁺), which are characteristic of acids. For example, sulfur dioxide reacts with water to form sulfurous acid:

