

Board – CBSE

Class – 10

Topic – Acids, Bases & Salts

1. Explain how antacid works.

Answer.

Hyperacidity is caused by excess of hydrochloric acid in stomach. Antacid is basic in nature. It neutralizes excess of acid and gives relief from pain caused by hyperacidity.

2. (a) Define olfactory indicators. Name two substances which can be used as olfactory indicator.
(b) Choose strong acids from the following:

**Answer.**

(a) Those substances whose smell (odour) changes in acidic or basic solution are called olfactory indicators, e.g. onion and vanilla.

(b) H_2SO_4 and HNO_3 are strong acids.

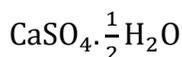
3. A white colored powder is used by doctors for supporting fractured bones.

(a) Write chemical name and formula of the powder.

(b) When this white powder is mixed with water a hard solid mass is obtained. Write balanced chemical equation for the change.

Answer.

(a) Calcium sulphate hemihydrate



(b) $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O} + \frac{3}{2} \text{H}_2\text{O} \rightarrow \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

4. Explain the action of dilute hydrochloric acid on the following with chemical equation:

(i) Magnesium ribbon (ii) Sodium hydroxide (iii) Crushed egg shells

Answer.

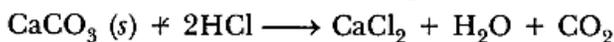
(i) Hydrogen gas will be formed



(ii) Sodium chloride and water will be formed



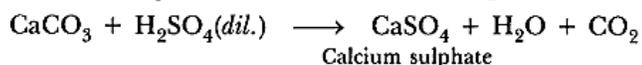
(iii) Crushed egg shell are made up of CaCO_3 which reacts with dil HCl to give brisk effervescence due to CO_2



5. (a) A metal compound 'X' reacts with dil. H_2SO_4 to produce effervescence, the gas evolved extinguishes a burning candle. If one of the compounds formed is calcium sulphates, then what is 'X' and the gas evolved? Also, write a balanced chemical equation for the reaction which occurred.
- (b) (i) Name one antacid. How does it help to relieve indigestion in stomach?
(ii) A farmer treats the soil with quicklime or calcium carbonate. What is the nature of soil? Why does the farmer treat the soil with quicklime?

Answer.

(a) 'X' is CaCO_3 (calcium carbonate). The gas evolved is CO_2 .



- (b) (i) NaHCO_3 is antacid. It neutralizes excess of acid formed in the stomach.
(ii) The soil is acidic in nature. The farmer wants to make it neutral by adding quicklime which is good for crops.
6. State reason for the following statements:
- (i) Tap water conducts electricity whereas distilled water does not.
(ii) Dry hydrogen chloride gas does not turn blue litmus red whereas dilute hydrochloric acid does.
(iii) During summer season, a milk man usually adds a very small amount of baking soda to fresh milk.
(iv) For a dilution of acid, acid is added into water and not water into acid.
(v) Ammonia is a base but does not contain hydroxyl group.

Answer.

- (i) Tap water contains ions which conduct electricity, distilled water does not contain ions.
(ii) Dry HCl does not form ions but HCl gives H^+ and Cl^-
(iii) Baking soda does not allow milk to change to lactic acid which makes milk sour.
(iv) Adding water to acid is highly exothermic. Therefore, water is added to acid very slowly with cooling.
(v) Ammonia dissolves in water and forms H^- Therefore, it is basic in nature.
7. A student detected the pH of four unknown solutions A, B, C and D as follows 11, 5, 7 and 2. Predict the nature of the solution.

Answer.

A is basic 'B' is acidic 'C' is natural and 'D' is strongly acidic.

8. Give the constituents of baking powder.

Answer.

Baking powder contains sodium hydrogen carbonate and tartaric acid.

9. What are strong and weak acids? In the following list of acids, separate strong acids from weak acids.

Hydrochloric acid, citric acid, acetic acid, nitric acid, formic acid, sulphuric acid.

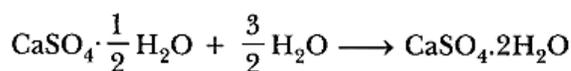
Answer.

Strong acids are those acids which are completely ionized in aqueous solution. Weak acids are those which do not ionize completely in aqueous solution. Strong acid: HCl, HNO₃, H₂SO₄ Weak acid: Citric acid, acetic acid, formic acid.

10. State the chemical name of Plaster of Paris. Write a chemical equation to show the reaction between Plaster of Paris and water.

Answer.

Calcium sulphate hemihydrate.

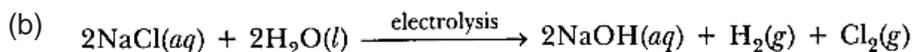


11. (a) What is universal indicator?

(b) Write the chemical equation involved in the preparation of sodium hydroxide. Name the process.

Answer.

(a) Universal indicator is the mixture of synthetic indicators which is used to find pH of solutions.



It is called chlor-alkali process.

12. Why does 1 M HCl solution have a higher concentration of H⁺ ions than 1 M CH₃COOH solution?

Answer.

1 M HCl has higher conc. of (H⁺) because it ionizes completely in aqueous solution whereas CH₃COOH does not as it is weak acid.

13. What is the colour of litmus in a solution of ammonium hydroxide?

Answer.

Red litmus will turn blue in ammonium hydroxide.

14. What colour do the following indicators turn when added to a base or alkali (such as sodium hydroxide)?

- (a) Methyl orange
- (b) Litmus
- (c) Red cabbage extract

Answer.

- (a) Yellow.
- (b) Blue.
- (c) Green.

Answer.

15. What colours do the following indicators turn when added to an acid (such as hydrochloric acid)?

- (a) Litmus
- (b) Methyl orange

Answer.

- (a) Red
- (b) Red

16. Name an indicator which is pink in alkaline solution but turns colourless in acidic solution.

Answer.

Phenolphthalein, Base

17. When a solution is added to vanilla extract, then the characteristic smell of vanilla cannot be detected. State whether the given solution is an acid or a base.

Answer.

When Hydrochloric acid reacts with an active metal (like zinc), we observe that gas filled bubbles are formed on the surface of the metal. Pass the gas formed through soap solution. Then, bring a burning candle near the gas filled soap bubble. If the gas present in bubble burns with a 'pop' sound, then its hydrogen gas.

18. How will you test for the gas which is liberated when hydrochloric acid reacts with an active metal?

Answer.

Carbon dioxide (CO₂) gas is evolved during the reaction. We pass this gas through lime water which turns milky because of the CO₂ passing through it. If we keep on passing the gas through the milky lime water, it would become clear again.

19. Name one animal and one plant whose stings contain formic acid (or methanoic acid).

Answer.

On diluting an acid, the concentration of hydronium ions (H_3O^+) in it decreases.

20. What is an olfactory indicator? Name two olfactory indicators. What is the effect of adding sodium hydroxide solution to these olfactory indicators?

Answer.

Those substances whose smell (or odour) changes in acidic or basic solutions are called olfactory indicators. Onion and vanilla extracts are olfactory indicators. When a basic solution like sodium hydroxide solution is added to a cloth strip treated with onions (or onion extract), then the onion smell cannot be detected.

21. While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid?

Answer.

When a concentrated acid is added to water for preparing a dilute acid, then the heat is evolved gradually and easily absorbed by the large amount of water (to which the acid is being added) however if water is added to concentrated acid, then large amount of heat is evolved at once. This heat changes some of the water to steam explosively which can splash the acid on our face or clothes and cause acid burns. Even the glass container may break due to the excessive heating.

22. (a) What are organic acids and mineral acids?

(b) Give two examples each of organic acids and mineral acids.

(c) State some of the uses of mineral acids in industry.

Answer.

(a) Organic acids are acids present in plant materials and animals. These are naturally occurring acids. A mineral acid (or inorganic acid) is an acid derived from one or more minerals of the earth.

(b) Organic acids: Citric acid, lactic acid; Mineral acids: Hydrochloric acid, sulphuric acid.

(c) Uses of mineral acids in industry:

- i. Sulphuric acid is used in the manufacture of fertilizers, paints, dyes, detergents etc.
- ii. Nitric acid is used for making fertilizers, explosives, dyes and plastics.
- iii. Hydrochloric acid is used for removing oxide film from steel objects, in textile, food and leather industries.