

CBSE Class 10 Science
NCERT Solutions
Chapter - 2
Acids, Bases and Salts

Page No. 18

1. You have been provided with three test tubes. One of them contains distilled water and the other two contain an acidic solution and a basic solution, respectively. If you are given only red litmus solution, how will you identify the contents of each test tube?

Ans. A few drops of red litmus solution is added to each test tube. Red colour will become light in the test tube containing water. Colour will turn blue in test tube containing basic solution. Red colour will become dark in the test tube containing acidic solution.

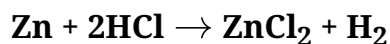
Page No. 22

1. Why should curd and sour substance not be kept in brass and copper vessels.

Ans. Brass and copper vessels contain copper and zinc metal that reacts with acids present in curd and sour substance forming soluble salts. These salts are poisonous in nature and make curd unfit for consumption.

2. Which gas is usually liberated when an acid reacts with a metal? Illustrate with an example. How will you test for the presence of this gas?

Ans. Usually hydrogen gas is liberated when an acid reacts with a metal. For example



When a burning candle or matchstick is brought near hydrogen gas it burns with pop sound.

3. Metal compound 'A' reacts with dilute hydrochloric acid to produce effervescence. The gas evolved extinguishes a burning candle. Write a balanced chemical equation for the reaction, if one of the compounds formed is calcium chloride.

Ans. As one of the compounds formed is calcium chloride, metal compound 'A' is salt of calcium.

Burning candle is extinguished by carbon dioxide so carbon dioxide gas is produced by reaction of 'A' with hydrochloric acid.

Carbon dioxide is produced by action of HCl on carbonate that means 'A' is calcium carbonate.



Page No. 25

1. Why do HCl, HNO₃ etc. show acidic characters in aqueous solution while solutions of compounds like alcohol and glucose do not show acidic character?

Ans. Compounds like HCl and HNO₃ release hydrogen ions in solution, therefore they show acidic character.

While compounds like alcohol and glucose do not release hydrogen ions. Therefore, they do not show acidic properties.

2. Why does an aqueous solution of an acid conduct electricity?

Ans. Electricity is conducted in a solution by ions. Acid release H⁺ ions in a solution so, it conducts electricity.

3. Why does dry HCl gas not change the colour of the dry litmus paper?

Ans. Colour of litmus paper changes only when it come in contact of H⁺ ions and H⁺ ions is produced only when HCl gas comes in contact with water. Therefore dry HCl do not change the colour of dry litmus paper.

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

Ans. Addition of water to acid is an exothermic reaction. If we add water to acid lot of heat is produced that may breaks the glass container or sprout to burns the person adding it.

But when acid is added to water with constant stirring, the heat produced is absorbed by water and no harm occurs.

5. How is concentration of hydronium ions (H_3O^+) affected when a solution of acid is diluted?

Ans. Concentration of hydronium ions decreased when the solution of an acid is diluted.

6. How is concentration of hydroxide ions (OH^-) affected when excess base is dissolved in a solution of sodium hydroxide?

Ans. Excess base dissolved in a solution of sodium hydroxide will release more hydroxide (OH^-) ions. Therefore, concentration of hydroxide ions (OH^-) will increase.

Page No. 28

1. You have two solutions 'A' and 'B'. The pH of solution 'A' is 6 and pH of solution 'B' is 8. Which solution has more hydrogen ions concentration? Which is acidic and which one is basic?

Ans. A solution having pH less than 7 is acidic and that having pH more than 7 is basic. So, solution 'A' is acid and 'B' is basic. Naturally 'A' which is acidic has greater concentration of hydrogen ions concentrations.

2. What effect does the concentration of H^+ ions have on the nature of the solution?

Ans. Higher the concentration of H^+ ions, greater is the acidic nature of the solution.

3. Do basic solutions also have H^+ ions? If yes, then why are these basic?

Ans. Acidic and basic solutions both have H^+ ions. The difference is that in acids H^+ ions

concentration is more than OH^- ions concentration while in basic solution OH^- ions concentration is more than H^+ ions concentration.

4. Under what soil condition do you think a farmer would treat the soil of his field with quicklime (calcium oxide) or slaked lime (calcium hydroxide) or chalk (calcium carbonate).

Ans. The farmer would treat the soil of his field with quicklime (calcium oxide) or slaked lime (calcium hydroxide) or chalk (calcium carbonate) when field has become acidic to neutralize the effect of acid.

Page No. 33

1. What is the common name of the compound CaOCl_2 ?

Ans. Bleaching powder.

2. Name the substance which on treatment with chlorine yields bleaching powder.

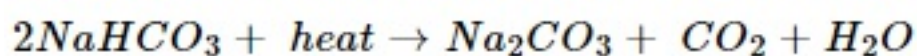
Ans. Slaked lime or calcium hydroxide.

3. Name the sodium compound which is used for softening hard water.

Ans. Sodium carbonate is used for softening hard water.

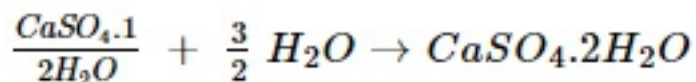
4. What will happen if a solution of sodium hydrogen carbonate is heated? Give the equation of reaction involved.

Ans. Sodium hydrogen carbonate solution on heating gives sodium carbonate, carbon dioxide and water.



5. Write an equation to show the reaction between plaster of Paris and water.

Ans. The reaction between plaster of Paris and water is as follows:



Textbook Exercises

1. A solution turns red litmus blue, its pH is likely to be

- (a) 1
- (b) 4
- (c) 5
- (d) 10

Ans. (d) 10

2. A solution reacts with crushed egg-shells to give a gas that turns lime-water milky.

The solution contains

- (a) NaCl
- (b) HCl
- (c) LiCl
- (d) KCl

Ans. (b) HCl

3. 10 mL of a solution of NaOH is found to be completely neutralized by 8 mL of a given solution of HCl. If we take 20 mL of same solution of NaOH, the amount of HCl solution required to neutralize it will be

- (a) 4 mL
- (b) 8 mL

(c) 12 mL

(d) 16 mL

Ans. (d) 16 mL

4. Which one of the following types of medicines is used for treating indigestion?

(a) Antibiotics

(b) Analgesic

(c) Antacid

(d) Antiseptic

Ans. (c) Antacid

5. Write word equations and then balanced equations for the reaction taking place when:

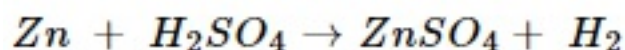
(a) Dilute Sulphuric acid reacts with zinc granules.

(b) Dilute hydrochloric acid reacts with magnesium ribbon.

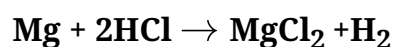
(c) Dilute Sulphuric acid reacts with aluminum powder

(d) Dilute hydrochloric acid reacts with iron fillings.

Ans. (a) Zinc + Sulphuric acid \rightarrow Zinc sulphate +Hydrogen



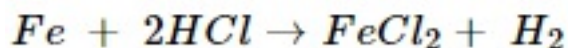
(b) Magnesium + Hydrochloric acid \rightarrow magnesium chloride +Hydrogen gas



(c) Aluminum + Sulphuric acid \rightarrow Aluminum sulphate +Hydrogen gas

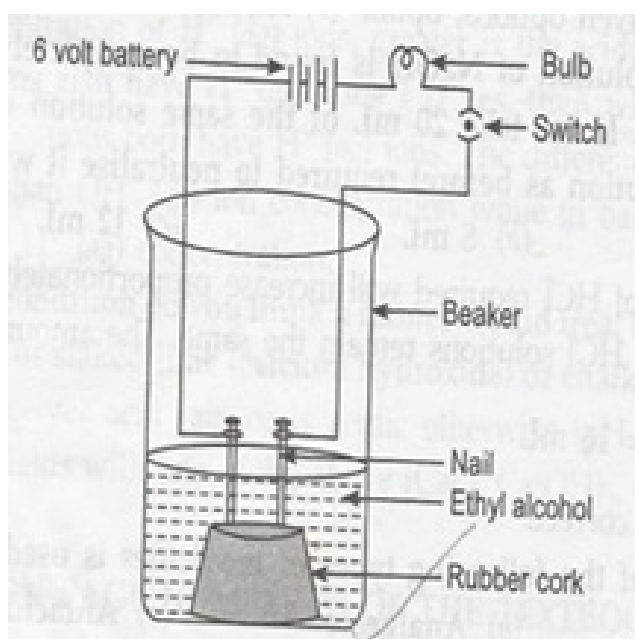


(d) Iron + Hydrochloric acid \rightarrow Iron chloride + Hydrogen



6. Compound such as alcohols and glucose also contain hydrogen but are not categorized as acids. Describe an activity.

Ans. Alcohol and glucose both contain hydrogen but not categorized as acids. This can be proved by following activity.



Material required: - Beaker, nails, battery, connecting wires, bulb, switch and alcohols.

Procedure:

1. Set up the experiment as follows
2. Take ethyl alcohol in the beaker in the beaker.
3. When the switch is turned on, the bulb does not glow.
4. Take glucose solution in place of alcohols but bulb does not glow.

7. Why does distilled water not conduct electricity, where as rain water does?

Ans. Rain water contains small amount of acid because of which it conducts electricity. Distilled water is pure water. It does not contain ions. Therefore, it does not conduct electricity.

8. Why do acids not show acidic behavior in the absence of water?

Ans. Acids produce hydrogen ions or hydronium ions only in presence of water. Therefore, it shows acidic behavior only presence of water.

9. Five solutions A, B, C, D and E when tested with universal indicators showed pH as 4, 1, 11, 7 and 9 respectively. Which solution is:

- (a) neutral?
- (b) strongly alkaline?
- (c) strongly acidic
- (d) weakly acidic?
- (e) weakly alkaline

Ans. (a) D

- (b) C
 - (c) B
 - (d) A
 - (e) E
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10. Equal lengths of magnesium ribbons are taken in test tubes A and B. hydrochloric acid is added to test tube A, while acetic acid is added to test B. In which test tube will the fizzing occur more vigorously and why?

Ans. HCl is stronger acid than CH_3COOH . Therefore, H^+ ions concentration in test tube A will be more than that in test tube B. hence, reaction will take place faster in test tube A than in test tube B. so, fizzing will occur more vigorously in test tube B.

11. Fresh milk has a pH of 6. How do you think the pH will change as it turns into curd? Explain your answer.

Ans. Bacteria change the fresh milk into curd by producing lactic acid. Because of the presence of lactic acid in curd, the pH will come down from 6 to lower value.

12. A milkman adds a very small amount of baking soda to fresh milk.

(a) Why does he shift the pH of the milk from 6 to slightly alkaline?

(b) Why does this milk take a long time to set a curd?

Ans. (a) The pH of milk changes from 6 to slightly alkaline on addition of a very small amount of baking soda. This is because sodium hydrogen carbonate (baking soda) is basic in nature. This prevents the milk from souring.

(b) Lactic acid formed as a result of fermentation is neutralized by sodium hydrogen carbonate. This prolongs the time taken by milk to set as curd.

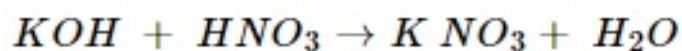
13. Plaster of Paris should be stored in moisture-proof container. Explain why?

Ans. Plaster of Paris reacts with moisture to form gypsum and sets to a hard mass. Therefore, it should be stored in moisture-proof container.

14. What is a neutralization reaction? Give two examples.

Ans. The reaction between an acid and a base to give salt and water is called neutralization reaction.

For example:



15. Give two important uses of washing soda and baking soda.

Ans. Uses of washing soda:

- (i)** As cleansing agent.
- (ii)** Removing permanent hardness of water.
- (iii)** Used in glass, soap and paper industries.

Uses of baking soda:

- (i)** For making baking powder.
- (ii)** As ingredient of antacid.