

Science

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(Chapter – 2) (Acids, Bases and Salts)
(Class 10)

Exercises

Question 1:

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

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

Answer 1:

(d) 10

Basic solution has a pH value more than 7. Since the solution turns red litmus blue, its pH is likely to be 10.

Question 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*

Answer 2:

(b) *HCl*

The crushed egg-shells contains calcium carbonate [CaCO_3]. When *HCl* solution reacts with this crushed egg-shells and produces carbon dioxide which turns lime – water milky.



Question 3:

10 mL of a solution of NaOH is found to be completely neutralised by 8 mL of a given solution of HCl. If we take 20 mL of the same solution of NaOH, the amount HCl solution (the same solution as before) required to neutralise it will be

- (a) 4 ml (b) 8 ml (c) 12 ml (d) 16 ml

Answer 3:

(d) 16 ml

Because for the neutralisation, the ratio of the acid and base should be same.

Question 4:

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

- (a) Antibiotic (b) Analgesic (c) Antacid (d) Antiseptic

Answer 4:

(c) Antacid

Because antacid reduced the acidity (produced due to excess release of HCl) in the stomach.

Question 5:

Write word equations and then balanced equations for the reaction taking place when –

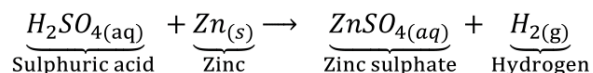
- (a) dilute sulphuric acid reacts with zinc granules.
(b) dilute hydrochloric acid reacts with magnesium ribbon.
(c) dilute sulphuric acid reacts with aluminium powder.
(d) dilute hydrochloric acid reacts with iron filings.

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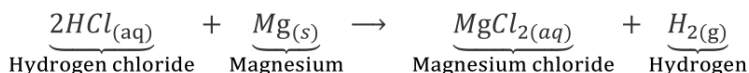
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Answer 5:

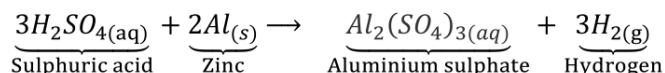
(a) Sulphuric acid + Zinc \longrightarrow Zinc sulphate + Hydrogen



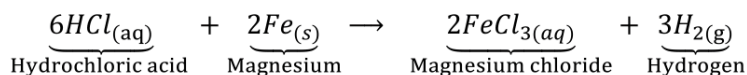
(b) Hydrochloric acid + Magnesium \longrightarrow Magnesium chloride + Hydrogen



(c) Sulphuric acid + Aluminium \longrightarrow Aluminium sulphate + Hydrogen



(d) Hydrochloric acid + Iron \longrightarrow Feric chloride + Hydrogen



Question 6:

Compounds such as alcohols and glucose also contain hydrogen but are not categorised as acids. Describe an Activity to prove it.

Answer 6:

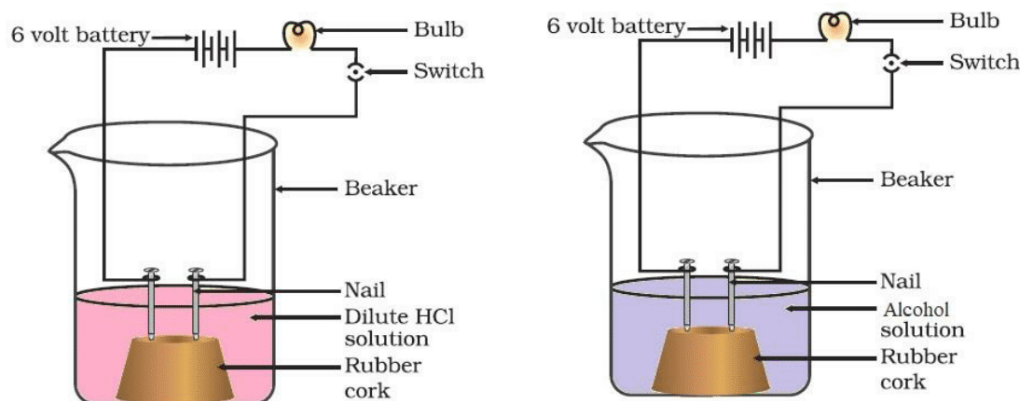
Two nails are fitted on a cork and are kept it in a 100 mL beaker. The nails are then connected to the two terminals of a 6-volt battery through a bulb and a switch. Some dilute HCl is poured in the beaker and the current is switched on. The same experiment is then performed with glucose solution and alcohol solution.

Observations

It will be observed that the bulb glows in the HCl solution and does not glow in the glucose solution.

Result

HCl dissociates into H^+ and Cl^- ions. These ions conduct electricity in the solution resulting in the glowing of the bulb. On the other hand, the glucose solution does not dissociate into ions. Therefore, it does not conduct electricity.



Conclusion

From this activity, it can be concluded that all acids contain hydrogen but not all compounds containing hydrogen are acids. That is why, though alcohols and glucose contain hydrogen, they are not categorised as acids.

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Question 7:

Why does distilled water not conduct electricity, whereas rain water does?

Answer 7:

Distilled water is a pure form of water not containing any ionic species. Therefore, it does not conduct electricity. Rain water, being an impure form of water, contains many ionic species (dissolved in air) such as acids and therefore it conducts electricity.

Question 8:

Why do acids not show acidic behaviour in the absence of water?

Answer 8:

Acids do not show acidic behaviour in the absence of water because the dissociation of hydrogen ions (H^+) from an acid occurs in the presence of water only. It is the hydrogen ions (H^+) that are responsible for the acidic behaviour.

Question 9:

Five solutions A,B,C,D and E when tested with universal indicator 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?

Arrange the pH in increasing order of hydrogen-ion concentration.

Answer 9:

- (a) Neutral → Solution D with pH 7
- (b) Strongly alkaline → Solution C with pH 11
- (c) Strongly acidic → Solution B with pH 1
- (d) Weakly acidic → Solution A with pH 4
- (e) Weakly alkaline → Solution E with pH 9

The pH can be arranged in the increasing order of the concentration of hydrogen ions as: $11 < 9 < 7 < 4 < 1$

Question 10:

Equal lengths of magnesium ribbons are taken in test tubes A and B. Hydrochloric acid (HCl) is added to test tube A, while acetic acid (CH_3COOH) is added to test tube B. In which test tube will the fizzing occur more vigorously and why?

Answer 10:

The fizzing will occur strongly in test tube A, in which hydrochloric acid (HCl) is added. This is because HCl is a stronger acid than CH_3COOH and therefore produces hydrogen gas at a faster speed due to which fizzing occurs.

Question 11:

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

Answer 11:

The pH of milk is 6. As it changes to curd, the pH will reduce because curd is acidic in nature. The acids present in it decrease the pH.

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Question 12:

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

- (a) Why does he shift the pH of the fresh milk from 6 to slightly alkaline?
(b) Why does this milk take a long time to set as curd?

Answer 12:

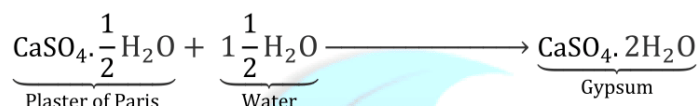
- (a) The milkman shifts the pH of the fresh milk from 6 to slightly alkaline because in alkaline condition, so that it takes longer time to be spoiled (become acidic).
(b) Since this milk is slightly basic than usual milk, acids produced to set the curd are neutralized by the base. Therefore, it takes a longer time for the curd to set.

Question 13:

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

Answer 13:

Plaster of Paris (POP) should be stored in a moisture-proof container because Plaster of Paris, a powdery mass, absorbs water (moisture) to form a hard solid known as gypsum.



Question 14:

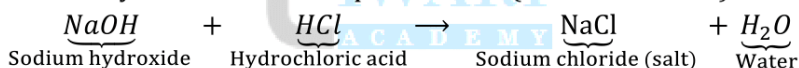
What is a neutralisation reaction? Give two examples.

Answer 14:

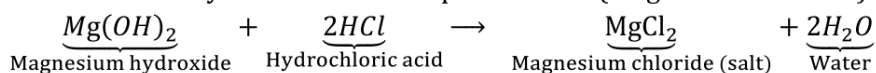
A reaction in which an acid and base react with each other to give a salt and water is termed as neutralization reaction. In this reaction, energy is evolved in the form of heat.

For example:

Sodium hydroxide reacts with hydrochloric acid to produce salt (sodium chloride) and water.



Magnesium hydroxide reacts with hydrochloric acid to produce salt (Magnesium chloride) and water.



Question 15:

Give two important uses of washing soda and baking soda.

Answer 15:

Important uses of Washing Soda

- Sodium carbonate (washing soda) is used in glass, soap and paper industries.
- It is used in the manufacture of sodium compounds such as borax.
- Sodium carbonate can be used as a cleaning agent for domestic purposes.
- It is used for removing permanent hardness of water.

Important uses of Baking Soda

- It is used to make bread or cake soft and spongy.
- It is used as antacids. Being alkaline, it neutralises excess acid in the stomach and provides relief.
- It is also used in soda-acid fire extinguishers.

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