
Chapter – 2 (Acids, bases and Salts)

Questions:

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

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

Answer:

Answer is 10 because litmus paper turns blue when reacts with basic solution (pH more than 7). Hence 10 is the answer.

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:

HCl

Egg shells contain calcium carbonate, which on reaction with HCl liberates CO₂ gas which turns lime water to 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

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- b.) 8 mL
c.) 12 mL
d.) 16 mL

Answer:

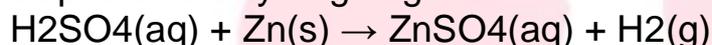
Indigestion is due to excess production of acid in the stomach.
Medicines used to treat indigestion is called as Antacid.

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

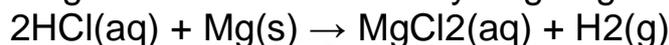
- a.) Dilute sulphuric acid reacts with zinc granules.
b.) Dilute hydrochloric acid reacts with magnesium ribbon.
c.) Dilute sulphuric acid reacts with aluminium powder.
d.) Dilute hydrochloric acid reacts with iron filings.

Answer:

a) Dilute sulphuric acid reacts with zinc granules to produce zinc sulphate and hydrogen gas



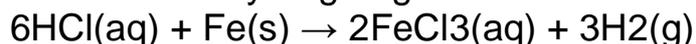
(b) Dilute hydrochloric acid reacts with magnesium ribbon to produce magnesium chloride and hydrogen gas.



(c) Dilute sulphuric acid reacts with aluminium powder to produce aluminium sulphate and hydrogen gas.



(d) Dilute hydrochloric acid reacts with iron filings to produce ferric chloride and hydrogen gas.



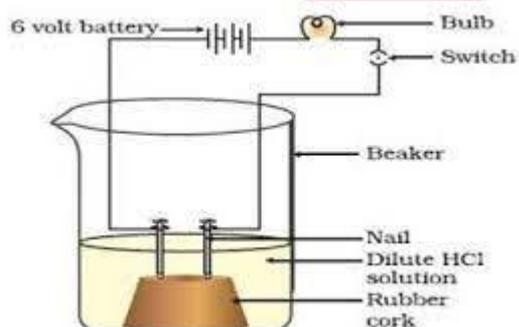
Question:6 Compounds such as alcohols glucose also contain hydrogen but are not categorised as acids. Describe an activity to prove it.

Answer:

Take the solution of dilute hydrochloric solution and glucose. 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. Dilute HCl is poured in the beaker and current is switched on. Now, the Same experiment is performed with a glucose solution and an alcohol solution.

We will observe that the bulb glows in HCl solution and does not glow in the glucose solution.

Because: HCl dissociate into $H^+ (aq)$ and $Cl^- (aq)$ 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 compounds like alcohols and glucose contain hydrogen, they are not categorized as acids.

Question:7 Why does distilled water not conduct electricity, whereas rain water does?

Answer:

The availability of ions is very important to conduct electricity. Distilled water is a pure type of water which does not contain any ions in it. Whereas rainwater contains dissolved gasses such as SO_2 , CO_2 .

These gases dissolve in water to form some kind of acids like carbonic acids which dissociates to give ions. Thus rainwater is conducting electricity while distilled water is not conducting electricity.

Question:8 Why do acids not show acidic behaviour in the absence of water?

Answer:

The acidic behaviour from acids is because of the presence of hydrogen ions.

Hydrogen ions can only be produced in the presence of water and therefore water is definitely needed if acids are to show their 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?

Answer:

pH↑[H+]Conc.↓

[H+] conc.↑ Acid Strength↑

B→ Strongly Acidic

A→ Weakly Acidic

D→ Neutral [pH=7]

E→ Weakly Alkaline

C→ Strongly Alkaline

So, [H+] conc. is B>A>D>E>C

Question: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 tube B. Amount and concentration taken for both the acids are

same. In which test tube will the fizzing occur more vigorously and why?

Answer:

When an acid reacts with magnesium metal, hydrogen gas is produced which causes fizzing. Stronger acids having a greater number of hydrogen ions in it. Hence, fizzing will occur strongly in test tube A, in which hydrochloric acid (HCl) is added.

This is because HCl is a stronger acid as compared to (CH_3COOH) and therefore, during the chemical reaction with magnesium metal, HCl will produce more hydrogen gas due to which fizzing will be more vigorous in test-tube A.

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:

Fresh milk is turned to curd due to production of lactic acid. Lactic acid reduces the pH of milk.

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:

a) When the milk is made more alkaline by adding a base to it, it is basically done to prevent it for more time to turning to curd. That's why milkman shifts the pH of fresh milk to slightly alkaline by adding a very small amount of baking soda to it as baking soda is alkaline in nature and it neutralizes the acidic nature of milk.

b) As this milk is slightly more alkaline than other, therefore, acid produced to set into curd will be neutralized by baking soda added by milkman. Hence, this milk takes a longer time to set as curd.

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

Answer:

Plaster of Paris should be stored in moisture-proof container because moisture can affect plaster of Paris by slowing down the setting of the plaster because of hydration. This will turn plaster useless.

Question:14 What is neutralisation reaction? Give two examples.

Answer:

A reaction in which an acid and base react with each other to give a salt and water is known as neutralization reaction. That is:



For example:

(i) Sodium hydroxide (NaOH) reacts with hydrochloric acid (HCl) to form sodium chloride (NaCl) and water:



(ii) Magnesium hydroxide reacts with hydrochloric acid to form magnesium chloride and water:



Question:15 Give two important use of washing soda and baking soda.

Answer:

Washing soda	Baking soda
It is used as an electrolyte.	It can be used to test the garden soil for acidity. If bubbles are developed then the soil is too acidic.
It can be used domestically as water softener for laundry.	If used on washing car then it will remove dead bug bodies without damaging the colour or the paint on the car.

In-text questions:

Que.1 You are given three test tubes. The three test tubes contain distilled water, acidic solution and the basic solution respectively. There is only red litmus paper available in order to identify what is there in each test tube. How will you find out what is in each of the test tubes?

Ans.

Add few drops of solution from all three test tubes on the red litmus paper separately. The solution which turns red litmus to blue contains basic solution. Use this blue litmus paper to test the solutions in other two test tubes. The solution from the test tube which turns blue litmus paper to red will be the acidic solution and solution of the test tube which do not change either red or blue litmus paper contain water.

Que.2 Why should curd and sour substances not be kept in brass and copper vessels?

Ans.

Curd and sour substances contain acids which can react with copper vessels and brass to form toxic compounds.

Que.3 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.

When an acid reacts with any metal, salt and hydrogen gas are formed.
Metal + Acid \rightarrow Salt + Hydrogen gas

Que.4 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 metal compound released is calcium chloride the gas evolved here is CO₂. Hence metal A should be Calcium Carbonate. Hence the reaction between Calcium Carbonate and HCl is



Que.5 Why do HCl, HNO₃ etc. show acidic characters in a aqueous solutions while solutions of compounds like alcohol and glucose do not show acidic character?

Ans.

Solutions like HCl, HNO₃ etc. get ionised in aqueous solutions and due to the presence of H⁺ ions they show acidic characters. While solutions of compounds like alcohol and glucose do not form any such ions so they do not show acidic characters.

Que.6 Why does an aqueous solution of an acid conduct electricity?

Ans.

Charged particles are responsible for the conductance of electricity in an acid. These charged particles called as ions are the reason behind conductance of electricity in acid.

Que.7 Why does dry HCl gas not change the colour of the dry litmus paper?

Ans.

HCl does not give out Hydrogen ions, therefore HCl does not show any acidic behaviour and colour of the litmus paper remain the same on reacting with HCl gas.

Que.8 While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid?

Ans.

When acid and water mix, the reaction is highly exothermic, the acid may splash, cause burns and even the bottle/container can break. To avoid this and allow the heat evolved to be absorbed by water slowly, acid is added to water for diluting it.

Que.9 How is the concentration of hydronium ions affected when a solution of an acid is diluted?

Ans.

When the solution of acid is diluted the H^+ ions are released from the acid to combine with H_2O and H_3O^+ ions is increased.

Que.10 How is the concentration of hydroxide ions affected when excess base is dissolved in a solution of sodium hydroxide?

Ans.

When base is mixed with water there is decrease in the concentration of OH^- ions per unit volume.

Que.11 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 ion concentration? Which of this is acidic and which one is basic?

Ans.

In order to find the hydrogen ion concentration, we can use the rule that states,

“The pH of any solution is inversely proportional to the hydrogen ion concentration.”

A with pH = 6 is acidic B with pH = 8 is basic ‘A’ has more hydrogen ion concentration.

Que.12 What affect does the concentration of H^+ ions have on the nature of the solution?

Ans.

Hydrogen ion concentration decides the nature of the solution. If Hydrogen ion concentration increase then solution turn acidic and similarly if Hydrogen ion concentration decrease then solution turn basic.

Que.13 Do basic solutions also have $H^+(aq)$ ions? If yes, then why are these basic?

Ans.

Basic solutions has H^+ ions, but hydroxide ions present in basic solution are more in basic solution. Hence Hydroxide ions turn solution to basic.

Que.14 Under what soil condition do you think a farmer would treat the soil of his fields with quick lime or slaked lime or chalk?

Ans.

If the soil is acidic in nature then such field should be treated with quick lime or slaked lime or chalk.

Que.15 What is the common name of the compound $CaOCl_2$?

Ans.

Common name of $CaOCl_2$ is bleaching powder.

Que.16 Name the substance which on treatment with chlorine yields bleaching powder.

Ans.

The substance which on treatment with chlorine yields bleaching powder is Calcium hydroxide.

Que.17 Name the sodium compound which is used for softening hard water.

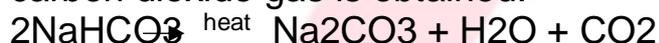
Ans.

Sodium carbonate is the compound which is used for softening hard water.

Que.18 What will happen if a solution of sodium hydrocarbonate is heated? Give the equation of the reaction involved.

Ans.

When sodium hydrocarbonate is heated, sodium carbonate, water, and carbon dioxide gas is obtained.



Que.19 Write an equation to show the reaction between Plaster of Paris and water.

Ans.

The chemical equation for the reaction of Plaster of Paris and water is

