

Acids, Bases and Salts

Improve your learning

Q. 1. 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 (AS1)

(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 : A is the weakly acidic solution.

B is the strongly acidic solution.

C is strongly alkaline(basic).

D is neutral.

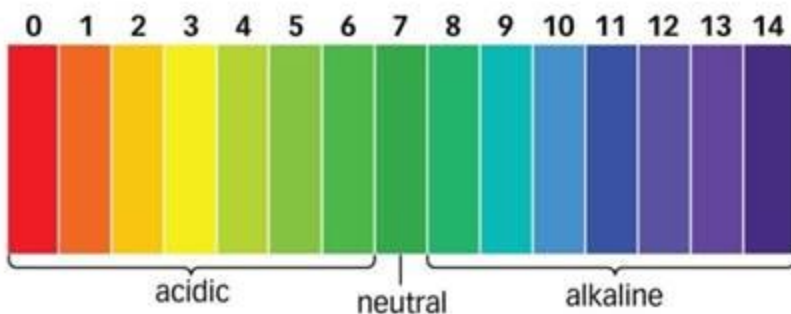
E is weakly alkaline.

Explanation: A scale of measuring hydrogen ion concentration in a solution is called pH scale. pH value of a solution is simply a number which indicates the acidic or basic nature of a solution.

pH of a neutral solution is 7.

Value less than 7 represent the acidic solution.

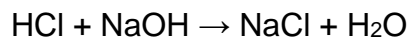
Value above than 7 represent the alkaline (basic) solution.



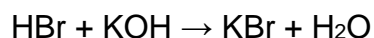
Q. 2. What is a neutralization react ion? Give two examples. (AS1)

Answer : Neutralization reaction: The reaction of an acid with a base to give a salt and water is known as neutralization reaction.

Two examples:



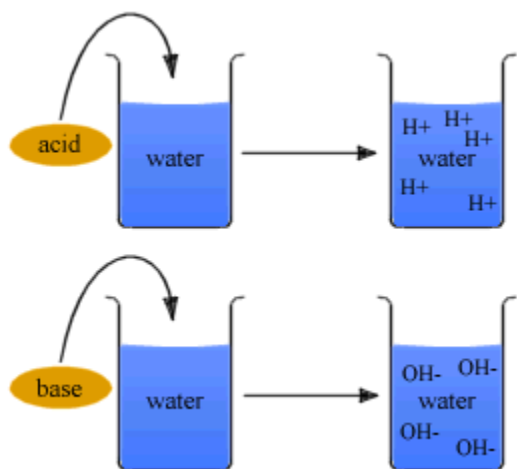
Acid-Base Salt Water



Acid-Base Salt Water

Q. 3. What happens when an acid or base is mixed with water? (AS1)

Answer : When an acid or base is mixed with water, it results in the decrease of concentration of ions ($\text{H}_3\text{O}^+/\text{OH}^-$) per unit volume. Such a process is called dilution and the acid or base is said to be diluted.



Q. 4. Why does tooth decay start when the pH of mouth is lower than 5.5? (AS1)

Answer : Tooth decay starts when the pH of mouth is lower than 5.5 because:

Tooth decays which are made of calcium phosphate are the hardest substance in the body.

It does not dissolve in water.

It gets corroded when the pH in the mouth is lower than 5.5.

Acids are produced by the bacteria present in the mouth

Q. 5. Why does not distilled water conduct electricity? (AS2)

Answer : Distilled water does not conduct electricity because:

Distilled water is a pure form of water, is neither acidic nor basic.

It does not dissociate into ions.

As we know that, to carry out electricity, ions are needed

Due to the absence of free ions, distilled water does not conduct electricity.

Q. 6. Dry hydrogen chloride gas does not turn blue litmus to red whereas hydrochloric acid does. Why? (AS1)

Answer : An acid is a substance which has the ability to give H^+ ion.

Dry hydrogen chloride gas is not an acid and has no ability to give hydrogen ions. Thus, it does not turn blue litmus to red.

Hydrochloric acid is an acid and has the ability to give Hydrogen ions. Thus, it turns blue litmus to red.

Q. 7. Why does pure acetic acid not conduct electricity? (AS2)

Answer : Pure acetic acid does not conduct electricity because pure acetic acid cannot dissociate into hydronium ion and acetate ions which are required for the conduction of electricity.

Note: On the other hand, acetic acid in water dissociates into hydronium ion and acetate ions for the conduction of electricity.

Q. 8. A milkman adds a very small amount of baking soda to fresh milk. (A52)

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

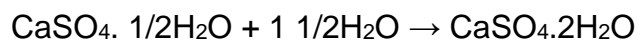
b) Why does this milk take a long time to set as curd?

Answer : a. He shifts the pH of the fresh milk from 6 to slightly alkaline because by doing this, he can keep the milk unspoiled for little more time than usual time.

b. After adding baking soda (alkaline in nature) to the milk, it changed into a base. But curd needs an acidic environment to set. Thus, this milk takes a long time to set as curd.

Q. 9. Plaster of Paris should be stored in moisture-proof container. Explain why? (AS2)

Answer : Plaster of Paris should be stored in moisture-proof container because it absorbs water from moisture and it sets into hard solid mass due to the formation of gypsum.



Plaster of Paris Gypsum

Q. 10. Fresh milk has a pH of 6. Explain why the pH changes as it turns into curd? (AS3)

Answer : When the milk is changed into curd, the pH value of milk (6) decreases due to the formation of lactic acid in the curd. Lactic acid is acidic in nature.

Thus, due to lactic acid, the pH of milk changes as it turns into curd.

Q. 11. Compounds such as alcohols and glucose contain hydrogen but are not categorized as acids. Describe all activity to prove it. (AS3)

Answer : Activity

Step 1: Connect two different coloured electrical wires to graphite rods separately in a 100ml beaker.

Step 2: Connect free ends of the wire to 230 volts Ac plug and complete the circuit.

Step 3: Connect a bulb to one of the wires.

Step 4: Now pour some dilute HCl in the beaker and switch on the current.

Step 5: Repeat the same activity with glucose and alcohol solutions.

In case of HCl	In case of glucose/alcohol solutions
1. The bulb will glow.	The bulb does not glow.
2. This indicates that there is a flow of electric current through the solution.	This indicates that there is no flow of electric current through the solution.
3. Acid have ions which are responsible for the conduction of electricity	Glucose and alcohol solutions have an absence of ions.
4. Acid produce H^+ ions in the solution which are responsible for their acidic properties	There is an absence of H^+ ions. Hence, they are not categorized as acids.

Q. 12. What is meant by "water of crystallization" of a substance? Describe an activity to show the water of crystallization. (AS3)

Answer : The water of crystallization: The fixed number of water molecules present in one formula unit of a salt is called water of crystallization.

In the crystals of some compounds, water molecules are included in this arrangement. That is the water of crystallization.

Activity to show water of crystallization:

Step 1: Take some crystals of copper sulfate in a test tubes

Step 2: Add some water in one test tube and shake it.

On heating, the crystalline structure of copper sulphate broke down to form a colourless powder and water came out. This water was part of the crystal structure of copper sulphate. It is called water of crystallization.

Q. 13. 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 of both the acids is same. In which test tube will the fizzing occur more vigorously and why? (AS4)

Answer : In test tube A, the fizzing will occur more vigorously.

Explanation:

HCl is a strong acid and acetic acid is a weak acid.

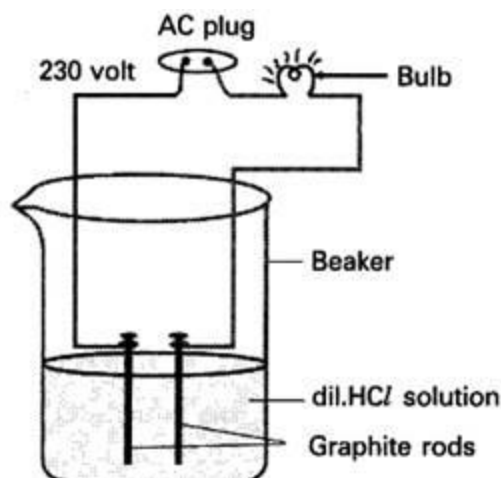
As HCl is a strong acid thus it releases more H^+ ions in the solution.

Due to which, the fizzing will occur more vigorously.

This fizzling is due to the liberation of hydrogen gas which is formed by mixing HCl with magnesium ribbon.

Q. 14. Draw a neat & again showing the acid solution in water conducts electricity (AS5)

Answer :



Acid solution in water conducts electricity

Q. 15. How do you prepare your own indicator using beetroot? Explain. (AS5)

Answer : Preparation of our own indicator using beetroot:

Step 1: Take the beetroot and peel it.

Step 2: Cut them into small pieces and make a paste by mixing them in a grinder.

Step 3: Add some water to the paste.

Step 4: Now, filter this and collect only juice from this. This filtered juice will act as indicator for acid and bases.

Step 5: Now add this juice (beetroot indicator) to orange juice.

We will see the change of colour. This shows the acidic nature of orange juice.

Q. 16. How does the flow of acid rain into a river make the survival of aquatic life in a river difficult? (AS7)

Answer : The flow of acid rain into a river changes the pH of the river. The pH of the water decreases due to the acid rain which is not suitable for the survival of aquatic plants and animals.

They need pH of 7 to 8 for survival. But acid rain increases the acidity of the river due to which it becomes difficult for them to survive.

Q. 17. What is baking powder? How does it make the cake soft and spongy? (AS7)

Answer : Baking powder

The chemical name of the compound is sodium carbonate (NaHCO_3).

Preparation of baking powder is

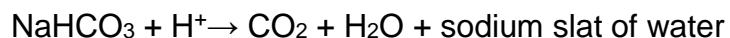


Baking Powder

It is sometimes added for faster cooking.

It is a mild non-corrosive base.

When baking powder (a mixture of baking soda and tartaric acid) is mixed with water, the reaction takes place:



CO_2 which is released during the reaction makes the cake soft and spongy.

Q. 18. Give two important uses of washing soda and baking soda. (AS7)

Answer : Two important uses of washing soda:

It is used as a cleaning agent for domestic purposes.

It is used in glass, soap and paper industries.

Two important uses of baking soda:

It is used as a mild antiseptic.

It is used as soda-acid in fire extinguishers.