

04. ACIDS, BASES AND SALTS

Questions and Answers

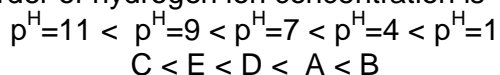
1. Five solutions A, B, C, D and E when tested with universal indicator showed pH as 4, 1, 11, 7 and 9, respectively, which solution is

(a) neutral (b) strongly alkaline (c) strongly acidic (d) weakly acidic (e) weakly alkaline
 Arrange the pH in increasing order of Hydrogen ion concentration.

A.

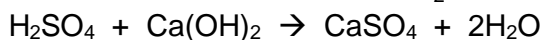
Solution	p ^H	Type of solution
A	4	Weak acid
B	1	Strong acid
C	11	Strong base
D	7	Neutral
E	9	Weak base

Arrangement of substances in increasing order of hydrogen ion concentration is



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

A. The reaction between an acid and a base to produce salt and water is called neutralization reaction.



3. What happens when an acid or base is mixed with water?

A. By mixing of acid to water, the concentration of hydrogen ions per unit volume decreases. This gives diluted acid. Similarly, by mixing of base to water, the concentration of hydroxide ions per unit volume decreases. This gives diluted base. Dilution of acid or base is an exothermic process.

4. Why does tooth decay start when the pH of mouth is lower than 5.5.

A. Tooth enamel, made of calcium phosphate is the hardest substance in the body. Bacteria present in the mouth produce acids by degradation of sugar and food particles remaining in the mouth. This acids attack on the enamel. So Tooth decay starts when the pH of the mouth is lower than 5.5.

5. Why does not distilled water conduct electricity?

A. Electricity passes through a solution when ions present in it. Distilled water does not contain any ionic substance that can dissociate hydronium ion. That's why It does not conduct electricity.

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

A. Dry HCl gas (Hydrogen chloride) is not an acid. So it does not turn blue litmus to red. Because The HCl gas dissociates in presence of water to produce hydrogen ions. In the absence of water dissociation of HCl molecules do not occur.

7. Why pure acetic acid does not turn blue litmus to red?

A. Pure acetic acid is a weak acid. The concentration of hydrogen ions in acetic acid is less. So it does not turns blue litmus in to red.

8. 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?

A. a) A milkman adds a very small amount of baking soda to fresh milk. By making the milk more alkaline, it prevents for more time to turn into curd.

b) This milk take a long time to set as curd. Because the acid produced to set into curd will be neutralized by baking soda. It takes long time to set as curd.

9. Plaster of Paris should be stored in moisture-proof container. Explain. Why?

A. Plaster of Paris should be stored in moisture-proof container. Because it turns into Gypsum after reacting with moisture present in air. Also it sets into hard solid.
$$\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O} + 1\frac{1}{2} \text{H}_2\text{O} \rightarrow \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$$

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

A. Fresh milk has a p^H of 6. By releasing lactic acid by Lacto bascillus bacteria, the milk turns into curd. As the p^H values of acids are less, The value of p^H of milk decreases, when it turns into curd.

11. Compounds such as alcohols and glucose contain hydrogen but are not categorized as acids. Describe an activity to prove it.

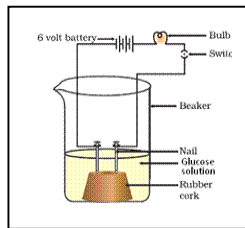
A. Prepare solutions of glucose, alcohol, hydrochloric acid and sulphuric acid etc., Connect two different

coloured electrical wires to graphite rods separately in a 100 ml beaker. Connect free ends of the wire to 6 volts battery through a bulb & a switch. Make a circuit.

Now pour some dilute HCl in the beaker and switch on the current. Repeat activity with dilute sulphuric acid and glucose and alcohol solutions separately.

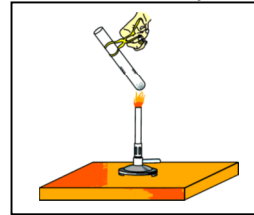
We will notice that the bulb glows only in acid solutions but not in glucose and alcohol solutions. Glowing of bulb indicates that there is flow of electric current through the solution. Acid solutions have ions and the movement of these ions in solution helps for flow of electric current through the solution.

Alcohol and glucose contains hydrogen but not dissociates hydrogen ion in their aqueous solutions. So they are not categorized as acids.



12. What is meant by “water of crystallization” of a substance? Describe an activity to show the water of crystallization.

A. Water crystallization: The water molecules which form part of the structure of a crystal are called water of crystallization. The salts which contain water of crystallization are called hydrated salts.



Activity: Take a few crystals of copper sulphate in a dry test tube and heat the test tube.

In the above activity copper sulphate crystals which seem to be dry contain the water of crystallization.

When these crystals are heated, water present in crystals is evaporated and the salt turns white.

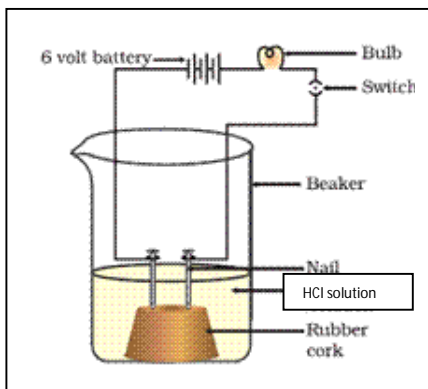
When the crystals are added with water, the blue colour reappears. Another salt which possesses water of crystallization is gypsum. It has two water molecules in its crystals and the formula is $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$.

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?

A. Magnesium is a metal. Strong acids reacts rapidly with metals. As HCl is a strong acid than acetic acid, In test tube A fizzing occur vigorously. And HCl reacts with magnesium ribbon.

14. Draw a neat diagram showing acid solution in water conducts electricity.

A.



15. How do you prepare your own indicator using beetroot? Explain.

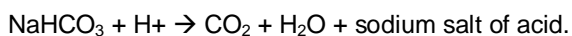
A. To prepare beet root indicator, we need beet root and a filter paper. Extract juice from beet root and filter it. Drop a filter paper into the juice. Let it be dry. The dried paper acts as beet root indicator.

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

A. Living organisms can survive only in a narrow range of pH change. When pH of rain water is less than 5.6, it is called acid rain. When acid rain flows in to the rivers, it lowers the pH of the river water, the survival of aquatic life in such rivers becomes difficult.

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

A. Baking powder is a mixture of baking soda and a mild edible acid such as tartaric acid. When baking powder is heated or mixed in water, the following reaction takes place.



Carbon dioxide produced during the reaction causes bread or cake to rise making them soft and spongy.

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

A. Uses of Baking Soda (NaHCO_3):

- Baking powder is used in the preparation of bread and cake. Carbon dioxide produced during the reaction causes bread or cake to rise making them soft and spongy.
- Baking soda is also an ingredient in antacids. Being alkaline, it neutralizes excess acid in the stomach and provides relief.
- It is also used in soda-acid fire extinguishers
- It acts as mild antiseptic.

Uses of Washing soda (Na_2CO_3):

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

*** ADDITIONAL QUESTIONS ***

- Why do curd and sour substances not be kept in copper vessels ?
- Which gas is liberated when acids react with metals? Give one example.
- Define strong acid and strong base. Give two examples for each.
- What is p^{H} ? How can we differ acids, bases according to the values of p^{H} .
- Acid should be added to water but not water to the acid. why?
- How can you prepare your own turmeric indicator? What is the use of it?