

Class 10 Chapter 2 Acids, Bases and Salts Important Questions with Answers

Matching Answer Type Questions

Note: Match the items of Column A and Column B in the following questions.

Q1. Match the acids given in Column (A) with their correct source given in Column (B)

Column A	Column B
Lactic acid	Tomato
Acetic acid	Lemon
Citric acid	Vinegar
Oxalic acid	Curd

Answer:

Column A	Column B
Lactic acid	Curd
Acetic acid	Vinegar
Citric acid	Lemon
Oxalic acid	Tomato

Q2. Match the important chemicals given in Column (A) with the chemical formulae given in Column (B).

Column A	Column B
Plaster of Paris	Ca(OH)_2
Gypsum	$\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$

Bleaching Powder	$\text{CaSO}_4 \cdot 2 \text{H}_2\text{O}$
Slaked Lime	CaOCl_2

Answer:

Column A	Column B
Plaster of Paris	$\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$
Gypsum	$\text{CaSO}_4 \cdot 2 \text{H}_2\text{O}$
Bleaching Powder	CaOCl_2
Slaked Lime	Ca(OH)_2

Short Answer Type Questions

Q1. What will be the action of the following substances on litmus paper?

- Dry HCl gas
- Moistened NH_3 gas
- Lemon juice
- Carbonated soft drinks
- Curd
- Soap solution

Answer:

The action of enlisted compounds on litmus paper will be as follows.

- Dry HCl gas: Dry HCl gas would not affect the litmus paper.
- Moistened NH_3 gas: Moistened NH_3 gas is alkaline in nature. Thus it will turn red litmus blue.
- Lemon juice: Lemon juice is acidic in nature. Thus it will turn blue litmus red.
- Carbonated soft drinks: Carbonated soft drinks contains carbonic acid. Thus it will turn blue litmus red.
- Curd: Curd contains lactic acid. Thus it will turn blue litmus red.
- Soap solution: Soap is a salt of a strong base. Thus it will turn red litmus blue.

Q2. Name the acid present in ant sting and give its chemical formula. Also, give the common method to get relief from the discomfort caused by the ant sting.

Answer:

Ant sting contains formic acid or methanoic acid. The chemical formula of formic acid is HCOOH .

- We can get relief from the discomfort caused by the ant sting by rubbing baking soda (NaHCO_3) in the affected area. Baking soda (NaHCO_3) is a salt of a strong base, i.e. basic in nature, it neutralises the acid effect of the ant bite when applied to the skin.
- We can also use a calamine solution. Zinc carbonate is present in calamine solution, which neutralises the acid effect of the ant bite when applied to the skin.

Q3. What happens when nitric acid is added to the eggshells?

Answer:

Eggshells contain calcium carbonate. Calcium carbonate reacts with nitric acid to form calcium nitrate and carbon dioxide gas.



Q4. A student prepared solutions of (i) an acid and (ii) a base in two separate beakers. She forgot to label the solutions, and litmus paper was not available in the laboratory. Since both the solutions are colourless, how will she distinguish between the two?

Answer:

We can use phenolphthalein to check which beakers contain acid and which one contains a base. Phenolphthalein turns colourless in acidic solutions and pink in basic solutions.

Apart from that, we can also use other natural indicators, like China rose or turmeric.

Turmeric is a natural indicator. It is yellow coloured. Turmeric paper turns red when it is dipped into a basic solution while it does not change its colour with acid.

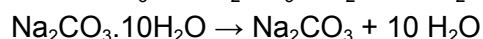
China rose is another natural indicator. China rose solution gives dark pink (magenta) colour with acid and green with base.

Q5. How would you distinguish between baking powder and washing soda by heating?

Answer:

Baking soda (NaHCO_3) liberates carbon dioxide gas on heating, confirmed by passing it in lime water. Whereas on heating washing soda $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ water of crystallisation is given out, the salt becomes anhydrous.

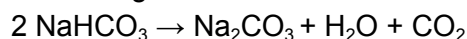
Reaction:



Q6. Salt A is commonly used in bakery products on heating gets converted into another salt B, which is used to remove the hardness of water, and a gas C is evolved. The gas C, when passed through lime water, turns it milky. Identify A, B and C.

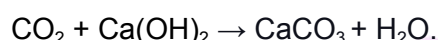
Answer:

Baking powder is the salt used in bakery products that give sodium carbonate, and carbon dioxide gas on heating.



Sodium carbonate is used to remove the hardness of the water.

Carbon dioxide turns lime water milky due to the formation of insoluble calcium carbonate.

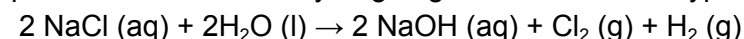


Thus, A is sodium bicarbonate (Baking powder), B is sodium carbonate, and C is carbon dioxide gas.

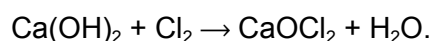
Q7. In one of the industrial processes used to manufacture sodium hydroxide, a gas X is formed as a byproduct. The gas X reacts with lime water to give a compound Y used as a bleaching agent in the chemical industry. Identify X and Y giving the chemical equation of the reactions involved.

Answer:

Sodium chloride is used to manufacture sodium hydroxide, called the chloralkali process. In this process, chlorine and hydrogen gas are formed as byproducts and sodium hydroxide.



Chlorine gas gives bleaching power when it reacts with lime water and is used as a bleaching agent in chemical industries.



Therefore, the gas X is chlorine. Compound Y is calcium oxychloride, commonly known as bleaching powder and is used as a bleaching agent in chemical industries.

Q8. Fill in the missing data in the following table.

S. No.	Name of the salt	Formula	Salt obtained from
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			Base	Acid
1.	Ammonium chloride	NH_4Cl	NH_4OH	-
2.	Copper sulphate	-	-	H_2SO_4
3.	Sodium chloride	NaCl	NaOH	-
4.	Magnesium nitrate	$\text{Mg}(\text{NO}_3)_2$	-	HNO_3
5.	Potassium sulphate	K_2SO_4	-	-
6.	Calcium nitrate	$\text{Ca}(\text{NO}_3)_2$	$\text{Ca}(\text{OH})_2$	-

Answer:

S. No.	Name of the salt	Formula	Salt obtained from	
			Base	Acid
1.	Ammonium chloride	NH_4Cl	NH_4OH	HCl
2.	Copper sulphate	CuSO_4	$\text{Cu}(\text{OH})_2$	H_2SO_4
3.	Sodium chloride	NaCl	NaOH	HCl
4.	Magnesium nitrate	$\text{Mg}(\text{NO}_3)_2$	$\text{Mg}(\text{OH})_2$	HNO_3
5.	Potassium sulphate	K_2SO_4	KOH	H_2SO_4
6.	Calcium nitrate	$\text{Ca}(\text{NO}_3)_2$	$\text{Ca}(\text{OH})_2$	HNO_3

Q9. What are strong and weak acids? In the following list of acids, separate strong acids from weak acids. Hydrochloric acid, citric acid, acetic acid, nitric acid, formic acid, sulphuric acid.

Answer:

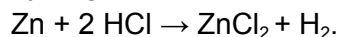
Acids that get completely ionised in an aqueous solution are called strong acids, whereas acids that do not get utterly ionised in an aqueous solution are called weak acids.

Hydrochloric acid, nitric acid, and sulphuric acid are examples of strong acids, while citric acid, acetic acid, and formic acid are examples of weak acids.

Q10. When zinc metal is treated with a dilute solution of a strong acid, a gas is evolved, which is utilised in the hydrogenation of oil. Name the gas evolved. Write the chemical equation of the reaction involved and also write a test to detect the gas formed.

Answer:

Zinc metal gives hydrogen gas when treated with dilute sulphuric acid. Hydrogen gas is utilised in the hydrogenation of oil.



Therefore, the gas that evolved is hydrogen.

Test for hydrogen gas: When a burning candle is brought near the hydrogen gas, it burns with a pop sound that confirms hydrogen gas's presence.

Long Answer Type Questions

Q1. In the following schematic diagram for the preparation of hydrogen gas as shown in Figure 2.3, what would happen if following changes are made?

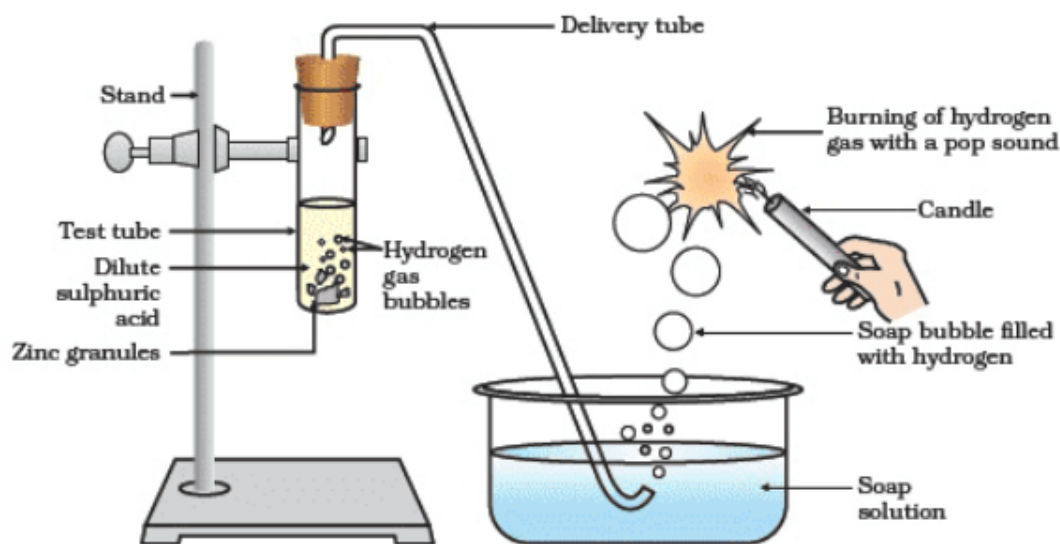
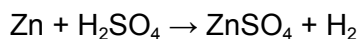


Fig. 2.3

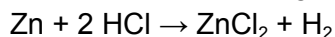
- (a) In place of zinc granules, the same amount of zinc dust is taken in the test tube
- (b) Instead of dilute sulphuric acid, dilute hydrochloric acid is taken
- (c) In place of zinc, copper turnings are taken
- (d) Sodium hydroxide is taken in place of dilute sulphuric acid and the tube is heated.

Answer:

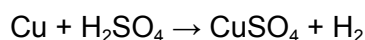
(a) If the same amount of zinc dust is taken in the test tube in the place of zinc granules, the reaction rate will increase, and the reaction will occur more quickly. This is because the surface area per unit volume of powder is more than that of the zinc granules, and hence the powder will provide more surface area for the reaction to occur.



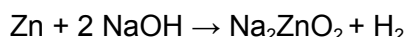
(b) If we use dilute hydrochloric acid instead of dilute sulphuric acid, the reaction will occur as usual because we are mixing a strong acid with metal.



(c) Suppose copper turning is taken in the place of zinc. In that case, the reaction will proceed similarly and lead to the evolution of hydrogen gas, as here, we are only replacing one metal with another metal on the reactant side of the reaction. In this case, also we are mixing a strong acid with a metal.



(d) If sodium hydroxide is taken in place of dilute sulphuric acid and the tube is heated, the metal will react with the base to form the corresponding salt and evolve hydrogen gas.

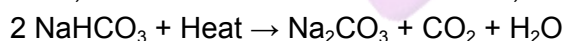


Q2. For making cake, baking powder is taken. If your mother uses baking soda instead of baking powder in cake at home,

- (a) How will it affect the taste of the cake and why?
- (b) How can baking soda be converted into baking powder?
- (c) What is the role of tartaric acid added to baking soda?

Answer:

(a) If we use baking soda instead of baking powder taste of the cake will be bitter. On heating baking soda, sodium carbonate will be formed, which will make the cake taste bitter.



(b) Baking soda can be converted to baking powder by adding an edible weak acid like tartaric acid in the baking soda.

(c) When tartaric acid is dissolved in water, it liberates hydrogen ions. Hydrogen ions react with sodium carbonate to release carbon dioxide gas, which will make the cake fluffy.

Q3. A metal carbonate X reacting with acid gives a gas that gives the carbonate back when passed through a solution Y. On the other hand, a gas G obtained at the anode during electrolysis of brine is passed on dry Y, it gives a compound Z, used for disinfecting drinking water. Identity X, Y, G and Z.

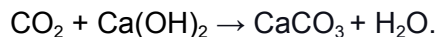
Answer:

Here, X is calcium carbonate (CaCO_3), Y is slaked lime [$\text{Ca}(\text{OH})_2$], Z is bleaching powder (CaOCl_2), and G is chlorine (Cl_2) gas.

When calcium carbonate (CaCO_3) reacts with HCl , it liberates carbon dioxide gas.

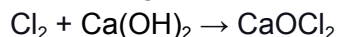


When CO_2 is passed into lime water [$\text{Ca}(\text{OH})_2$], it turns milky due to the formation of Calcium carbonate (CaCO_3).



Hence, solution Y is lime water.

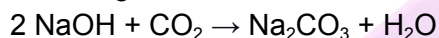
When chlorine (Cl_2) gas is passed on dry lime water, it gives bleaching powder which is used for disinfecting water.



Q4. A dry pellet of a common base B absorbs moisture and turns sticky when kept open. The compound is also a by-product of the chloralkali process. Identify B. What type of reaction occurs when B is treated with an acidic oxide? Write a balanced chemical equation for one such solution.

Answer:

Sodium hydroxide (NaOH) is a commonly used base and is hygroscopic; it absorbs moisture from the atmosphere and becomes sticky. A neutralisation reaction occurs when acidic oxides react with the base to give salt and water.



Q5. A sulphate salt of Group 2 element of the Periodic Table is a white, soft substance, which can be moulded into different shapes by making its dough. When this compound is left open for some time, it becomes a solid mass and cannot be used for moulding purposes. Identify the sulphate salt and why does it show such behaviour? Give the reaction involved.

Answer:

Calcium belongs to group 2. Calcium sulphate is a soft white substance. It is known as the Plaster of Paris, which can be moulded into different shapes by making its dough.

When the Plaster of Paris is left open, it turns into a solid mass because of a reaction with moisture present in the atmosphere. The solid mass so formed is known as gypsum and cannot be further used for moulding.



Plaster of Paris shows such behaviour because of half water molecule as water of crystallisation. It absorbs moisture from the atmosphere and forms gypsum, a hard solid mass when left open for some time.

Q6. Identify the compound X based on the reactions given below. Also, write the name and chemical formulae of A, B and C.

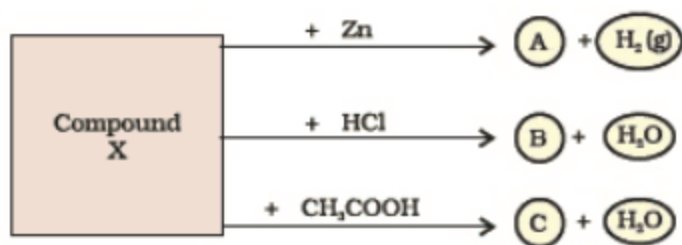


Fig. 2.4

Answer:

Here, X is sodium hydroxide (NaOH), A is sodium zincate (Na₂ZnO₂), B is sodium chloride (NaCl), and C is sodium acetate (CH₃COONa).

