

## CHAPTER - 2

### Acids, Bases and Salt

Question (Pg. - 18).

- ① You have been provided with three test tubes. One of them contain distilled water and the other two contain an acidic and basic solution. If you are given only red litmus paper, how will you identify the content of them?

Ans . If red litmus paper is in all three test tube which changes colour contains basic solution.

- Now dip blue litmus paper to each of 2 test tubes. The one which changes colour to red is acidic. The remaining one is distilled water, as it has no effect on any litmus paper.

Questions (Pg. 22)

- ① Why should acid and sour substances not be kept in brass and copper vessels?

Ans. Acid and sour substance, if kept in a brass or copper vessel, react with them and form hydrogen and other harmful substance, due to presence of acid in them.

The toxic substance can cause food poisoning or other damage to health.

② Which gas is usually liberated when an acid reacts with a metal? Illustrate it with an example. How will you test for the presence of this gas?

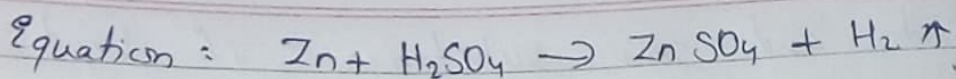
Ans. Hydrogen gas is liberated, when acid reacts with metal.

Ex. - Zinc granules react with  $H_2SO_4$ .

### Activity:

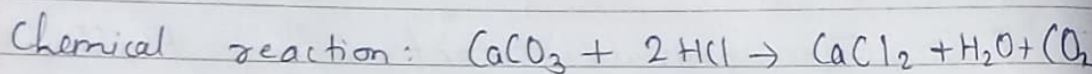
- Take 5g of Zn granules in woulfe-bottle.
- Add 20 ml of dilute  $H_2SO_4$  by thistle funnel and set the apparatus.
- Collect the gas evolved in gas jar. Observe the colour and ~~and~~ odour of gas.
- Bring a burning matchstick near the gas jar.
- Observation: A colourless, odourless gas is evolved. It burns explosively with 'pop' sound, when a burning candle brought near it, indicating the presence of hydrogen gas.





- ③ A metal compound 'A' reacts with dilute HCl to produce effervescence ( $\text{CO}_2$  gas). The gas evolved extinguishes a burning candle. Write a balanced chemical equation for the reaction if one of the compounds formed is CaCl. Calcium carbonate (A) when reacts with HCl produces Carbon dioxide ( $\text{CO}_2$ ) with effervescence.

$\text{CO}_2$  gas is used as fire extinguisher.  
 $\therefore$  it extinguish a burning candle.



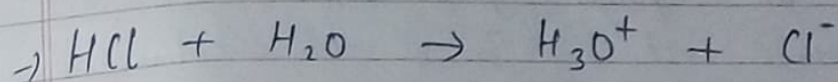
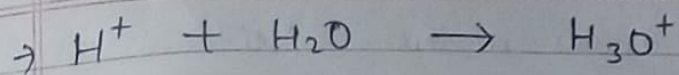
### Question (Pg. 25)

- ① Why do HCl,  $\text{HNO}_3$ , etc. show acidic character in aqueous solutions while solutions of compound like alcohol do not show?

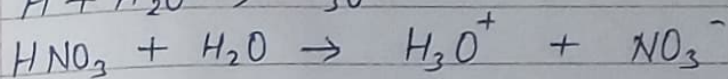
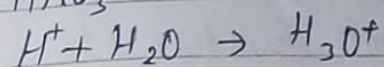
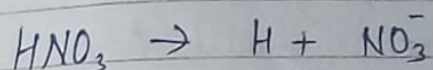
Ans → HCl or  $\text{HNO}_3$  dissociate into their ~~ion~~ in presence of water. They form ~~H<sup>+</sup>~~  $\text{H}^+$ .

These hydrogen ~~ion~~ ions combines with  $\text{H}_2\text{O}$  to form  $\text{H}_3\text{O}^+$  (hydronium ion)





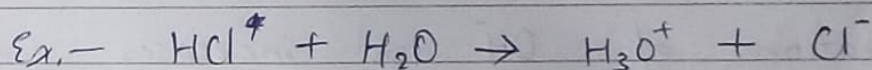
Due to this property HCl and  $\text{HNO}_3$  shows acidic character in aqueous solution.



Alcohol and glucose cannot dissociate in water to form hydrogen ion. Hence they do not show acidic character.

② Why does an aqueous solution of acid conduct electricity?

Ans An aqueous solution of an acid conduct electricity because of presence of charged particles called ions. When dissolved in water, acid dissociate to form ions, responsible for conducting electricity.



③ Why does the HCl gas does not change the colour of dry litmus paper?

Ans The colour of red litmus is changed by  $\text{H}^+$  ions of an acid. Dry HCl do not dissociate to give  $\text{H}^+$  ions. Acid dissociate to give

only one to excess water. Neither  
still is an excess from the  
litmus paper test. So the colour  
of litmus paper does not change.

- ③ While diluting an acid, why is it  
recommended that the acid should be  
added to water, and not water to  
the acid?

Ans. The process of dissolving acid in  
water is highly exothermic reaction. Acid  
must always be added to water, with  
constant stirring. If water is added  
to concentrated acid, heat generation may  
cause splash out for severe burning.  
The glass container may also break  
due to excessive heat.

- ④ Concentration of hydrogen ion decreases  
when solution of acid is diluted.

- ⑤ Concentration of  $\text{OH}^-$  ion increases  
when base is dissolved in solution of  
 $\text{NaOH}$ .



Text Questions (Pg 20)

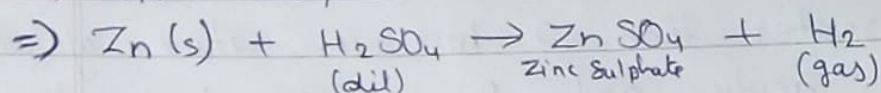
- ① Solution A has more  $H^+$  ion concentration of pH value less than 7 indicates acid in nature, while greater than 7 base in nature of solution. So A is acid and B is base in nature.
- ② Concentration of  $H^+$  ion increases with the nature of solution, while decrease in  $pH$  increases basicity of solution.
- ③ Yes, basic solution also have  $H^+$  ion. However, their concentration is less as compared to  $OH^-$  ion that makes the solution basic.
- ④ If farmer find the soil to be more acidic, he tend to increase basicity of soil. He should treat the soil of his field with quick lime or slaked lime or chalk powder.

Interst Questions - Pg 33

- ① Bleaching powder
- ② Dry slaked lime  $Ca(OH)_2$
- ③ Washing soda (Sodium carbonate)  $Na_2CO_3$
- ④  $NaHCO_3$  along with water releases  $CO_2$   
 $2NaHCO_3 \xrightarrow{\text{heat}} Na_2CO_3 + H_2O + CO_2$
- ⑤  $CaSO_4 \cdot \frac{1}{2} H_2O + \frac{1}{2} H_2O \rightarrow CaSO_4 \cdot 2 H_2O$   
Gypsum

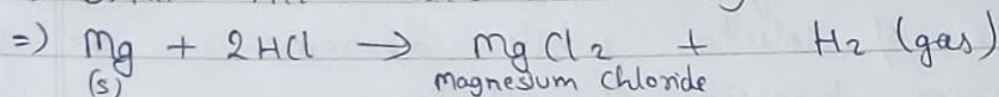
## Exercises :

5. a) Dilute sulphuric acid reacts with zinc granules.



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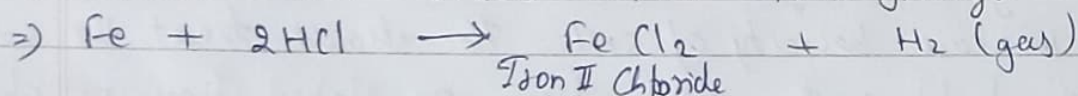
b) Dilute HCl reacts with magnesium ribbon



c) Dilute sulphuric acid reacts with aluminium powder.



d) Dilute HCl reacts with iron fillings.



⑥. Fix 2 iron nail on cork & place this cork in beaker.

- Connect the nail with 2 terminal with 6 volt battery, along with switch.

- Add some dilute HCl in beaker & switch on the current. Take Observation. Repeat the experiment separately for alcohol and glucose.

- Repeat

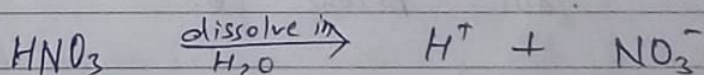
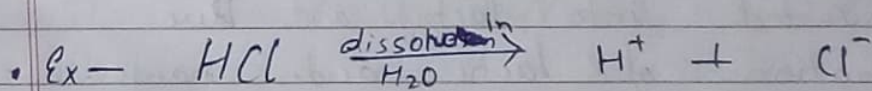
Observation: We will observe that

in case dilute HCl, bulb glows, but when glucose or alcohol solution is taken in beaker, the bulb does not glow.

- Conclusion: The aqueous solution of HCl conducts electricity due to availability of  $H^+$  ions in their solution. Unlike acids, glucose and ethanol do not ionise in aqueous solution. Hence do not give  $H^+$  ions.  $\therefore$  cannot conduct electricity.  $\therefore$  glucose & ethanol are not characterised as acid.

⑦ Distilled water does not contain any ionic compound, unlike acid, base or salt.  $\therefore$  it does not dissociate into ions as it is weak electrolyte. Salts are present in rain water which help in dissociation of rain water into ions which helps to conduct electricity.

⑧ It is because acid do not dissociate into ions in absence of water, but when an acid is dissolved in water, it forms  $H^+$ , hence shows acidic behaviour





- ⑦ a) D with  $pH = 7$  neutral  
b) C with  $pH = 11$  strong alkaline  
c) B with  $pH = 1$  strong acid  
d) A with  $pH = 4$  weak acid  
e) E with  $pH = 9$  weak alkaline

CE E, D, A, B is in ascending order of  $H^+$  ion concentration.

- ⑩ Fizzing occurs more ~~vagor~~ vigorously in HCl than in acetic acid, because HCl is stronger acid than acetic acid.

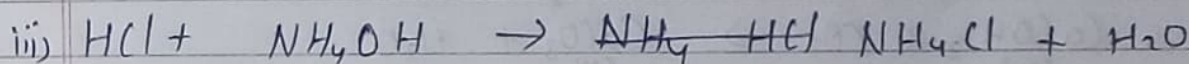
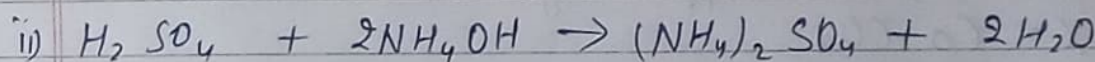
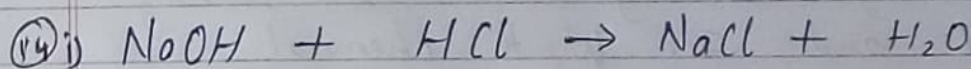
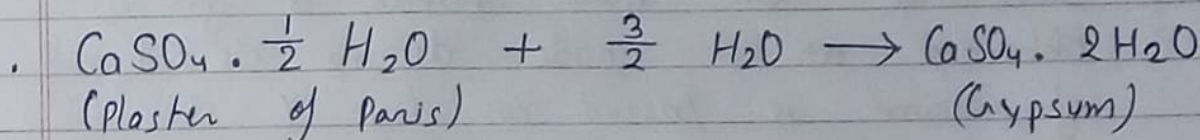
HCl dissociates into  $H^+$  and  $Cl^-$  completely, whereas, acetic ~~ion~~ acid partially dissociates into ions.

- ⑪ Milk contain carbohydrate lactose. When milk sets as curd lactose get converted into lactic acid. Due to formation of lactic acid, range of  $pH$  falls below 6.

(12) a) It is done to increase the shelf life of milk

b) The alkaline milk takes a longer time to set as curd, as lactic acid being formed has to neutralise the alkaline present in it.

(13) It will absorb water to form gypsum which is set into hard solid mass.



(15) ★ Uses of washing soda:

i) It is used in glass, soap, paper and other sodium compounds like borax.

ii) It is used in softening of hard water.

★ Uses of baking soda

i) It is used as antacid to neutralize acidity in stomach.

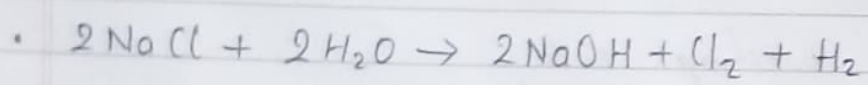
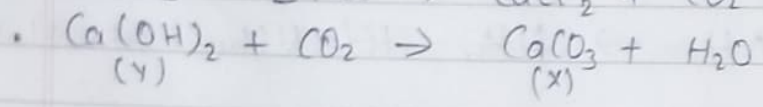
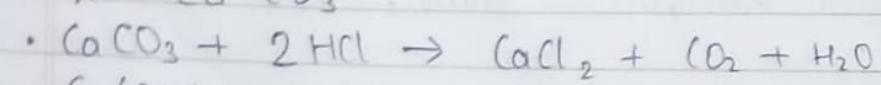


- ii) It is ingredient of baking powder which contain  $\text{NaHCO}_3$  and tartaric acid.

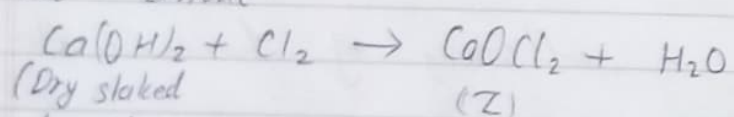
### Extra Questions:

- ① A metal carbonate 'X' on reacting with acid gives solution 'Y', gives carbonate substance. On other hands, a gas is obtained at anode during electrolysis of brine is passed on dry 'Y' it gives compound 'Z' which is used for disinfecting drinking water. Identify X, Y and Z. Write chemical formula to support your answer.

Ans:  $\text{X} = \text{CaCO}_3$



- The chlorine gas which is obtained at anode



(Bleaching powder) &  
(calcium oxy chloride)

Tartaric acid:	-COOH
$\text{C}_4\text{H}_6\text{O}_6$	Carboxylic acid

- ② A dry pellet of common base B when kept in open environment, absorbs moisture and becomes sticky. This compound is also obtained as a by-product of chlor-alkali process. When B is treated with acid oxide, what will be the chemical equation for such solution?

Ans → B is NaOH (Sodium hydroxide)

It absorbs moisture from atmosphere, because it is hygroscopic in nature. It is obtained as B reacts with acid oxide  $\text{CO}_2$  to form salt and water. This reaction is a neutralization reaction.

