

STUDY COURSE MATERIAL

CHEMISTRY

SESSION-2020-21

CLASS-X

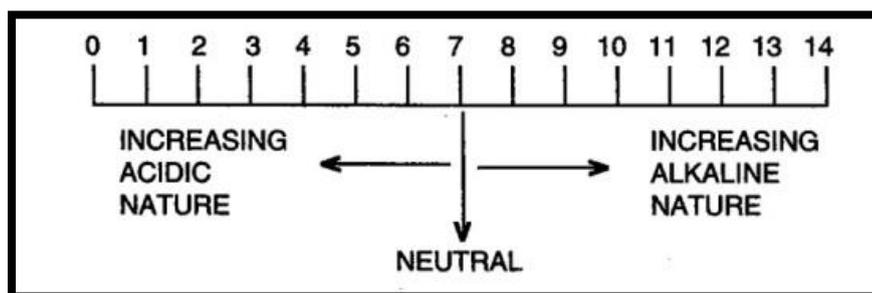
TOPIC: ACIDS, BASES AND SALTS

DAY-1

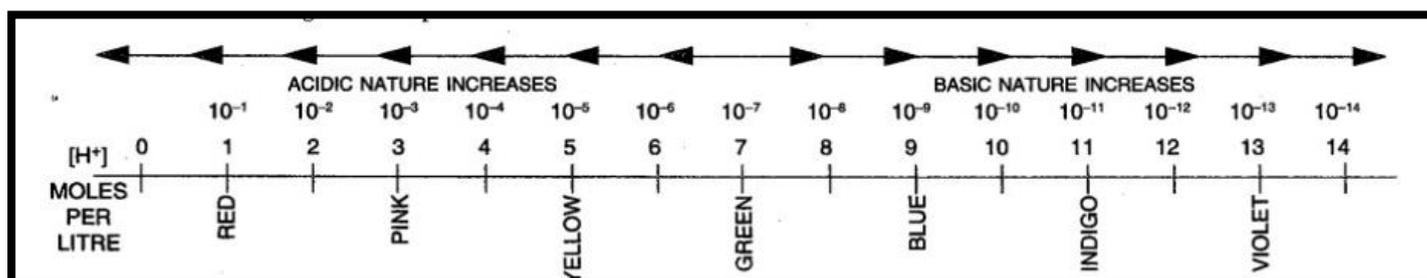
❖ TEACHING MATERIAL

STRENGTH OF ACIDIC AND BASIC SOLUTION

- ✚ The acidic, basic or neutral solution can be ascertained on the basis of ionization.
- ✚ A Danish biochemist devised a scale known as pH scale which represents the $[H_3O^+]$ ion concentration of the given aqueous solution.
- ✚ The 'p' in pH stands for 'Potenz' in German meaning power.



- ✚ The universal indicator is a mixture of organic dyes or mixed indicators. It gives different colours at different concentrations of hydrogen ions in a solution.



SALTS

✚ Salt is a compound formed by the partial or total replacement of the ionisable hydrogen atoms of an acid by a metallic ion.



(Partial replacement)



(Complete replacement)

CLASSIFICATION OF SALTS

There are six kinds of salts

1. Normal salts
2. Acid salts
3. Basic salts
4. Double salts
5. Mixed salts
6. Complex salts

❖ VIDEO-LINKS

LINK 1:

<https://www.brightstorm.com/science/chemistry/acids-and-bases/strength-of-acids-and-bases/>

LINK 2:

https://youtu.be/PdqFSw_SRug

❖ LAB ACTIVITY:

https://youtu.be/U_FhBLjJs24

❖ ASSIGNMENT:

- 1) Why should curd and sour substances not be kept in brass and copper vessels?
- 2) How is the concentration of hydroxide ions affected when excess base is dissolved in a solution of sodium hydroxide?

DAY-2

❖ TEACING MATERIAL

Normal salts

These are formed by the complete replacement of the ionisable hydrogen atoms of an acid.
Examples: NaCl, Na₂SO₄, etc.

Acid salts

These are formed by the partial replacement of the ionisable hydrogen atoms of polybasic acids.
Examples: NaHSO₄, NaHSO₃, etc.

Basic salts

These are formed by the partial replacement of the hydroxyl group of di-or-a tri-acidic base by an acid.
Examples: [Pb(OH)Cl] - Basic lead chloride, [Mg(OH)Cl] - Basic magnesium chloride, etc.

Double salts

These are formed by the union of two simple salts that dissolve in water and crystallise.
Examples: Potash alum - K₂SO₄.(Al₂SO₄).24H₂O
Mohr's Salt - FeSO₄.(NH₄)₂SO₄.6H₂O

Mixed salts

Mixed salts are those salts that contain more than one basic or acidic radical.
Examples : Sodium potassium carbonate : NaKCO₃ ; Bleaching powder : CaOCl₂ , etc.

Complex salts

Complex salts are those which on dissociation give one simple and one complex ion .

Examples : Na_2ZnO_2 , $[\text{Ag}(\text{NH}_3)_2]\text{Cl}$, etc.

❖ VIDEO-LINKS

<https://www.youtube.com/watch?v=WnAKhtnJz0>

<https://www.youtube.com/watch?v=T0Bh1oGYDJc>

❖ ASSIGNMENT:

1. Explain neutralization reaction with help of an activity

DAY-3

❖ TEACINGMATERIAL

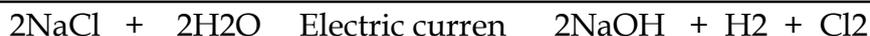
Some important compounds

Sodium Chloride: -

- It is commonly known as common salt or table salt.
- Its chemical formula is NaCl .
- It is formed by the reaction between solution of sodium hydroxide and hydrochloric acid.
$$\text{NaOH} + \text{HCl} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$$
- Biologically, it has a number of functions to perform such as muscle contraction, in conduction of nerve impulses in nervous system and is also converted in hydrochloric acid in stomach which helps in digestion of food.

Sodium hydroxide

- It is commercially known as Caustic Soda.
- Its chemical formula is NaOH .
- It is prepared on large scale by passing electric current through a concentrated sodium chloride i.e. brine.



- This process of electrolysis is known as Chlor-alkali process because of the products 'chlor' for chlorine and 'alkali' for sodium hydroxide.
- In this process hydrogen gas is evolved at cathode and chlorine at anode.
- Caustic soda is used:
 - (i) In manufacturing of soaps, detergents, paper, rayon and large number of chemicals.
 - (ii) In refining of petroleum and vegetable oils.
 - (iii) In the preparation of soda lime ($\text{NaOH} + \text{CaO}$)
 - (iv) As a laboratory reagent.

❖ VIDEO-LINKS

https://www.youtube.com/watch?v=VS4_wwDmoMc

❖ LAB ACTIVITY

<https://www.youtube.com/watch?v=uIxn3AecS5I>

<https://www.youtube.com/watch?v=d2geiGKFveE>

❖ ASSIGNMENT:

- 1) Name the sodium compound which is used for softening hard water.
- 2) Write an equation to show the reaction between Plaster of Paris and water.

DAY-4

❖ TEACINGMATERIAL

Bleaching powder

- It is yellowish white solid and chemically known as **calcium oxy-chloride** or chloride of lime.
- Its chemical formula CaOCl_2 .
- It is formed by passing chlorine gas through slaked lime.
$$\text{Ca(OH)}_2 + \text{Cl}_2 \longrightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$$
- It is used:
 - (i) For bleaching cotton, linen, wool pulp etc.
 - (ii) In rendering wool unshrinkable.
 - (iii) In manufacture of chloroform.
 - (iv) As an oxidizing agent in the laboratory.

Baking Soda

- It is chemically known as sodium hydrogen carbonate.
- Its chemical formula is NaHCO_3 .
- It is prepared by reacting cold brine solution with ammonia and carbon dioxide.



- It is used:
 - Preparing baking powder.
 - Manufacture of soda water.
 - As an antacid in medicine.

❖ VIDEO-LINKS

<https://www.youtube.com/watch?v=TokGHtbTQCY>

<https://www.youtube.com/watch?v=eKqjGlf4XhU>

❖ ASSIGNMENT:

1. Explain solvay process with the help of an activity.

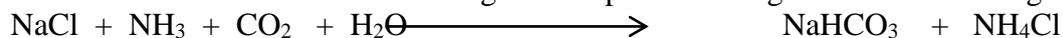
DAY-5

❖ TEACING MATERIAL

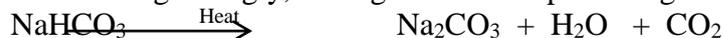
Washing Soda

- It is chemically known as sodium carbonate decahydrate.
- Its chemical formula is $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$.
- In anhydrous form, it is called Soda ash with formula Na_2CO_3 .
- It is prepared by using following steps: (**Solvay process**)

Step – 1 Both ammonia and carbon dioxide gases are passed through brine solution to get baking soda.



Step – 2 On heating strongly, baking soda decomposes to give soda ash.



Step – 3 Soda ash is dissolved in water. The solution is concentrated and upon cooling, it gives washing soda.



- It is used:
 - (i) In the manufacture of glass, soaps, paper and chemicals like caustic soda, borax ($\text{Na}_2\text{B}_4\text{O}_7$) etc.
 - (ii) In the laundry for washing clothes.
 - (iii) As a cleansing agent for domestic purposes.
 - (iv) For removing permanent hardness of water.

Plaster of Paris

- It is chemically known as calcium sulphate hemihydrate.
- Its chemical formula is $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$.
- It can be obtained by **gypsum** carefully to a temperature 373 K.
$$\text{CaSO}_4 \cdot 2\text{H}_2\text{O} \xrightarrow{373\text{K}} \text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O} + \frac{3}{2} \text{H}_2\text{O}$$
- It is used:
 - (i) For making toys or casts for toys, pottery, ceramics etc.
 - (ii) In surgical bandages for setting fractured bones.
 - (iii) For covering the walls and roofs and for making design on them.

❖ VIDEO-LINKS

https://www.youtube.com/watch?v=SsUemSnD_-M

<https://www.youtube.com/watch?v=yTjIFikO6tc>

❖ LAB ACTIVITY

<https://www.youtube.com/watch?v=yar8X8PbKcQ>

❖ PPT LINK

<https://www.slideshare.net/mohitshivhare/chapter-2-class-x>

❖ EXERCISE

Solve in text and exercise question with the help the link.

<http://ncert.nic.in/textbook/textbook.htm>

❖ CONCEPT MAP:

<https://www.oswaalbooks.com/download/freeresources/class10/843Oswaal%20CBSE%20Mind%20Maps,%20Science%20Class-10.pdf>

