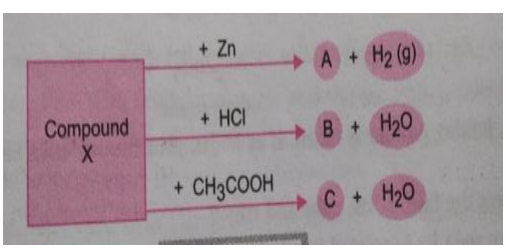
THE GROWTH HUB

AN INSTITUTE FOR QUALITY EDUCATION..

कक्षा 1 से 10 तक (युपी बोर्ड, सीबीएसई,ICSE) Mob: 6299370226, 7870441213

1. Why should curd and sour substance not be kept in brass and copper vessels?
2. Which gas is liberated when an acid reacts with metal?
3. Why does an aqueous solution of an acid conduct electricity?
4. Why does dry HCL gas does nt change the colour of dry litmus paper?
5. What effect does the concentration of H+ ions have on the acidic nature of the solution?
6. What is the common name $CaOCl_2$
7. What will happen if the solution of sodium bicarbonate is heated?
8. Write an equation of Gypsum?
9. Is antacid used in medicine of acidity?
10. Fresh milk has a pH of 6. How do you think the pH will change as it turns into red?
11. Plaster of paris is should be stored in moisture proof container. Explain why?
12. What is neutralisation reaction?
13. Give two I mportant uses of washing soda and baking soda?
14. Calcium phosphate is present in tooth enamel. Its nature is……..
15. One of the constituents of baking powder is sodium hydrogen carbonate, the other constituents is ……
16. …….. Is used for dissolution of gold.
17. What happens when nitric acid is added to egg shell?
18. What is salvay's process?
19. What are strong and weak acid?
20. Find all compound.



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1. Briefly explain any five characterstatics properties of acids?
2. To prove that acid conduct electricity?
3. Briefly explain the ionic product of water PH value and pH scale.
4. How can you classify salts into different types?
5. What is plaster of paris? How it is obtained?
6. What is meant by water of crystallization in a substance? How would you show that blue copper sulphate contain water of crystallisation?
7. What does Slaking of lime stands for?
8. What is efforoesence? Name the sompound which shows efforosence.
9. A solution contain 0.02 mole HCL in 2.0 litre of the solution. Calculate the molarity?
10. Explain the difference between “deliquescent” and “hygroscopic”?
11. What will be the effect on the rate of evoloution of hydrogen gas if the concentration of HCL is doubled?
12. Why do we feel a burning sensation in the stomach when we overeat?
13. How a soda acid fire extinguishr helps in putting out a fire?
14. What is acid base indicator? Give two example of synthetic acid base indicator?
15. What is olfactory indicator?
16. Why is sulphuric acid called”King of chemical”?
17. What is commercial name of the compound Calcium sulphate hemihydrate?
18. Name the raw material used for baking soda?
19. What is arhenius definition of acid and base?
20. Which acid is indicated when a bee sting cause pain?

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By Ravesh Sir

CHAPTER 2 : ACIDS, BASES AND SALTS

TYPES OF SUBSTANCES BASED ON NATURE

ACIDIC	BASIC	NEUTRAL	AMPHOTERIC
• Behave as an acid and combines with basic substance to form SALT.	• Behave as a base and combines with acidic substances to form SALT	• Neither acidic nor basic.	• Behave as an acid in presence of base and vice versa.
eg All acids. (HCl, H_2SO_4, HNO_3)	eg All bases ($NaOH$, KOH, etc)	eg Water, salts like NaCl	eg Some salts eg Al_2O_3, ZnO etc.

Remember :- • All ACIDS are acidic in nature BUT Salts can be acidic, basic, neutral or amphoteric in nature.
• All BASES are basic in nature

BASIC COMPARISON BETWEEN ACIDS, BASES & SALTS

ACIDS	BASES	SALTS
• Give H_3O^+ [H^+] ions in their aqueous solutions. eg $HCl \longrightarrow H^+ + Cl^-$	• Give [OH^-] ions in their aqueous solutions. eg $NaOH \longrightarrow Na^+ + OH^-$	• Dissociates in positive and negative radicles in aqueous/molten state eg $NaCl \longrightarrow Na^+ + Cl^-$
• All are acidic & turns blue litmus red.	• All are basic & turns red litmus blue.	• Generally neutral (other can be acidic, basic or amphoteric.
• pH range → 0 to 7	• pH range → 7 to 14	• For neutral pH = 7
• Generally sour to taste.	• generally bitter to taste.	• Generally salty to taste.
• Combines with base to form salt and water	• Combines with acid to form salt & water	• Formed by action of acid on base
• Types :- i) Strong acids - eg HCl, H_2SO_4, HNO_3 ii) Weak acids - eg H_2CO_3, H_3PO_4, all organic acids	• Types :- i) Strong bases - eg KOH and NaOH ii) Weak bases - eg $Ca(OH)_2$, $Mg(OH)_2$ $Al(OH)_3$, etc.	• Types :- i) Neutral salts - eg NaCl, KCl, $MgCl_2$, etc ii) Acidic salts - eg $CaSO_4$, $CuSO_4$ iii) Basic salts eg Na_2CO_3, CH_3COONa

The physical properties of acids are as follows:

1. **Acids have sour taste.**
2. **Acids turn blue litmus red.**
3. **Acids have pH less than 7.**
4. **Strong acid cause burn on skin.**
5. **Strong acids also destroy fabric.**
6. **Acids are electrolytes.**

INDICATORS

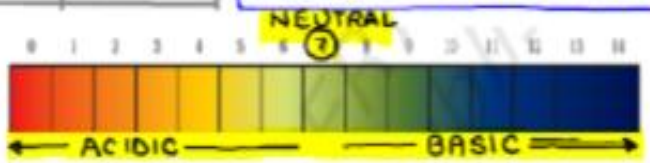
The natural or artificial substances which helps to identify / distinguish between an acidic, basic & neutral substance on the basis of change in colour or odour.

TYPES

Based on colour change

	TYPE	EXAMPLE	COLOUR CHANGE In acidic	In basic	In neutral
A]	Natural indicators	a) Turmeric b) Litmus c) Beet root	Yellow Red Bluish red	Red Blue Violet→Yellow	Yellow Purple Red
B]	Synthetic indicators	a) Phenolphthalein b) Methyl orange	Colourless Pink	Pink Yellow	Colourless Yellow
C]	Universal indicator	Mixture of 2 or more indicator dyes	Red to yellow	Blue to violet	Yellowish green

Universal indicator :- It gives different colour for different pH value of a substance.
[most accurate in determining the strength)



Based on odour change

Eg. Eucalyptus oil, Vanilla essence, Onion extract, etc (all are natural indicators)

Coloured petals of flower like Hibiscus, Petunia, Hydrangea & Geranium also acts as colour indicators

TABLE 2.1. Some Naturally Occurring Sources of Acids and the Acids present

S. No.	Natural Source	Acid Present
1.	Oranges, lemons	Citric acid
2.	Apples	Malic acid
3.	Tomatoes	Oxalic acid
4.	Tamarind (*Imli*)	Tartaric acid
5.	Sour milk or curd	Lactic acid
6.	Vinegar	Acetic acid
7.	Proteins	Amino acids

Organic and Inorganic (Mineral) Acids

organisms) are called organic acids. The examples

TABLE 2.2. Some Common Acids and their Chemical Formulas

S. No.	Name of the Acid	Chemical Formula
1.	Hydrochloric acid	HCl
2.	Sulphuric acid	H_2SO_4
3.	Nitric acid	HNO_3
4.	Acetic acid	CH_3COOH
5.	Formic acid	HCOOH
6.	Carbonic acid	H_2CO_3
7.	Phosphoric acid	H_3PO_4

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2.1 UNDERSTANDING THE CHEMICAL PROPERTIES OF ACIDS & BASES

CHEMICAL PROPERTIES OF ACIDS :-

ACIDS + METAL → SALT + HYDROGEN GAS ①
ACIDS + METAL CARBONATE → SALT + CO_2 + WATER ②
ACIDS + METAL HYDROGEN CARBONATE → SALT + CO_2 + WATER ③
ACIDS + METAL OXIDES → SALT + WATER ④
ACIDS + BASES → SALT + WATER ⑤

① Egs :- ACID + METAL

(A) Sulphuric acid + Calcium → Calcium sulphate + Hydrogen
$H_2SO_{4(aq)} + Ca_{(s)} \rightarrow CaSO_{4(aq)} + H_2\uparrow_{(g)}$

(B) Hydrochloric acid + Magnesium → Magnesium chloride + Hydrogen
$2HCl_{(aq)} + Mg_{(s)} \rightarrow MgCl_{2(aq)} + H_2\uparrow_{(g)}$

(C) Nitric acid + zinc → Zinc nitrate + Hydrogen
$2HNO_3 + Zn \rightarrow Zn(NO_3)_2 + H_2\uparrow$

② Egs:- ACID + METAL CARBONATE

(A) Hydrochloric acid + Sodium carbonate → Sodium chloride + carbon dioxide + water
$2HCl_{(aq)} + Na_2CO_{3(aq)} \rightarrow 2NaCl_{(aq)} + CO_2\uparrow_{(g)} + H_2O_{(l)}$

(B) Sulphuric acid + Calcium carbonate → Calcium sulphate + carbon dioxide + water
$H_2SO_4 + CaCO_3 \rightarrow CaSO_4 + CO_2\uparrow + H_2O$

③ Egs :- ACID + METAL HYDROGEN CARBONATE

(A) Hydrochloric acid + Calcium bicarbonate → Calcium chloride + carbon dioxide + water
$2HCl_{(aq)} + Ca(HCO_3)_{2(aq)} \rightarrow CaCl_{2(aq)} + 2CO_2\uparrow_{(g)} + 2H_2O_{(l)}$

(B) Sulphuric acid + sodium bicarbonate → Sodium chloride + carbon dioxide + water
$H_2SO_{4(aq)} + 2NaHCO_{3(aq)} \rightarrow Na_2SO_{4(aq)} + 2CO_2\uparrow_{(g)} + 2H_2O_{(l)}$

④ Egs ACID + METAL OXIDE

(A) Hydrochloric acid + Copper oxide → Copper chloride + water
$2HCl_{(aq)} + CuO_{(s)} \rightarrow CuCl_{2(aq)} + H_2O_{(l)}$

(B) Sulphuric acid + Aluminium oxide → Aluminium sulphate + water
$3H_2SO_{4(aq)} + Al_2O_{3(s)} \rightarrow Al_2(SO_4)_{3(aq)} + 3H_2O_{(l)}$

⑤ Egs ACID + BASE

(A) Hydrochloric acid + Sodium hydroxide → Sodium chloride + Water
$HCl_{(aq)} + NaOH_{(aq)} \rightarrow NaCl_{(aq)} + H_2O_{(l)}$

(B) Sulphuric acid + Potassium hydroxide → Potassium sulphate + water
$H_2SO_{4(aq)} + 2KOH_{(aq)} \rightarrow K_2SO_{4(aq)} + H_2O_{(l)}$

(C) Hydrochloric acid + calcium hydroxide → Calcium chloride + water
$2HCl_{(aq)} + Ca(OH)_{2(aq)} \rightarrow CaCl_{2(aq)} + 2H_2O_{(l)}$

THIS RECTION IS CALLED NEUTRALISATION REACTION →

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BASE

- The bases change the color of the litmus from red to blue.
- They are bitter in taste.
- Bases lose their base when mixed with acids.
- The bases react with the acids and form salt and water. This complete process is known Neutralization Reaction (Read).
- They can generate electricity as well.
- The bases feel slippery or soapy.
- Some bases are good electrical conductors. Bases such as sodium hydroxide, potassium hydroxide, etc. are used as electrolytes.
- Alkalis are the bases that produce hydroxyl ions (OH^-) when mixed with water.
- Strong alkalis naturally rust naturally and some alkalis are mildly corrosive.
- The pH value of the bases ranges from 8-14.
- The Alkalis and ammonium salts produce ammonia.
- Hydrogen gas changes when metals react at the base.
- The bases are divided on the basis of strength, concentration and acidity.
- Different types of acids are strong acid, weak base acid, concentrated base, dilute base, monoacidic base, diacidic base and triacidic base.

REACTION OF BASES WITH METALS:

Metals like zinc, tin and aluminum react with strong alkalies like NaOH (caustic soda), KOH (caustic potash) to evolve hydrogen gas.

$Zn(s) + 2NaOH(aq) \rightarrow Na_2ZnO_2\ (aq) + H_2\ (g)$

Sodium zincate

$Sn(s) + 2NaOH(aq) \rightarrow Na_2SnO_2\ (aq) + H_2\ (g)$

Sodium stannite

$2Al(s) + 2NaOH + 2H_2O \rightarrow 2NaAlO_2\ (aq) + 3H_2\ (g)$

Sodium meta aluminate

Bases reacts with acid:-

This reaction is called neutralization reaction, because when base and acid react with each other, they neutralize each other's effect (i.e. acid destroys the basic property of a base and a base destroys the acidic property of an acid)

(i) $NaOH(aq) + HCl(aq) \longrightarrow NaCl(aq) + H_2O(l)$

sodium hydroxide hydrochloric acid sodium chloride water

(base) (acid) (salt)

(ii) $2NaOH(aq) + H_2SO_4(aq) \longrightarrow Na_2SO_4(aq) + 2H_2O(l)$

sodium hydroxide sulphuric acid sodium sulphate water

Reaction with non metal oxide:

Sodium hydroxide gives sodium carbonate and water when it reacts with carbon dioxide.

$$2NaOH(aq) + CO_2(g) \longrightarrow Na_2CO_3(aq) + H_2O(l)$$

Sodium hydroxide Carbon dioxide Sodium Carbonate Water

Calcium hydroxide gives calcium carbonate and water when it reacts with carbon dioxide.

$$Ca(OH)_2(aq) + CO_2(g) \longrightarrow CaCO_3(s) + H_2O(l)$$

Calcium hydroxide Carbon dioxide Calcium carbonate (salt) Water

Reaction of Acid with Metal Oxides: Metal oxides are basic in nature. Thus, when an acid reacts with a metal oxide both neutralize each other. In this reaction, the respective salt and water are formed.

Acid + Metal Oxide → Salt + Water

(Metal oxides are basic in nature)-

$$2HCl(aq) + CaO(s) \longrightarrow CaCl_2(aq) + H_2O(l)$$

Hydrochloric acid Calcium oxide Calcium chloride Water

Similarly, when sulphuric acid reacts with zinc oxide, zinc sulphate and water are formed.

$$H_2SO_4(aq) + ZnO(aq) \longrightarrow ZnCl_2(aq) + H_2O(l)$$

Sulphuric acid Zinc oxide Zinc chloride Water

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Salts: Salts are the ionic compounds which are produced after the neutralization reaction between acid and base. Salts are electrically neutral. There are number of salts but sodium chloride is the most common among them. Sodium chloride is also known as table salt or common salt. Sodium chloride is used to enhance the taste of food.

Characteristics of salt:

- Most of the salts are crystalline soild.
- Salts may be transparent or opaque.
- Most of the salts are soluble in water.
- Solution of the salts conducts electricity in their molten state also.
- The salt may be salty, sour, sweet, bitter and umami (savoury).
- Neutral salts are odourless.
- Salts can be colourless or coloured.

Family of Salt: Salts having common acidic or basic radicals are said to belong to the same family.

Example:

(i) Sodium chloride (NaCl) and Calcium chloride ($CaCl_2$) belongs to chloride family.

(ii) Calcium chloride ($CaCl_2$) and Calcium sulphate ($CaSO_4$) belongs to calcium family.

(iii) Zinc chloride ($ZnCl_2$) and Zinc sulphate ($ZnSO_4$) belongs to the zinc family.

Neutral, Acidic and Basic Salts:

(i) Neutral Salt: Salts produced because of reaction between a strong acid and strong base are neutral in nature. The pH value of such salts is equal to 7, i.e. neutral.

.

Sodium chloride (NaCl): It is formed after the reaction between hydrochloric acid (a strong acid) and sodium hydroxide (a strong base).

$$\underset{\text{Sodium hydroxide}}{NaOH\ (aq)} + \underset{\text{Hydrochloric acid}}{HCl\ (aq)} \longrightarrow \underset{\text{Sodium chloride}}{NaCl\ (aq)} + \underset{\text{Water}}{H_2O(l)}$$

Sodium Sulphate (Na_2SO_4): It is formed after the reaction between sodium hydroxide (a strong base) and sulphuric acid (a strong acid).

$$\underset{\text{Sodium hydroxide}}{2NaOH\ (aq)} + \underset{\text{Sulphuric acid}}{H_2SO_4(aq)} \longrightarrow \underset{\text{Sodium sulphate}}{Na_2SO_4(aq)} + \underset{\text{Water}}{2H_2O(l)}$$

(ii) Acidic Salts: Salts which are formed after the reaction between a strong acid and weak base are called Acidic salts. The pH value of acidic salt is lower than 7. For example Ammonium sulphate, Ammonium chloride, etc.
Ammonium chloride is formed after reaction between hydrochloric acid
(a strong acid) and ammonium hydroxide (a weak base).

$$\underset{\text{Ammonium hydroxide}}{NH_4OH(aq)} + \underset{\text{Hydrochloric acid}}{HCl(aq)} \longrightarrow \underset{\text{Ammonium chloride}}{NH_4Cl(aq)} + \underset{\text{Water}}{H_2O(l)}$$

Ammonium sulphate is formed after reaction between ammonium hydroxide (a weak base) and sulphuric acid (a strong acid).

$$\underset{\text{Ammonium hydroxide}}{2NH_4OH(aq)} + \underset{\text{Sulphuric acid}}{H_2SO_4(aq)} \longrightarrow \underset{\text{Ammonium sulphate}}{(NH_4)_2SO_4(aq)} + \underset{\text{Water}}{2H_2O(l)}$$

iii. Basic salts:- Salts which are formed after the reaction between a weak acid and strong base are called Basic Salts. For example; Sodium carbonate, Sodium acetate, etc.
Sodium carbonate is formed after the reaction between sodium hydroxide (a strong base) and carbonic acid (a weak acid)

$$\underset{\text{Carbonic acid}}{H_2CO_3(aq)} + 2\underset{\text{Sodium hydroxide}}{NaOH(aq)} \longrightarrow \underset{\text{Sodium carbonate}}{Na_2CO_3} + \underset{\text{Water}}{H_2O(l)}$$

pH value of salt:
•Neutral salt: The pH value of a neutral salt is almost equal to 7.
•Acidic salt: The pH value of an acidic salt is less than 7.
•Basic salt: The pH value of a basic salt is more than 7.
•**The water of Crystallization:** Many salts contain water molecule and are known as Hydrated Salts. The water molecule present in salt is known as Water of crystallization.
•CuSO4.5H2O

Common Salt

Chemical Name :→ NaCl (Sodium chloride)

Table Salt :→ NaCl with Iodized Salt

Occurence of Common Salt :-

1. Sea water
2. Rock Salt
3. Inland Lakes

Uses of Common Salt :-

1. It is an essential constituent of our diet
2. It is used as a preservative for a meat / fish
3. It has a no. of industrial application
   ex:- Manufacture of soap
4. It is used to make freezing mixture

Properties of Common Salt :-

1. It is crystalline substance with M.P 800°C
2. Its solubility is 358g / 100g of water at room Temp
3. On heating, A crackling sound is produced
4. $NaCl + Conc.\ H_2SO_4 \xrightarrow{\Delta} NaHSO_4 + HCl\uparrow$
5. $AgNO_3 + NaCl \longrightarrow AgCl\downarrow + NaNO_3$

Common Salt is an important Raw material used for the production of other chemical such as Sodium, Chlorine, HCl, Caustic Soda, washing soda.

Plaster of Paris

Chemical Name :→ Calcium Sulphate hemihydrate

Gypsum :→ $CaSO_4 \cdot 2H_2O$

Preparation of Plaster of Paris :→

$$CaSO_4 \cdot 2H_2O \xrightarrow{100^\circ C} CaSO_4 \cdot \frac{1}{2}H_2O + 1\frac{1}{2}H_2O$$

Properties of P.O.P

(a) It is a white powder

(b) $CaSO_4 \cdot \frac{1}{2}H_2O + 1\frac{1}{2}H_2O \longrightarrow CaSO_4 \cdot 2H_2O$ Gypsum (Hard mass)

Uses of Plaster of Paris :→

1. In Medical Science, It is used for setting fracture bones in the right position and in making casts in dentistry
2. Its making the surface smooth (statues)
3. It making decorative design of ceilings.
4. It making chalks.

Bleaching Powder $CaOCl_2$ (→ Calcium oxy chloride)

Manufacture :→

$Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O$

↳ Hanselever Plant (Method)

Properties of Bleaching Powder :

1. It is a yellowish white Powder
2. $CaOCl_2 + CO_2 \longrightarrow CaCO_3 + Cl_2$
3. It is soluble in cold water
4. $CaOCl_2 + \text{Acid (HCl)} \longrightarrow CaCl_2 + H_2O + Cl_2$
5. 35-38% chlorine Present.

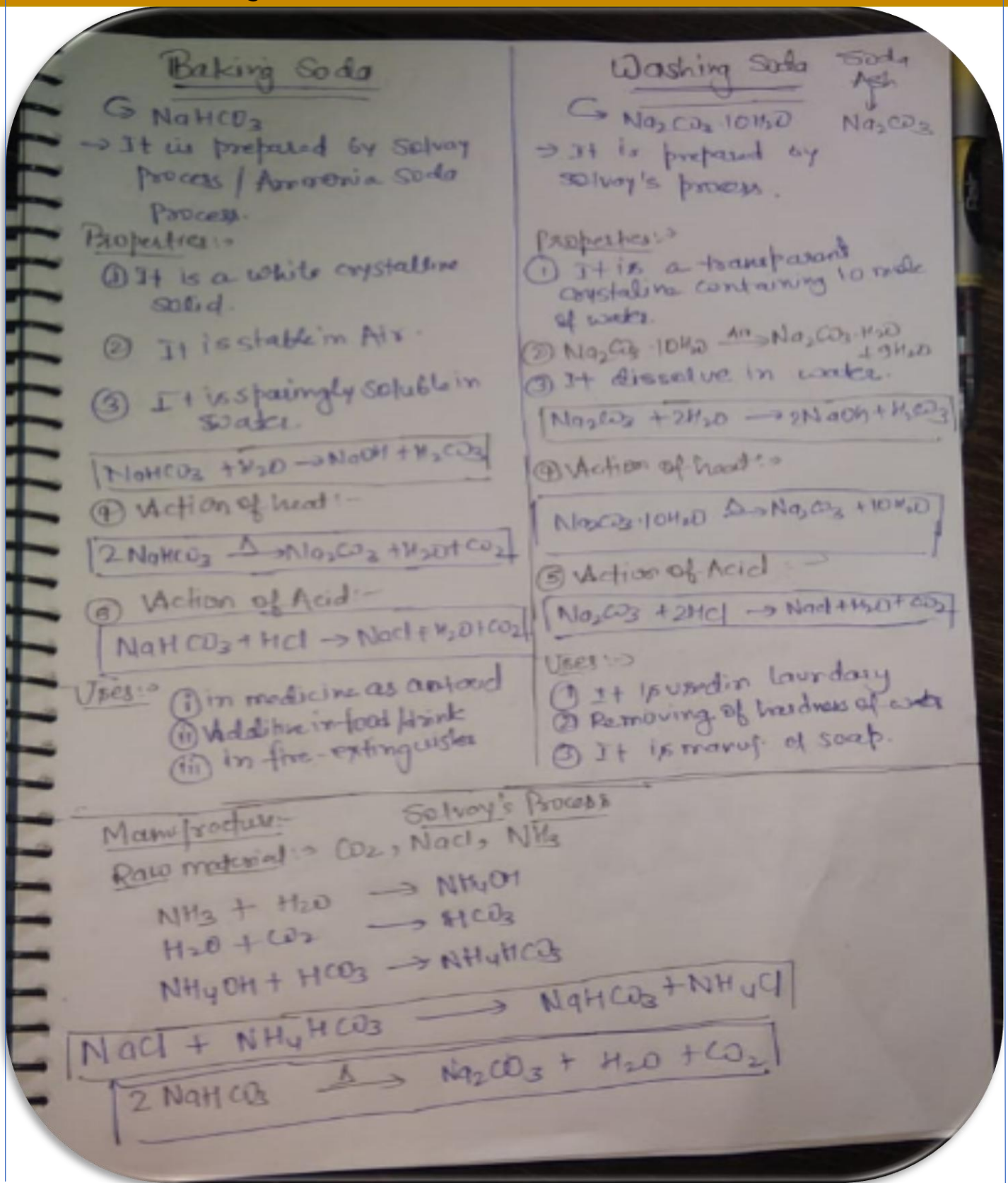
Uses :

(i) Textile industry for bleaching cotton

(ii) Paper industry for bleaching wood pulp

(iii) making wool unshrinkable

(iv) Manufacture of chloroform ($CHCl_3$)



Baking Soda

$NaHCO_3$

→ It is prepared by Solvay Process / Ammonia Soda Process.

Properties :-

① It is a white crystalline solid.

② It is stable in Air.

③ It is sparingly soluble in water.

$NaHCO_3 + H_2O \rightarrow NaOH + H_2CO_3$

④ Action of heat :-

$2NaHCO_3 \xrightarrow{\Delta} Na_2CO_3 + H_2O\uparrow + CO_2\uparrow$

⑤ Action of Acid :-

$NaHCO_3 + HCl \rightarrow NaCl + H_2O + CO_2\uparrow$

Uses :-

(i) in medicine as antacid
(ii) Additive in food drink
(iii) in fire-extinguisher

Washing Soda

Soda Ash → Na_2CO_3

$Na_2CO_3 \cdot 10H_2O$

→ It is prepared by solvay's process.

Properties :-

① It is a transparent crystaline containing 10 mole of water.

② $Na_2CO_3 \cdot 10H_2O \xrightarrow{Air} Na_2CO_3 \cdot H_2O + 9H_2O$

③ It dissolve in water.

$Na_2CO_3 + 2H_2O \rightarrow 2NaOH + H_2CO_3$

④ Action of heat :-

$Na_2CO_3 \cdot 10H_2O \xrightarrow{\Delta} Na_2CO_3 + 10H_2O$

⑤ Action of Acid :-

$Na_2CO_3 + 2HCl \rightarrow NaCl + H_2O + CO_2$

Uses :-

① It is used in laundary
② Removing of hardness of water
③ It is manuf. of soap.

Manufacture :- Solvay's Process

Raw material :- CO_2, NaCl, NH_3

$NH_3 + H_2O \rightarrow NH_4OH$

$H_2O + CO_2 \rightarrow HCO_3$

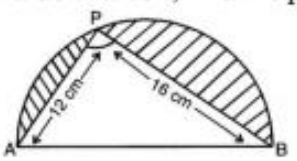
$NH_4OH + HCO_3 \rightarrow NH_4HCO_3$

$NaCl + NH_4HCO_3 \rightarrow NaHCO_3 + NH_4Cl$

$2NaHCO_3 \xrightarrow{\Delta} Na_2CO_3 + H_2O + CO_2$

1. The part of the circular region enclosed by a chord and the corresponding arc of a circle is called **(1)**
   a. a segment
   b. a diameter
   c. a radius
   d. a sector
2. If a line meets the circle in two distinct points, it is called **(1)**
   a. a chord
   b. a radius
   c. secant
   d. a tangent
3. Area of a sector of angle p (in degrees) of a circle with radius R is **(1)**
   a. $\frac{p}{360} \times 2\pi R$
   b. $\frac{p}{180} \times \pi R^2$
   c. $\frac{p}{180} \times 2\pi R$
   d. $\frac{p}{720} \times 2\pi R^2$
4. If 'r' is the radius of a circle, then it's circumference is given by **(1)**
   a. $2\pi r$
   b. None of these
   c. πr
   d. $2\pi d$
5. The perimeter of a protractor is **(1)**
   a. πr
   b. $\pi r + 2r$
   c. $\pi + r$
   d. $\pi + 2r$
6. If circumference of a circle is 44 cm, then what will be the area of the circle? **(1)**
7. Find the area of circle that can be inscribed in a square of side 10 cm. **(1)**

8. In the given figure, AB is the diameter where AP = 12 cm and PB = 16 cm. Taking the value of π as 3, find the perimeter of the shaded region. **(1)**



9. If the perimeter of a semi-circular protactor is 36 cm, then find its diameter. **(1)**

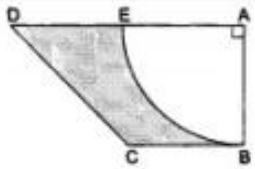
10. What is the perimeter of a square which circumscribes a circle of radius a cm? **(1)**

11. On a square cardboard sheet of area 784 cm^2, four circular plates of maximum size are placed such that each circular plate touches the other two plates and each side of the square sheet is tangent to circular plates. Find the area of the square sheet not covered by the circular plates. **(2)**

12. The circumference of a circle is 22 cm. Find the area of its quadrant. **(2)**

13. A sector of a circle of radius 4 cm contains an angle of 30°. Find the area of the sector. **(2)**

14. In the given figure, ABCD is a trapezium of area 24.5 cm^2. If AD II BC, $\angle DAB = 90°$, AD = 10 cm, BC = 4 cm and ABE is quadrant of a circle then find the area of the shaded region. **(3)**



15. The given figure depicts a racing track whose left and right ends are semi-circular. The difference between the two inner parallel line segments is 60m and they are each 106m long. If the track is 10m wide, find: