

UPDAAN



2025

Bharat Mata Ki Jai❤

ACIDS, BASES AND SALTS

(CLASSIFICATION, PHYSICAL AND
CHEMICAL PROPERTIES OF ACIDS)

CHEMISTRY

Lecture - 02

BY: SUNIL BHAIIYA



Topics

to be covered

- 1 Classification of Acids Based on Source
- 2 Physical Properties of Acids
- 3 Chemical Properties of Acids



Knowledge Ride On



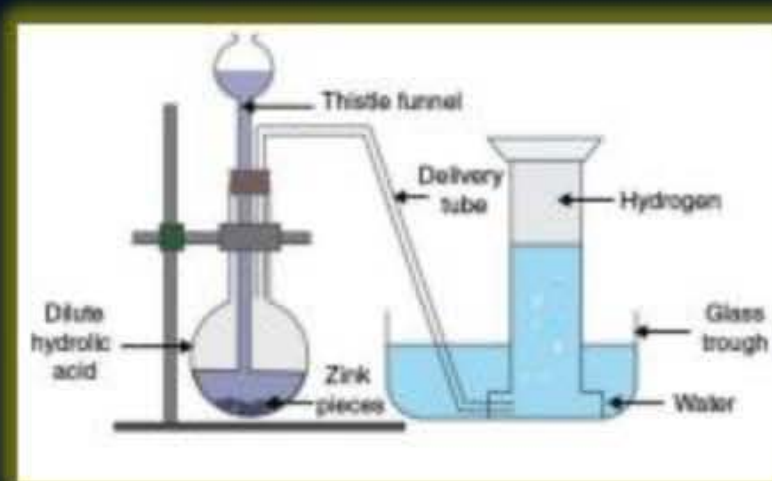
✓
Classification of Acids Based on
Source

Knowledge Ride On



✓
Physical Properties of Acids

Knowledge Ride On



✓
Chemical Properties of Acids

Knowledge Ride On



✓
Insaniyat Ka Gyaan



Hasmukhlal: Which two chemical elements when combine will heal?⁶⁹

Simaila: Pagla gya hai kya Hasmukhlal? Har waqt bss Chemistry, Chemistry mein ni bta rhi hai...

Hasmukhlal: Dekhna abhi Udaanians btaenge.

Helium (He) Aluminium (Al)

RIDDLE WALLAH



Hasmukhlal: Which two chemical elements when combine will heal?

Simaila: Pagla gya hai kya Hasmukhlal? Har waqt bss Chemistry, Chemistry mein ni bta rhi hai...

Hasmukhlal: Dekhna abhi Udaanians btaenge.

Udaanians Be Like





(अम्ल)

Classification of Acids Based on 'Source'



Classification of Acids Based on Source

(i) Organic

acid

(ii) Inorganic

Mineral
acid

Source

Living sources: Plants & Animals

Non-living: Rocks & Minerals
sources

**Special
Condition**

C and H are present & at least one
bond is present btw. C & H

(Out-of-NCERT)





Classification of Acids Based on Source



(i) Organic acids: These are obtained from living sources, i.e. plants and animals.

→ They contain C and H atoms and atleast a bond is present between them.

Lemon, Orange etc.
↓
contains
Vitamin C
↓
Ascorbic Acid

Natural source	Acid	Natural source	Acid
Citrus fruits	Citric acid	Nettle sting 	Formic acid
Grapes, Tamarind (अमर) 	Tartaric acid	Apple	Malic acid
Tomato (टमाटर)	Oxalic acid	Honey bee sting / Ant sting	Formic acid
Vinegar (शिरका)	Acetic acid	Curd	Lactic acid

Methanoic acid

Methanoic acid



Let's Practice



PW Ka **ChemStar!**



HASMUKHLAL
KREGA ANSWER!

QUESTION



Which acid is present in ⁶urine⁹?

- A** Tannic acid → In tea
- B** ✓ Uric acid → In urine
- C** Butyric acid → Rancid butter
- D** Oleic acid → Olive oil (जैतून का तेल)

Classification of Acids Based on Source

Mineral acids/

(ii) Inorganic acids: These are obtained from non-living sources, i.e. rocks and minerals.

Examples: Hydrochloric acid (HCl), Sulphuric acid (H₂SO₄), Nitric acid (HNO₃), Carbonic acid (H₂CO₃) and more.

(DOUBT RESOLUTION)



① HCL is a mineral acid because no C & H are present.

② HCL can't burn or damage our stomach due to lining created by mucus.

'Out-of-NCERT'



Why carbonic acid (H_2CO_3) is inorganic acid?

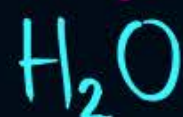
No C & H
are present

Inorganic



+

Inorganic



Inorganic

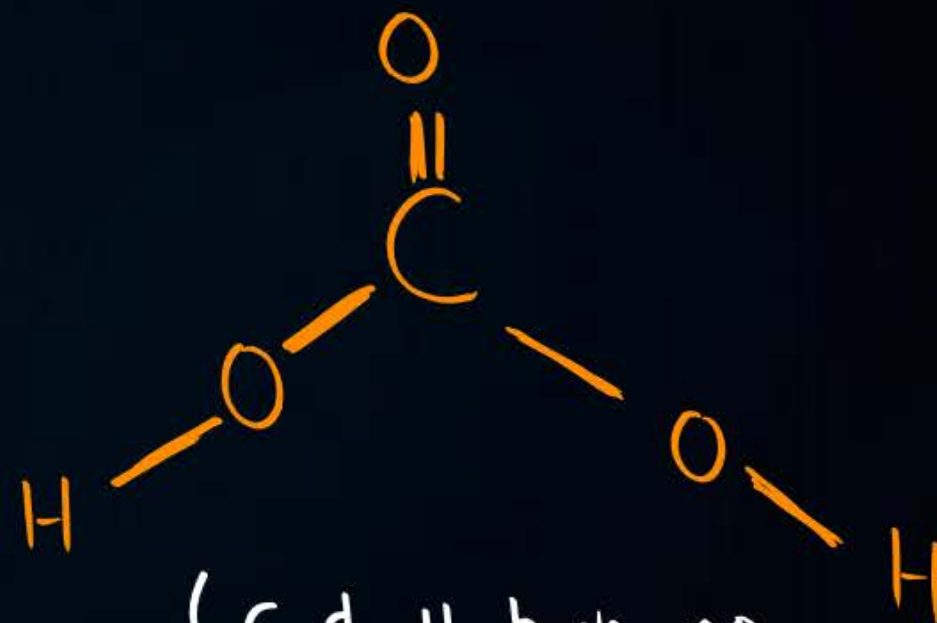


C & H are present (✓)
at least 1 bond btw.
C & H (x)

Source:

Respiration of
living organisms

Transpiration
of plants &
respiration of
organisms



(C & H have no
direct bond or are not
directly bonded to each other)

KYA BOLTI PUBLIC



(भौतिक)
↑
Physical Properties of
Acids
(अम्ल)



True or False



Acids are always found in the 'liquid state' at room temperature.

A. True

☒ B. False

(तरल अवस्था) (25°C)



Physical Properties of Acids

(ठोस अवस्था)

(i) Physical State: Some acids are found in solid-state while others are found in liquid state at room temperature. (25 °C)

(तरल अवस्था)

Acid	Physical state (At 25 °C)
<div><div><div>✓ (a) Boric acid (H_3BO_3)</div><div>✓ (b) Tartaric acid ($\text{C}_4\text{H}_6\text{O}_6$)</div><div>✓ (c) Oxalic acid (COOH)₂</div></div></div>	<div>Solid</div>
<div><div>✓ (a) Hydrochloric acid (HCl)</div><div>✓ (b) Carbonic acid (H_2CO_3)</div><div>✓ (c) Sulphuric acid (H_2SO_4)</div><div>✓ (d) Nitric acid (HNO_3)</div></div>	<div>Liquid</div>



Physical Properties of Acids

✓(ii) **Taste:** Generally, all acids taste sour but they can taste bitter as well as sweet.
 (most of the) (मीठा) (कड़वा)

✓(iii) **Corrosive nature:** Generally, all mineral acids are corrosive and can cause painful burns if fallen on the skin.

Organic acids are not corrosive!

An illustration of a young boy with orange hair, wearing a black graduation cap and gown, standing on a stack of books. A large globe is positioned behind him.

Beat Your Brains Out

(Out - of - NCERT)

All acids are stored in glass except hydrofluoric acid. Why?

(HF)



Beat Your Brains Out



All acids are stored in glass except hydrofluoric acid. Why?

(i) Due to the corrosive nature of acids and chemical inertness of glass, acids are stored in glass containers except HF.

(unreactive)

(ii) *HF is not stored in glass because it reacts with glass to form H_2SiF_6 . This is the reason why HF is also used for etching of glass.*

(patterns, text on glass)

'hexafluorosilicic acid'

HF and other acids are stored in teflon containers.

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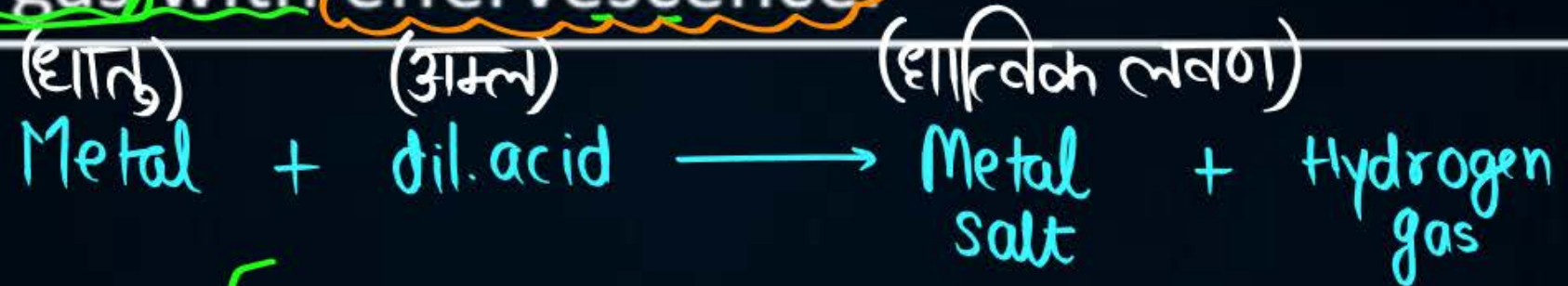
(रासायनिक) (जुगो)
Chemical Properties of
Acids
(अम्ल)

Reaction of Metal with Dilute Acid



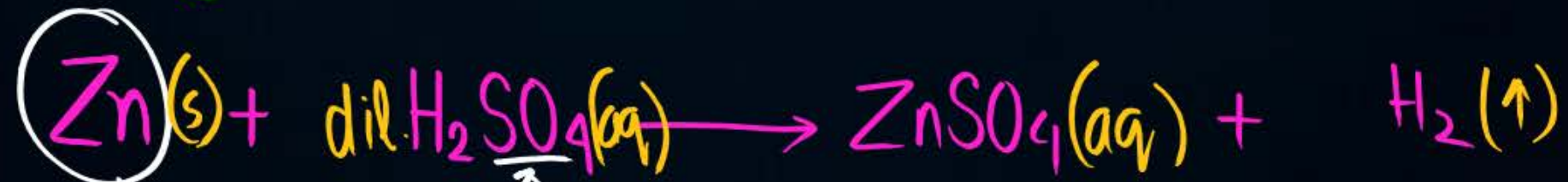
Dilute acid

(i) **Reaction with metals:** Dilute acids react with metals to form metallic salts and hydrogen gas with effervescence



[possible when reactivity of metal > hydrogen of acid]

(Reactivity of $\text{Zn} > \text{H}$) ;



(Metal - nonmetal displacement rxn)



Reaction of Metal with Dilute Acid

if effervescence is very fast / rapid
(BRISK EFFERVESCENCE)

(i) Reaction with metals: Dilute acids react with metals to form metallic salts and hydrogen gas with **effervescence**.

Evolution of gas from a solution in the form of bubbles along with fizzing and foaming.

Soap bubbles filled with H_2 gas

put in soap solution

Metal	+	Dilute acid	→	Salt	+	Hydrogen
Zn(s)	+	2dil.HCl(aq)	→	ZnCl ₂ (aq)	+	H ₂ (↑)
Mg(s)	+	2dil.H ₂ SO ₄ (aq)	→	MgSO ₄ (aq)	+	H ₂ (↑)

Reactivity of Zn & Mg > H of acid



Experimental Verification of H_2 Gas



Experimental Verification of Evolved Hydrogen:

① On bringing a burning splinter near the mouth of the test tube or beaker in which the reaction takes place, a 'squeaky pop' sound is heard. This confirms the presence of hydrogen gas which is highly inflammable and explodes when ignited in the presence of air (or oxygen).

② Hydrogen & oxygen mixture \rightarrow DETONATING MIXTURE

③ Hydrogen \rightarrow Combustible but not a supporter of combustion
जलती है पर जलने में या जलाने में मदद नहीं करती।



Let's Practice



PW Ka **ChemStar!**

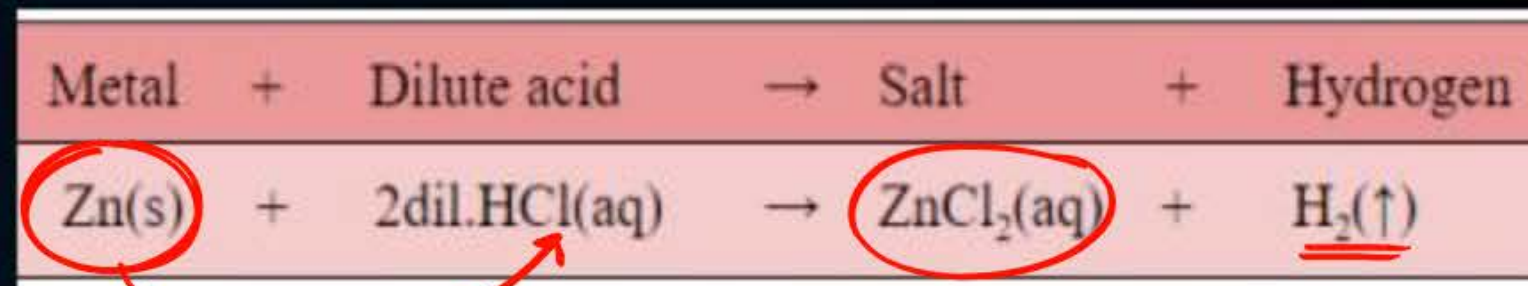
QUESTION

Identify the types of the reaction when zinc granules react with dilute hydrochloric acid.

- ☐ **A** Displacement, Endothermic, Redox
- ☐ **B** Displacement, Endothermic, Neutralisation
- ☒ **C** Displacement, Exothermic, Redox
- ☐ **D** Double displacement, Exothermic, Redox

QUESTION

Identify the types of the reaction when zinc granules react with dilute hydrochloric acid.



A Displacement, Endothermic, Redox

B Displacement, Endothermic, Neutralisation

C Displacement, Exothermic, Redox

D Double displacement, Exothermic, Redox

→ Metal-nonmetal displacement rxn

→ Redox Rxn

→ Exothermic Rxn

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Reaction of Metal carbonate/bicarbonate with Acid

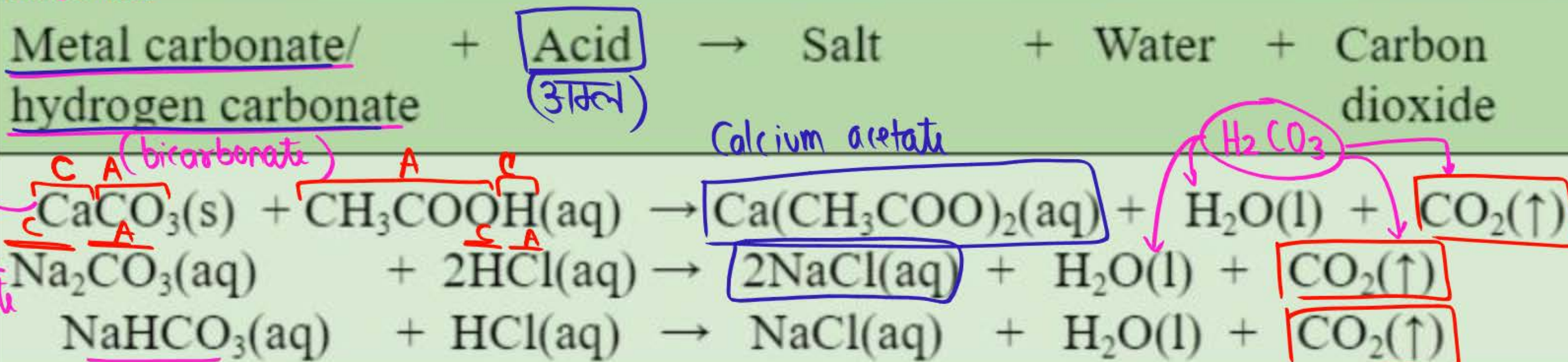


(ii) Reaction with metal carbonates/bicarbonates: Acids react with metal carbonates and metal hydrogen carbonates to produce corresponding salt, water and carbon dioxide gas with effervescence.

Calcium carbonate

Sodium carbonate

↳ Sodium bicarbonate



Calcium acetate

H_2CO_3

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Concept Polish (गृहकार्य)



QUESTION

When we put a raw egg inside a beaker containing vinegar, there are bubbles of gas (X). Identify the gas (X).

- A** H_2
- B** CO
- C** CO_2
- D** H_2S

Insaniyat Ka Gyaan

*Insaniyat Ka Gyaan
Jo Banae Behtar Insan*

जब इंसान में अहंकार आ जाए कि
जो हो रहा है उसकी वजह से हो रहा
है समझ लेना उसकी अंत करीब है

SUNIL BHAIYA IS ALWAYS THERE FOR YOU.

#sbsathhai (✓)

#pwsathhai (✓)



**THANK
YOU**

