

CHEMISTRY 9<sup>th</sup> (New Book)

## CHAPTER NO 7

## Acid Base Chemistry

## Exercise: Multiple Choice Questions

1.	Formic acid	2.	Carbon dioxide
3.	All the above-mentioned characters are true	4.	2
5.	3	6.	Stearic acid
7.	<a href="http://www.ilmkidunya.com">www.ilmkidunya.com</a> H <sub>2</sub> SO <sub>3</sub>	8.	Tomato
9.	CH <sub>3</sub> COO <sup>-</sup>	10.	Reaction of an alkali with ammonium salt

## Q#2: Short Question Answer

## i. Choose Arrhenius Acids among the following compounds:

HF, NH<sub>4</sub>, H<sub>2</sub>SO<sub>4</sub>, SO<sub>3</sub>, H<sub>2</sub>S, H<sub>2</sub>O

## Arrhenius Acids:

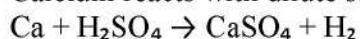
According to Arrhenius, an acid is a substance which dissociates in water to give proton (H<sup>+</sup>) or hydronium ion (H<sub>3</sub>O<sup>+</sup>).

So **HF, H<sub>2</sub>SO<sub>4</sub> and H<sub>2</sub>O** are Arrhenius acids.

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ii. How does calcium metal react with dilute H<sub>2</sub>SO<sub>4</sub>?

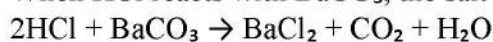
Calcium reacts with dilute sulfuric acid to produce **calcium sulfate and hydrogen gas**:



Effervescence is observed due to the release of hydrogen gas.

iii. Which salt is formed when HCl reacts with BaCO<sub>3</sub>?

When HCl reacts with BaCO<sub>3</sub>, the salt barium chloride is formed.



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iv. How will you justify that HSO<sub>4</sub><sup>-</sup> is a Bronsted-Lowry acid?

## Bronsted-Lowry Acid:

According to the Bronsted-Lowry definition, an acid is a substance that **donates a proton (H<sup>+</sup>)**.

HSO<sub>4</sub><sup>-</sup> can donate a proton to form SO<sub>4</sub><sup>2-</sup>.



Thus, **HSO<sub>4</sub><sup>-</sup> is a Bronsted-Lowry acid** because it acts as a **proton donor**.

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## v. Why is HCl not edible although it is present in the stomach and responsible for digestion of food?

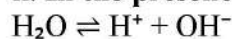
HCl (hydrochloric acid) in the stomach is highly **diluted** and regulated by the body to aid digestion.

- Concentrated or industrial HCl is highly corrosive and dangerous.
- It can burn tissues, damage the mouth, throat, and stomach if ingested in concentrated form.

Therefore, **HCl is not edible**.

**Q#3: Constructed Response Questions****i. What chemical name will you give to soap as compound?****Chemical Name:**Soap is chemically known as **sodium salt of a long-chain fatty acid**.

- **Sodium stearate** ( $C_{17}H_{35}COONa$ ) is a common soap compound.

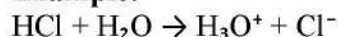
**ii. In the presence of a drop of an acid, water is known to ionize as follows:**

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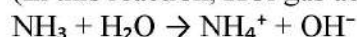
In your opinion, which name will be suitable for water: an acid, a base or both?

**Amphoteric compound:**

Water is called an amphoteric compound which means a compound that can behave both as an acid and a base.

**Example:**

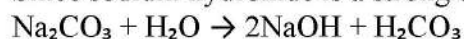
(In this reaction, HCl gas acts as a base and water acts as an acid.)

(In this reaction,  $NH_3$  gas acts as base and water acts as an acid.)

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**iii. Why does  $Na_2CO_3$  behave like a base in water?****Behaves as base:**Sodium carbonate reacts with water to form **sodium hydroxide ( $NaOH$ )** and **carbonic acid ( $H_2CO_3$ )**.

Since sodium hydroxide is a strong base while carbonic acid is a weak acid, so it makes the solution basic.

**iv. Is  $NaHCO_3$  a base or an acid? Justify your answer.**

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**Amphoteric Nature:** $NaHCO_3$  is **amphoteric** because it behaves as **weak base** when it reacts with acids and behaves as **weak acid** when it reacts with bases.**v. What is the difference between a strong acid and a concentrated acid?**

Strong Acid	Concentrated Acid
Acid which completely ionizes in water.	It has a high amount of acid per unit volume.
<b>Dependence:</b>	
It depends on nature of acid.	It depends on amount (concentration).
<b>Example:</b>	
Strong Acid: $HCl$ , $HNO_3$ , $H_2SO_4$	Concentrated Acid: 12 M $HCl$ (concentrated), 1 M $HCl$ (dilute)