CHEMISTRY 9th (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.	H_2SO_3	8.	Tomato
9.	CH_3COO^-	10.	Reaction of an alkali with ammonium salt

Q#2: Short Question Answer

i. Choose Arrhenius Acids among the following compounds:

HF, NH_4, H_2SO_4, SO_3, H_2S, H_2O

Arrhenius Acids:

According to Arrhenius, an acid is a substance which dissociates in water to give proton (H^+) or hydronium ion (H_3O^+).

So **HF, H_2SO_3 and H_2O** are Arrhenius acids.

ii. How does calcium metal react with dilute H_2SO_4?

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

$Ca + H_2SO_4 \rightarrow CaSO_4 + H_2$

Effervescence is observed due to the release of hydrogen gas.

iii. Which salt is formed when HCl reacts with $BaCO_3$?

When HCl reacts with $BaCO_3$, the salt barium chloride is formed.

$2HCl + BaCO_3 \rightarrow BaCl_2 + CO_2 + H_2O$

iv. How will you justify that HSO_4^- is a Bronsted-Lowry acid?

Bronsted-Lowry Acid:

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

HSO_4^- can donate a proton to form SO_4^{2-}.

$HSO_4^- \rightarrow H^+ + SO_4^{2-}$

Thus, **HSO_4^- is a Bronsted-Lowry acid** because it acts as a **proton donor.**

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:

$H_2O \rightleftharpoons H^+ + OH^-$

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:

$HCl + H_2O \rightarrow H_3O^+ + Cl^-$

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

$NH_3 + H_2O \rightarrow NH_4^+ + OH^-$

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

---

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.

$Na_2CO_3 + H_2O \rightarrow 2NaOH + H_2CO_3$

---

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

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.
Dependence:	
It depends on nature of acid.	It depends on amount (concentration).
Example:	
Strong Acid: HCl, HNO_3, H_2SO_4	Concentrated Acid: 12 M HCl (concentrated), 1 M HCl (dilute)