

## IONIC EQUILIBRIUM

### 9. STRENGTH, PREPARATION AND PROPERTIES OF ACIDS & BASES

#### SOLUTIONS

#### TEACHING TASK

##### Single Answer Type

1. Which of the following is a weak acid?

- A)  $\text{H}_3\text{PO}_4$                       B)  $\text{H}_2\text{CO}_3$                       C)  $\text{HNO}_2$                       D) All of these

**Answer: D**

Solution:  $\text{H}_3\text{PO}_4$  — phosphoric acid, weak acid (triprotic but does not fully dissociate in water)

$\text{H}_2\text{CO}_3$  — carbonic acid, weak acid

$\text{HNO}_2$  — nitrous acid, weak acid

2.  $\text{NaHCO}_3 + \text{HCl} \rightarrow \dots\dots\dots + \text{CO}_2 + \text{H}_2\text{O}$ .

- A)  $\text{NaOH}$                       B)  $\text{NaO}$                       C)  $\text{NaCl}$                       D)  $\text{Na}$

**Answer: C**

Solution:  $\text{Na}_2\text{CO}_3 + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{CO}_2 + \text{H}_2\text{O}$

3. Which acid do not change into their vapours, even on strong heating also.

(FA & SA- 5 Marks / 8 Marks)

- A)  $\text{H}_2\text{SO}_4$                       B)  $\text{HCl}$                       C)  $\text{CH}_3\text{COOH}$                       D)  $\text{HNO}_3$

**Answer: A**

Solution:

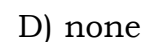
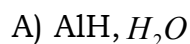
$\text{H}_2\text{SO}_4$  (Sulfuric acid) – It is non-volatile. Even on strong heating (unless extremely high temperature), it does not vaporize easily; instead, it may decompose at very high temperatures ( $\sim 300^\circ\text{C}$  and above) to give  $\text{SO}_3$ , but it doesn't boil like volatile acids.

$\text{HCl}$  (Hydrochloric acid) – This is volatile; concentrated  $\text{HCl}$  solution releases  $\text{HCl}$  gas on mild heating.

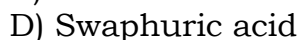
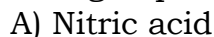
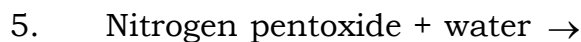
$\text{CH}_3\text{COOH}$  (Acetic acid) – Volatile; vaporizes easily upon heating (boiling point  $\sim 118^\circ\text{C}$ ).

$\text{HNO}_3$  (Nitric acid) – Volatile; boils and decomposes on heating.

The acid that does not change into vapour even on strong heating is  $\text{H}_2\text{SO}_4$  because of its very low volatility and high boiling point ( $\sim 337^\circ\text{C}$  for pure acid; but when heated strongly, it decomposes rather than vaporizing intact).

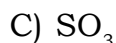
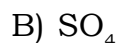
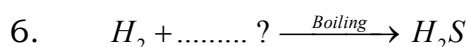
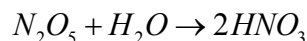


**Answer:C**

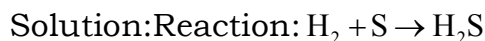


**Answer:A**

Solution: When nitrogen pentoxide ( $N_2O_5$ ) reacts with water, it forms nitric acid ( $HNO_3$ ).



**Answer:D**

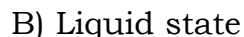
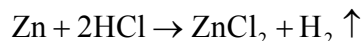


Hydrogen gas reacts with sulfur to form hydrogen sulfide.



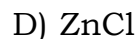
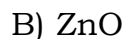
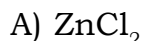
**Answer:A**

Solution: Metals reacting with acids typically produce hydrogen gas ( $H_2$ ).

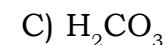
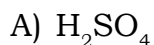
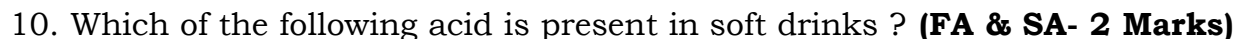


**Answer:A**

Solution:  $H_3BO_3$  (boric acid) at room temperature and normal conditions is a solid (white crystalline powder).

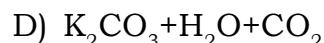
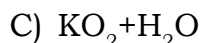
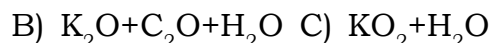


**Answer:A**

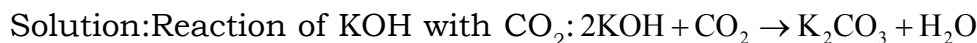


**Answer:C**

Solution: Soft drinks contain carbonic acid ( $H_2CO_3$ ) due to dissolved  $CO_2$  in water.



**Answer:A**



12. When alkalis are warmed with Ammonium salts, they liberated .....

(FA & SA- 3 Marks / 4 Marks)

- A)  $H_2$  Gas                      B)  $CO_2$  Gas                      C)  $NH_3$  Gas                      D)  $NH_4$  Gas

**Answer:C**

Solution:When an alkali (like NaOH or KOH) is heated with an ammonium salt (like  $NH_4Cl$  or  $(NH_4)_2SO_4$ ), ammonia gas is liberated

13.  $2NaOH + Zn \rightarrow \dots\dots\dots + H_2$ .

- A)  $Zn(OH)_2$                       B) NaO                      C)  $Na_2ZnO_2$                       D) none

**Answer:C**

Solution:Reaction:  $2NaOH + Zn \rightarrow Na_2ZnO_2 + H_2$

Sodium zincate is  $Na_2ZnO_2$

14. Bases are

- A) Good conductors of electricity                      B) Bad conductors of electricity  
C) Neutral                      D) Bad conductors of heat

**Answer:A**

Solution:Bases, when dissolved in water, dissociate into ions (e.g.,  $OH^-$ ), making the solution a good conductor of electricity.

### JEE ADVANCED LEVEL

**Multi Correct Choice Type:**

15. Which of the following is true about acids ?

- A) Acids are corrosive                      B) Acids taste sour  
C) Soluble in water                      D) Turn Red to Blue

**Answer:A,B,C**

Solution:Properties of acids: Corrosive , Sour taste ,Soluble in water (acids we commonly refer to are soluble), Turn blue litmus red (not red to blue)

16. Which of the following acids are volatile ?

- A)  $H_2SO_4$                       B) HCl                      C)  $HNO_3$                       D)  $H_2SO_{31}$

**Answer:B,C,D**

Solution:Volatile acids vaporize easily at room temperature:

$H_2SO_4$  — nonvolatile

HCl — volatile

$HNO_3$  — volatile

$H_2SO_3$  — sulfurous acid, volatile

**Statement Type :**

17. **Statement-I :** Magnesium Hydroxide is used as an antacid

**Statement-II :** It cures indigestion by neutralising excess acid in the stomach

**Answer:A**

Solution:Statement I: Magnesium hydroxide is used as an antacid — True.

Statement II: It cures indigestion by neutralizing excess acid in the stomach — True, and it explains Statement I.

18. **Statement-I :** Phosphorous acid is a weak acid

**Statement-II :** They produce less concentration of  $H^+$  ions in water.

**Answer:A**

Solution: Statement I: Phosphorous acid is a weak acid — True.

Statement II: They produce less concentration of  $H^+$  ions in water — True, and this is the definition of a weak acid.

19. **Statement-I** :  $HNO_3$  is a strong acid

**Statement-II** :  $H_2CO_3$  is a strong acid

**Answer:C**

Solution: Statement I:  $HNO_3$  is a strong acid — True.

Statement II:  $H_2CO_3$  is a strong acid — False ( $H_2CO_3$  is weak).

### Comprehension type

An acid which contains hydrogen and a non-metallic element, other than oxygen is called Hydroacid.

20. Which of the following acid is Hydro acid

A) HCN

B)  $HNO_2$

C)  $H_2SO_4$

D)  $H_2CO_3$

**Answer:A**

Solution: A hydro acid is a binary acid composed of hydrogen and one other non-metal element (e.g., HCl, HF,  $H_2S$ ).

Among the options:

HCN — hydrogen cyanide — binary compound of H and CN (pseudo-binary), often considered a hydro acid.

$HNO_2$  — nitrous acid — oxoacid (contains oxygen).

$H_2SO_4$  — sulfuric acid — oxoacid.

$H_2CO_3$  — carbonic acid — oxoacid.

21. An acid which contain hydrogen and non-metallic element other than oxygen .....

A) Volatile acid

B) Non volatile acid

C) Hydro acid

D) Oxy acid

**Answer:C**

Solution: An acid that contains hydrogen and a non-metallic element other than oxygen is called a hydro acid.

Examples: HCl, HBr,  $H_2S$ , HCN.

### Integer Type :

22. Volatile acids easily changes into their vapours either at room temperature or heating below .....

**Answer:100°C**

Solution: Volatile acids change into vapor below 100°C (often at room temperature).

23. Hydro acids contain \_\_\_\_\_ type of elements.

**Answer:2**

Solution: Hydro acids contain 2 types of elements: hydrogen and a nonmetal (no oxygen).

**Matrix Matching Type :**

24. 1)  $N_2O_5 + H_2O$  ( ) A)  $H_3PO_3$   
 2)  $N_2O_3 + H_2O$  ( ) B)  $HNO_3$   
 3)  $P_2O_3 + H_2O$  ( ) C)  $H_3PO_4$   
 4)  $P_2O_5 + H_2O$  ( ) D)  $HNO_2$

**Answer: 1-B, 2-D, 3-A, 4-C**

Solution:

- |  |              |
|--|--------------|
| 1) $N_2O_5 + H_2O \rightarrow 2 HNO_3$   | B) $HNO_3$   |
| 2) $N_2O_3 + H_2O \rightarrow 2 HNO_2$   | D) $HNO_2$   |
| 3) $P_2O_3 + H_2O \rightarrow 2 H_3PO_3$ | A) $H_3PO_3$ |
| 4) $P_2O_5 + H_2O \rightarrow 2 H_3PO_4$ | C) $H_3PO_4$ |

**LEARNER'S TASK****Conceptual Understanding Questions (CUQ's)**

1. The acid which kills most of the germs then we swallow with food.  
 A)  $H_2SO_4$  B)  $HCl$  C)  $HNO_3$  D)  $H_2CO_3$

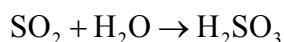
**Answer: B**

Solution: The acid in our stomach is hydrochloric acid ( $HCl$ ), which helps kill germs that may be present in the food we swallow.

2.  $SO_2 + H_2O \rightarrow$   
 A)  $H_2SO_4$  B)  $H_2SO_3$  C)  $HSO_3$  D) None

**Answer: B**

Solution: When sulfur dioxide dissolves in water, it forms sulfurous acid



3.  $H_2SO_4$  is example for  
 A) strong acid B) Dibasic acid C) Non-volatile acid D) All the above

**Answer: D**

Solution:  $H_2SO_4$  is:

A strong acid (fully dissociates in water for the first proton, strong for the second in dilute solutions).

A dibasic acid (has two replaceable  $H^+$  ions).

A non-volatile acid (high boiling point, does not evaporate easily).

4. The acids in which more than 30% of the molecules of it ionise in water to furnish  $H^+$  ions, are called\_\_\_\_\_.  
 A) Weak acids B) Strong acids  
 C) Neutral acids D) Inorganic acids

**Answer: B**

Solution: Acids that ionize more than 30% (or to a large extent) in water to produce  $H^+$  ions are called strong acids.

5. Which of the following is a Hydro acid  
 A)  $HCl$  B)  $HNO_3$  C)  $H_2SO_4$  D)  $H_2CO_3$

**Answer:A**

Solution: A hydro acid is a binary acid composed of hydrogen and one other nonmetal element, typically from the halogen group or sometimes sulfur, selenium, etc., but in simple terms it's a binary acid like HCl, HBr, HF, H<sub>2</sub>S (but H<sub>2</sub>S is sometimes called hydrosulfuric acid).

From the options:

HCl – Hydrochloric acid → Hydro acid (binary compound of H and Cl).

HNO<sub>3</sub> – Oxoacid (contains oxygen).

H<sub>2</sub>SO<sub>4</sub> – Oxoacid.

H<sub>2</sub>CO<sub>3</sub> – Oxoacid.

6. The acids which easily change into their vapours is called

A) Volatile acids

B) Non volatile acids

C) Strong acids

D) Weak acids

**Answer:A**

Solution: Acids that easily turn into vapors upon heating are called volatile acids.

7. Color of HCl is

A) Colourless

B) Brown

C) Red

D) Pink

**Answer:A**

Solution: Hydrogen chloride gas and its aqueous solution (hydrochloric acid) are both colourless.

8.  $H_2 + Cl_2 \xrightarrow{?} 2HCl$

A) Heat

B) Sunlight

C) Catalyst

D) None

**Answer:B**

Solution: Hydrogen and chlorine combine explosively in the presence of sunlight to form hydrogen chloride gas

9.  $SO_3 + H_2O \longrightarrow$

A) H<sub>2</sub>SO<sub>3</sub>

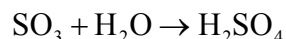
B) H<sub>2</sub>SO<sub>4</sub>

C) H<sub>2</sub>S

D) H<sub>2</sub>CO<sub>3</sub>

**Answer:B**

Solution: Sulfur trioxide reacts with water to form sulphuric acid



10. Which of the following acid is heavier than water ?

A) Sulphuric acid

B) Hydrochloric acid

C) Sulphurous acid

D) Carbonic acid

**Answer:A**

Solution: Sulphuric acid (specific gravity ~ 1.84) is much heavier than water (specific gravity = 1)

11. The Number of hydroxyl ions (OH<sup>-</sup>) furnished by one molecule of an alkali is called as

A) acidity

B) Basicity

C) Atomcity

D) None

**Answer:A**

Solution: The number of hydroxyl ions (OH<sup>-</sup>) furnished by one molecule of an alkali is called its acidity.

12.  $\text{NaOH} + \text{CO}_2 \rightarrow ?$

- A) Carbonate      B) Bicarbonate      C) Oxide      D) none

**Answer:A,B**

Solution: The reaction between sodium hydroxide (NaOH) and carbon dioxide ( $\text{CO}_2$ ) can produce either sodium carbonate or sodium bicarbonate, depending on the ratio of the reactants.

When there is a limited amount of carbon dioxide or an excess of sodium hydroxide, the product is sodium carbonate  $\text{Na}_2\text{CO}_3$ . This is an acid-base neutralization reaction, as carbon dioxide is an acidic oxide. The balanced chemical equation is:  $2\text{NaOH} + \text{CO}_2 \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O}$

If there is an excess of carbon dioxide, it will react with the initially formed sodium carbonate and water to produce sodium bicarbonate  $\text{NaHCO}_3$ . The reaction is:  $\text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O} \rightarrow 2\text{NaHCO}_3$

This can also be written as a direct reaction with excess carbon dioxide:  $\text{NaOH} + \text{CO}_2 \rightarrow \text{NaHCO}_3$

13. Bases in methyl orange solution turns

- A) Brown      B) Yellow      C) Pink      D) Blue

**Answer:B**

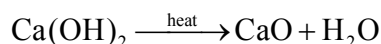
Solution: Bases turn methyl orange solution yellow.

14.  $\text{Ca}(\text{OH})_2 \xrightarrow{\text{heat}} ?$

- A)  $\text{CaO} + \text{H}_2\text{O}$       B)  $\text{Ca} + \text{H}_2\text{O}$       C)  $\text{CaOH} + \text{O}_2$       D)  $\text{CaO}_2 + \text{H}_2\text{O}$

**Answer:A**

Solution: When calcium hydroxide (slaked lime) is heated, it decomposes to form calcium oxide (quicklime) and water



15. Bases in phenolphthalein solution

- A) Yellow      B) Pink      C) Brown      D) Red

**Answer:B**

Solution: Bases turn phenolphthalein solution from colorless to pink.

### JEE MAIN LEVEL

1.  $\text{Ca}(\text{OH})_2 + \text{H}_2\text{SO}_4 \rightarrow$

- A)  $\text{CaSO}_4$       B)  $\text{H}_2\text{O}$       C) Both 1 and 2      D)  $\text{CaO}$

**Answer:C**

Solution:  $\text{Ca}(\text{OH})_2 + \text{H}_2\text{SO}_4 \rightarrow \text{CaSO}_4 + 2\text{H}_2\text{O}$

2. Acid which is Brown due to impurities

- A)  $\text{H}_2\text{SO}_4$       B)  $\text{HCl}$       C)  $\text{H}_2\text{CO}_3$       D)  $\text{HNO}_3$

**Answer:D**

Solution: The acid that turns brown due to impurities is nitric acid  $\text{HNO}_3$



3. Hydrogen gas is not evolved when ..... is mixed with Zinc.  
 A) Dil  $\text{HNO}_3$       B) Conc  $\text{HNO}_3$       C) Dil  $\text{H}_2\text{SO}_4$       D) Conc  $\text{H}_2\text{SO}_4$

**Answer: A**

Solution: When zinc reacts with dilute nitric acid, the nitric acid acts as a strong oxidizing agent, oxidizing the produced hydrogen to water, hence no hydrogen gas is released.

4. The acids which undergoes complete ionisation when dissolved in water and furnish large conc of  $\text{H}^+$  ions are called.  
 A) Strong acids      B) weak acids      C) Volatile acids      D) Non - Volatile acids

**Answer: A**

Solution: Acids that undergo complete ionization in water and produce a large concentration of  $\text{H}^+$  ions are called strong acids.

5. Hydro chloric acid is also known as  
 A) muriatic acid      B) Organic acid      C) Non volatilve acid      D) Weak acid

**Answer: A**

Solution: Hydrochloric acid ( $\text{HCl}$ ) is commonly called muriatic acid, especially in industrial and cleaning applications

6. Chloric acid is a  
 A) Strong acid      B) weak acid      C) Non volatile acid      D) Organic acid

**Answer: A**

Solution: Chloric acid ( $\text{HClO}_3$ ) is a strong acid that ionizes almost completely in water to produce  $\text{H}^+$  ions

7. Which of the following acid is a Hygroscopic in nature ?  
 (FA & SA- 3 Marks / 4 Marks)  
 A)  $\text{H}_2\text{SO}_4$       B)  $\text{HCl}$       C)  $\text{HNO}_3$       D)  $\text{H}_2\text{CO}_3$

**Answer: A**

Solution: Hygroscopic substances are those that absorb moisture from the air. Concentrated sulphuric acid ( $\text{H}_2\text{SO}_4$ ) is highly hygroscopic and can even dehydrate organic substances due to its strong affinity for water.

Other options:

$\text{HCl} \rightarrow$  volatile, not strongly hygroscopic

$\text{HNO}_3 \rightarrow$  slightly hygroscopic, but less than  $\text{H}_2\text{SO}_4$

$\text{H}_2\text{CO}_3 \rightarrow$  unstable in water, not hygroscopic

8. Which of the following highly corrosive mineral acid ?  
 A)  $\text{H}_2\text{SO}_4$       B)  $\text{HCl}$       C)  $\text{HNO}_3$       D)  $\text{H}_2\text{CO}_3$

**Answer: A**

Solution:  $\text{H}_2\text{SO}_4$  is very corrosive and can cause severe burns on contact with skin. It is a strong mineral acid used widely in industry

9. Another name of formic acid is  
 (FA & SA- 2 Marks)  
 A) Ethanoic acid      B) Methanoic acid      C) Nitrous acid      D) Oxalic acid

**Answer: B**

Solution: Formic acid has the chemical formula  $\text{HCOOH}$ , and according to IUPAC



nomenclature, it is called Methanoic acid

10. A metals will not react with dilute acids ?

- A) Copper                      B) Silver                      C) Both 1 and 2    D) Zinc

**Answer:C**

Solution:Copper and silver are less reactive metals (below hydrogen in the reactivity series), so they do not displace hydrogen from dilute acids

11. Which of the following are correct statements

- A) Bases conduct electricity in solution      B) Alkalis bitter in taste  
C) Bases Turns red litmus blue                  D) All the above.

**Answer:D**

Solution:All statements are true:

Bases conduct electricity in aqueous solution (due to ions).

Alkalis are bitter in taste.

Bases turn red litmus blue

12. Choose the false statements:

- A)  $\text{Na}_2\text{O}$  is a common base.                      B)  $\text{NaOH}$  is a common base.  
C)  $\text{CuO}$  is a common alkali.                      D)  $\text{Al}(\text{OH})_3$  is a common alkali.

**Answer:C**

Solution: $\text{CuO}$  (copper(II) oxide) is a metal oxide base, but not soluble in water — so it is not an alkali.

13.  $3\text{Fe} + \text{H}_2\text{O}(\text{steam}) \xrightarrow{\Delta} ? + \text{H}_2 \uparrow$

- A)  $\text{FeO}$                       B)  $\text{Fe}_2\text{O}_3$                       C)  $\text{Fe}_3\text{O}_4$                       D)  $\text{Fe}$

**Answer:C**

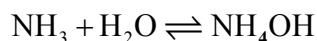
Solution:  $3\text{Fe} + 4\text{H}_2\text{O}(\text{steam}) \xrightarrow{\Delta} \text{Fe}_3\text{O}_4 + 4\text{H}_2 \uparrow$

14. Ammonia gas dissolved in water produces

- A)  $\text{NH}_4$                       B)  $\text{NH}_4\text{OH}$                       C)  $\text{NH}_3$                       D)  $\text{NH}_4(\text{OH})_2$

**Answer:B**

Solution:Ammonia reacts with water to form ammonium hydroxide ( $\text{NH}_4\text{OH}$ )

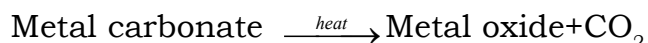


15. Metal carbonates on strong heating produces **(FA & SA- 5 Marks / 8Marks)**

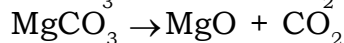
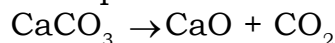
- A)  $\text{H}_2$  Gas                      B)  $\text{CO}_2$  Gas                      C)  $\text{CO}$  Gas                      D)  $\text{N}_2$  Gas

**Answer:B**

Solution: Metal carbonates decompose on strong heating to form metal oxides and carbon dioxide gas.



Examples:



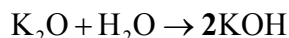
Concept: Thermal decomposition of carbonates always releases  $\text{CO}_2$  gas

16.  $\text{K}_2\text{O} + \text{H}_2\text{O} \rightarrow ?$

- A)  $\text{KOH}$                       B)  $\text{K}_2\text{O}$                       C)  $\text{K} + \text{O}_2$                       D)  $\text{K}(\text{OH})_2$

**Answer:A**

Solution: The reaction of potassium oxide ( $K_2O$ ) with water ( $H_2O$ ) is a characteristic reaction of a basic metal oxide with water, which produces a metal hydroxide



The product is Potassium Hydroxide (KOH).

17. Which of the following metals produces hydrogen gas on steam ?

- A) Na                      B) Ca                      C) Mg                      D) Cu

**Answer:C**

Solution: Magnesium reacts with steam to form magnesium oxide ( $MgO$ ) and hydrogen gas ( $H_2$ ).



Sodium (Na) and calcium (Ca) react with cold water, not steam.

Copper (Cu) does not react with water or steam

**JEE ADVANCED LEVEL****Multi Correct answer type**

18. Which of the following are strong acids ?

- A) Chloric acid                      B) Per chloric acid  
C) Hydronic acid                      D) Hydro iodic acid

**Answer:A,B,D**

Solution:  $HClO_3$ ,  $HClO_4$ , and HI are strong acids – they ionize almost completely in water.

19. Which of the following are weak acids ?

- A) Oxalic acid                      B) Formic acid                      C) Benzoic acid                      D) Hydroic acid

**Answer:A,B,C**

Solution: 1) Oxalic acid ( $H_2C_2O_4$ ): Weak Acid (Yes, it's a weak dicarboxylic acid)

2) Formic acid ( $HCOOH$ ): Weak Acid (Yes, it's a weak carboxylic acid)

3) Benzoic acid ( $C_6H_5COOH$ ): Weak Acid (Yes, it's a weak carboxylic acid)

20. Which of the following is a Diacidic Alkali/Base

- A)  $Ca(OH)_2$                       B)  $Mg(OH)_2$                       C)  $Cu(OH)_2$                       D)  $Fe(OH)_3$

**Answer:A,B,C**

Solution: A base (or alkali) is classified by its acidity (also called basicity) based on the number of hydroxyl ( $OH^-$ ) ions it can produce per molecule in an aqueous solution. A Diacidic base produces two ( $OH^-$ ) ions per molecule.

1)  $Ca(OH)_2$  (Calcium Hydroxide) : Dissociates to  $Ca^{2+} + 2OH^-$  .Diacidic Base

2)  $Mg(OH)_2$  (Magnesium Hydroxide) : Dissociates to  $Mg^{2+} + 2OH^-$  .Diacidic Base

3)  $Cu(OH)_2$  (Copper (II) Hydroxide) : Dissociates to  $Cu^{2+} + 2OH^-$  .Diacidic Base

4)  $Fe(OH)_3$  (Iron (III) Hydroxide) : Dissociates to  $Fe^{3+} + 3OH^-$  .This is a Triacidic Base

**Statement Type :**

- A) Both the statements are **TRUE** and **Statement -II** is the correct explanation of **STATEMENT - I**  
 B) Both the statements are **TRUE** and **Statement -II** is not the correct explanation of Statement -I  
 C) Statement -I is **TRUE** and Statement -II is **FALSE**  
 D) Statement -I is **FALSE** and Statement -II is **TRUE**

21. **Statement -I :**  $2\text{HCl} + \text{CuCO}_3 \rightarrow \text{CuCl}_2 + \text{H}_2\text{O} + \text{CO}_2$

**Statement -II :** Green solid dissolves with effervescence to form blue solution.

**Answer:A**

Solution: Both statements are TRUE, and Statement-II correctly explains Statement-I — effervescence is due to  $\text{CO}_2$  gas, and the blue solution is due to  $\text{CuCl}_2$

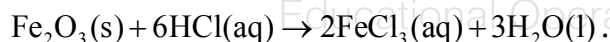
22. **Statement -I :** Acids react with bases to form salts and water.

**Statement -II :** When Hydrochloric acid reacts with Iron (III) oxide forms Reddish - Brown Crystals.

**Answer:B**

Solution: Statement-I: Acids react with bases to form salts and water. Analysis: This is the definition of a neutralization reaction. (TRUE)

Statement-II: When Hydrochloric acid reacts with Iron (III) oxide forms Reddish - Brown Crystals. Analysis: The reaction is:



Iron(III) oxide is an amphoteric/basic oxide that reacts with acid. Iron(III) chloride ( $\text{FeCl}_3$ ) is a yellowish-brown/reddish-brown solid salt that can form crystals upon evaporation. (TRUE)

23. **Statement -I :** The oxides of metals are commonly called basic oxides.

**Statement -II :** The basic oxides react with acids to form salt and water as only products.

**Answer:A**

Solution: Both are TRUE, and Statement-II correctly explains Statement-I

24. Carbonate metal which will not decompose on strong heating also.

- A)  $\text{K}_2\text{CO}_3$                       B)  $\text{CaCO}_3$                       C)  $\text{ZnCO}_3$                       D)  $\text{CuCO}_3$

**Answer:A**

Solution:

Among carbonates —

$\text{Na}_2\text{CO}_3$  and  $\text{K}_2\text{CO}_3$  (alkali metal carbonates) do not decompose even on strong heating.

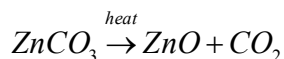
$\text{CaCO}_3$ ,  $\text{ZnCO}_3$ ,  $\text{CuCO}_3$  all decompose on heating to give metal oxide +  $\text{CO}_2$

25.  $\text{ZnCO}_3 \xrightarrow{\text{heat}} ? + ?$

- A)  $\text{ZnO}$ ,  $\text{CO}_2$                       B)  $\text{Zn}$ ,  $\text{CO}_2$                       C)  $\text{ZnCO}_2$ ,  $\text{O}_2$                       D)  $\text{Zn}$ ,  $\text{O}_2$

**Answer:A**

Solution: On heating, zinc carbonate decomposes to give zinc oxide and carbon dioxide



### Integer Type :

26. Di acidic base contain ..... number of Hydroxyl ions to react with one molecule acid.

**Answer:2**

Solution: A diacidic base can donate two hydroxyl ( $\text{OH}^-$ ) ions.

It can react with one molecule of dibasic acid completely

27. ....  $\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2 \uparrow$

**Answer:2**

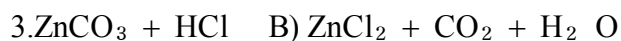
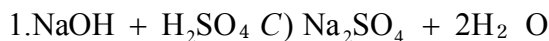
Solution:  $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2 \uparrow$

### Matrix Matching Type :

28. Column-I	Column-II
1) $\text{NaOH} + \text{H}_2\text{SO}_4$	( ) A) $\text{ZnCl}_2 + \text{H}_2\text{O}$
2) $\text{ZnO} + \text{HCl}$	( ) B) $\text{ZnCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$
3) $\text{ZnCO}_3 + \text{HCl}$	( ) C) $\text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$
4) $\text{Zn} + \text{HCl}$	( ) D) $\text{ZnCl}_2 + \text{H}_2$

**Answer: 1-C, 2-A, 3-B, 4-D**

Solution:



# KEY

			TEACHING TASK							
1	2	3	4	5	6	7	8	9	10	
D	C	A	C	A	D	A	A	A	C	
11	12	13	14	15	16	17	18	19	20	
A	C	C	A	A,B,C	B,C,D	A	A	C	A	
21	22	23	24							
C	100	2	1-B,2-D,3-A,4-C							
			LEARNER'S TASK							
			CONCEPTUAL UNDERSTANDING QUESTIONS(CUQ'S)							
1	2	3	4	5	6	7	8	9	10	
B	B	D	B	A	A	A	B	B	A	
11	12	13	14	15						
A	A,B	B	A	B						
			JEE MAINS & ADVANCED LEVEL QUESTIONS							
1	2	3	4	5	6	7	8	9	10	
C	D	A	A	A	A	A	A	B	C	
11	12	13	14	15	16	17	18	19	20	
D	C	C	B	B	A	C	A,B,D	A,B,C	A,B,C	
21	22	23	24	25	26	27	28			
A	B	A	A	A	2	2 1-C,2-A,3-B,4-D				

Educational Operating System



Educational Operating System