

12. PREPARATION & PROPERTIES OF ACIDS

SOLUTIONS

TEACHING TASK

JEE MAIN LEVEL

Single Answer Type

1. Which of the following is a weak acid?

- 1) H_3PO_4 2) H_2CO_3 3) HNO_2 4) All of these

Answer:4

Solution: H_3PO_4 – weak acid

H_2CO_3 – weak acid

HNO_2 – weak acid

All are weak acids.

2. $NaHCO_3 + HCl \rightarrow \dots\dots\dots + CO_2 + H_2O$.

- 1) NaOH 2) NaO 3) NaCl 4) Na

Answer:3

Solution: Reaction: $NaHCO_3 + HCl \rightarrow NaCl + CO_2 + H_2O$

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

- 1) H_2SO_4 2) HCl 3) CH_3COOH 4) HNO_3

Answer:1

Solution: H_2SO_4 – high boiling point, nonvolatile

HCl – volatile

CH_3COOH – volatile

HNO_3 – volatile

4. $Al(OH)_3 + H_2SO_4 \rightarrow \dots\dots\dots + \dots\dots\dots$

- 1) AlH, H_2O 2) $AlSO_4, SO_2$ 3) $Al_2(SO_4)_3, H_2O$ 4) none

Answer:3

Solution: Neutralization: $2Al(OH)_3 + 3H_2SO_4 \rightarrow Al_2(SO_4)_3 + 6H_2O$

5. Nitrogen pentoxide + water \rightarrow

- 1) Nitric acid 2) Nitrous acid
3) Sulphurous acid 4) Swaphuric acid

Answer:1

Solution: $N_2O_5 + H_2O \rightarrow 2HNO_3$

6. $H_2 + \dots ? \xrightarrow{\text{Boiling}} H_2S$

- 1) Cl 2) SO_4 3) SO_3 4) S

Answer:4

Solution:Direct synthesis: $H_2 + S \xrightarrow{\Delta} H_2S$

7. Metals displace hydrogen from the acids. They release.

- 1) H_2 Gas 2) O_2 Gas 3) SO_2 Gas 4) CO_2 Gas

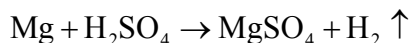
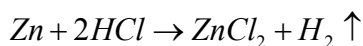
Answer:1

Solution:Chemical Reaction Principle:

Metals that are more reactive than hydrogen (located above hydrogen in the reactivity series) can displace hydrogen from acids. The general chemical reaction is:

Metal + acid \rightarrow salt + H_2 gas

Examples:



Why Hydrogen Gas is Released:

Acids like HCl, H_2SO_4 (dilute) contain H^+ ions in aqueous solution. When a reactive metal comes in contact with the acid, it donates electrons to the H^+ ions, reducing them to hydrogen gas: $2H^+ + 2e^- \rightarrow H_2 \uparrow$

The metal gets oxidized to metal ions, forming the corresponding salt.

8. H_3BO_3 is in

- 1) Solid state 2) Liquid state 3) Gaseous state 4) None

Answer:1

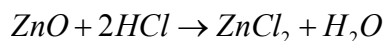
Solution:Boric acid is solid at room temperature.

9. $ZnO + 2HCl \xrightarrow{?} + H_2O$

- 1) $ZnCl_2$ 2) ZnO 3) Zn 4) $ZnCl$

Answer:1

Solution:Metal oxide + acid \rightarrow salt + water



10. Which of the following acid is present in soft drinks ?

- 1) H_2SO_4 2) H_2NO_3 3) H_2CO_3 4) HNO_3

Answer:3

Solution:Carbonic acid (H_2CO_3) from dissolved CO_2 .

Comprehension type

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

15. Which of the following acid is Hydro acid

- 1) HCN 2) HNO₂ 3) H₂SO₄ 4) H₂CO₃

Answer:1

Solution:Hydro acids are binary acids composed of hydrogen + a nonmetal, no oxygen.

- A) HCN → Hydrogen + Carbon + Nitrogen → Not purely binary; contains C and N (cyanide), but often classified as a hydro acid (binary acid of a pseudo-halogen).
 B) HNO₂ → Contains O → oxyacid
 C) H₂SO₄ → Contains O → oxyacid
 D) H₂CO₃ → Contains O → oxyacid

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

- 1) Volatile acid 2) Non volatile acid 3) Hydro acid 4) Oxy acid

Answer:3

Solution:An acid which contains hydrogen and a non-metal element other than oxygen is called a Hydro acid.

Integer Type :

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

Answer:100

Solution:Volatile acids vaporize at relatively low temperatures — often below 100°C (since water boils at 100°C, volatile acids usually vaporize below that).

18. Hydro acids contain _____ type of elements.

Answer:2

Solution:Hydro acids are binary acids: contain hydrogen and one other nonmetal (e.g., HCl, HBr, H₂S, HCN).
 So number of types of elements = 2.

19. Hydrochloric acid, Nitric acid, Sulphuric acid, Phosphoric acid - How many are used for fertilizers?

Answer:3

Solution:Hydrochloric acid → Not used in fertilizers
 Nitric acid → Used to make ammonium nitrate (fertilizer)
 Sulphuric acid → Used to make superphosphate and ammonium sulfate
 Phosphoric acid → Used to make phosphate fertilizers

3) Neutral acids

4) Inorganic acids

Answer:2

Solution: Acids with >30% ionization in water are called Strong acids

Examples: HCl, HNO₃, H₂SO₄ (near 100% dissociation).

5. Which of the following is a Hydro acid

1) HCl

2) HNO₃3) H₂SO₄4) H₂CO₃**Answer:1**

Solution: Hydro acid (hydrogen + non-metal, no oxygen): A) HCl (Hydrochloric acid)

Others contain oxygen (Oxyacids).

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

1) Volatile acids

2) Non volatile acids

3) Strong acids

4) Weak acids

Answer:1

Solution: Acids that easily vaporize are called Volatile acids

7. Color of HCl is

1) Colourless

2) Brown

3) Red

4) Pink

Answer:1

Solution: Gaseous HCl is colorless; solutions are clear.

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

1) Heat

2) Sunlight

3) Catalyst

4) None

Answer:2

Solution: Photochemical reaction (forms explosive mix in direct sunlight)

9. $SO_3 + H_2O \longrightarrow$ 1) H₂SO₃2) H₂SO₄3) H₂S4) H₂CO₃**Answer:2**

Solution: $SO_3 + H_2O \rightarrow H_2SO_4$

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

1) Sulphuric acid

2) Hydrochloric acid

3) Sulphurous acid

4) Carbonic acid

Answer:1

Solution: A) Sulphuric acid (H₂SO₄)

Density: ~1.84 g/cm³ (water = 1 g/cm³).

JEE MAIN LEVEL QUESTIONS

1. $\text{Ca(OH)}_2 + \text{H}_2\text{SO}_4 \rightarrow$
 1) CaSO_4 2) H_2O 3) Both 1 and 2 4) CaO

Answer:3

Solution:Balanced Reaction: $\text{Ca(OH)}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{CaSO}_4 + \text{H}_2\text{O}$
 Neutralization reaction producing calcium sulfate (gypsum) and water.

2. Acid which is Brown due to impurities
 1) H_2SO_4 2) HCl 3) H_2CO_3 4) HNO_3

Answer:4

Solution:Concentrated HNO_3 turns yellow-brown due to dissolved NO_2 gas (decomposition product).

3. Hydrogen gas is not evolved when is mixed with Zinc.
 1) Dil HNO_3 2) Conc HNO_3 3) Dil H_2SO_4 4) Conc H_2SO_4

Answer:1

Solution: HNO_3 (even dilute) is an oxidizing acid. With Zn, it produces NO /
 $\text{N}_2\text{O}/\text{NO}_2$ instead of H_2 : $4\text{Zn} + 10\text{HNO}_3 \rightarrow 4\text{Zn}(\text{NO}_3)_2 + \text{NH}_4\text{NO}_3 + 3\text{H}_2\text{O}$

4. The acids which undergoes complete ionisation when dissolved in water and furnish large conc of H^+ ions are called.
 1) Strong acids 2) weak acids 3) Volatile acids 4) Non - Volatile acids

Answer:1

Solution:Acids with complete ionization in water (high H^+ concentration): Strong acids

5. Hydro chloric acid is also known as
 1) muriatic acid 2) Organic acid 3) Non volatilve acid 4) Weak acid

Answer:1

Solution:.. Hydrochloric acid is also known as Muriatic acid
 Common name used in industrial/cleaning contexts.

6. Chloric acid is a
 1) Strong acid 2) weak acid 3) Non volatile acid 4) Organic acid

Answer:1

Solution:Chloric acid (HClO_3) is a Strong acid
 Fully dissociates in water: $\text{HClO}_3 \rightarrow \text{H}^+ + \text{ClO}_3^-$

7. Which of the following acid is a Hygroscopic in nature ?
 1) H_2SO_4 2) HCl 3) HNO_3 4) H_2CO_3

Answer:1

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**

13. **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: The reaction between hydrochloric acid (HCl) and copper carbonate (CuCO_3) produces:

Copper chloride (CuCl_2 , blue solution)

Water (H_2O)

Carbon dioxide (CO_2 , effervescence)

Balanced equation: $2\text{HCl} + \text{CuCO}_3 \rightarrow \text{CuCl}_2 + \text{H}_2\text{O} + \text{CO}_2$

Statement-II (True & Explanatory)

Green solid (CuCO_3) dissolves in HCl.

Effervescence (CO_2 gas bubbles) occurs.

Blue solution (CuCl_2) forms.

This matches the products described in Statement-I.

14. **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 is correct (neutralization).

Statement II: $\text{Fe}_2\text{O}_3 + 6\text{HCl} \rightarrow 2\text{FeCl}_3 + 3\text{H}_2\text{O}$;

FeCl_3 is yellow/brown, not always reddish-brown crystals. But FeCl_3 solution is yellow/brown; solid is reddish-brown.

Both correct, but II is not an explanation of I, it's an example.

Comprehension type

An acid which contains oxygen, along with hydrogen and one more element is called oxyacids.

15. Which of the following acid is oxy acid ?

1) HCN

2) HI

3) HF

4) HCOOH

Answer:4

Solution:Oxyacids contain hydrogen (H) + oxygen (O) + another element (usually a non-metal).

HCOOH: Structure is H-C(=O)-OH (contains C, H, and O).

Other options:

A) HCN (Hydrocyanic acid): No oxygen → Hydroacid.

B) HI (Hydroiodic acid): No oxygen → Hydroacid.

C) HF (Hydrofluoric acid): No oxygen → Hydroacid.

16. Oxalic acid is a

- 1) Oxy acid 2) Solid state acid 3) Volatile acid 4) All of the above

Answer:1,2

Solution:A) Oxyacid: Contains C, H, and O (structure: HOOC-COOH).

B) Solid state: Exists as white crystalline solid at room temperature.

C) Volatile acid: Incorrect. Oxalic acid is non-volatile (high melting point).

D) All of the above: False (since it's not volatile).

Integer Type :

17. Acid solutions have a PH value

Answer:0 TO 7

Solution:he pH scale ranges from 0 to 14:

Acidic solutions: pH < 7 (e.g., HCl pH ~1, vinegar pH ~3).

Neutral solutions: pH = 7 (pure water).

Basic solutions: pH > 7 (e.g., NaOH pH ~14).

18. Phosphoric acid contains number of phosphorous atoms.

Answer:1

Solution:Molecular formula of phosphoric acid: H_3PO_4 .

Contains 1 phosphorus (P) atom, 4 oxygen (O) atoms, and 3 hydrogen (H) atoms.

Matrix Matching Type :

19. **Column-I**

Column-I

- | | | |
|---------------------|--------|---------------------------|
| 1) $NaOH + H_2SO_4$ | () | A) $ZnCl_2 + H_2O$ |
| 2) $ZnO + HCl$ | () | B) $ZnCl_2 + CO_2 + H_2O$ |
| 3) $ZnCO_3 + HCl$ | () | C) $Na_2SO_4 + 2H_2O$ |
| 4) $Zn + HCl$ | () | D) $ZnCl_2 + H_2$ |

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

Solution:

Column-I

1) $NaOH + H_2SO_4$

2) $ZnO + HCl$

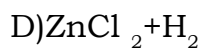
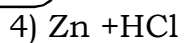
3) $ZnCO_3 + HCl$

Column-I

C) $Na_2SO_4 + 2H_2O$

A) $ZnCl_2 + H_2O$

B) $ZnCl_2 + CO_2 + H_2O$

20. **Column-I****Column-I**

1) Acetic acid

A) Ink stain remover

2) Carbonic acid

B) Washing eyes

3) Oxalic acid

C) Softdrinks

4) Boric acid

D) Cooking

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

Solution:

Column-I

Column-I

1) Acetic acid

D) Cooking

2) Carbonic acid

C) Softdrinks

3) Oxalic acid

A) Ink stain remover

4) Boric acid

B) Washing eyes

KEY

EdoS
Educational Operating System

TEACHING TASK									
JEE MAINS LEVEL QUESTIONS									
1	2	3	4	5	6	7	8	9	10
4	3	1	3	1	4	1	1	1	3
JEE ADVANCED LEVEL QUESTIONS									
11	12	13	14	15	16	17	18	19	
1,2,3	2,3,4	A	C	1	3	100	2	3	
20	20	LEARNER'S TASK							
CONCEPTUAL UNDERSTANDING QUESTIONS									
1	2	3	4	5	6	7	8	9	10
2	2	4	2	1	1	1	2	2	1
JEE MAINS LEVEL QUESTIONS									
1	2	3	4	5	6	7	8	9	10
3	4	1	1	1	1	1	1	2	3
JEE ADVANCED LEVEL QUESTIONS									
11	12	13	14	15	16	17	18	19	
1,2,4	1,2,3	A	B	4 1,2	0 TO 7		1	1-C,2-A,3-B,4-D	
20	20								
1-D,2-C,3-A,4-B									



 Educational Operating System