

Introduction to Acid and Base

EXERCISE [PAGE 88]

Exercise | Q 1 | Page 88

Identify the following solutions, whether they are acid or alkali.

Solution	Change in Indicator			Acid/Alkali
	Litmus	Phenolphthalein	Methyl orange	
1.	...	No change	...	
2.	...	...	Orange colour turns red	
3.	Red litmus turns blue	...	...	

Solution: Identify the following solutions, whether they are acid or alkali.

Solution	Change in Indicator			Acid/Alkali
	Litmus	Phenolphthalein	Methyl orange	
1.	Blue litmus turns red	No change	Orange colour turns red	Acid
2.	Blue litmus turns red	No change	Orange colour turns red	Acid
3.	Red litmus turns blue	Colourless to pink	Orange colour turns yellow	

Exercise | Q 2 | Page 88

Write chemical names from given formulae.

H_2SO_4 , $\text{Ca}(\text{OH})_2$, HCl , NaOH , KOH , NH_4OH

Solution: H_2SO_4 = Hydrogen sulphate

$\text{Ca}(\text{OH})_2$ = Calcium hydroxide

HCl = Hydrogen chloride

NaOH = Sodium hydroxide

KOH = Potassium hydroxide

NH_4OH = Ammonium hydroxide

Exercise | Q 3 | Page 88



Sulphuric acid has highest importance in chemical industry. Why?

Solution: Sulphuric acid is a chemical of major industrial importance. It is difficult to imagine life without it. Since, it is used in the manufacturing of a vast array of materials. Sulphuric acid can either be Concentrated or Diluted.

- Concentrated sulphuric acid is a colourless, viscous liquid that absorbs water vapour from the air and becomes a solution. It is hygroscopic. It is a good dehydrating agent and shows some oxidising ability.
- Dilute sulphuric acid behaves like a typical acid, reacting with metals to give hydrogen and a metal sulphate (i.e. it is corrosive), with metal carbonates to give carbon dioxide, water, and a metal sulphate and with bases give a metal sulphate and water.

Sulphuric acid has highest importance in chemical industry as

- 1.Sulphuric acid is used in manufacturing fertilizers such as super phosphate, ammonium sulphate etc.
- 2.Sulphuric acid is used in the manufacture of dyes.
- 3.Nitric acid is used in the manufacture of paints.
- 4.Sulphuric acid is used in the manufacture of drugs.
- 5.Sulphuric acid is used in the manufacture of explosives.
- 6.Sulphuric acid is used in batteries, which is used in cars.
- 7.Tannic acid is used in the manufacture of ink and leather.
- 8.Hydrochloric acid is used to make aqua regia, which is used to dissolve noble metals such as gold and platinum.
- 9.Sulphuric acid is used in the manufacture of jet fuel, kerosene and leather.

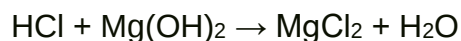
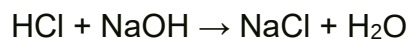
Exercise | Q 4.1 | Page 88

Give answers

Which acid is used for getting chloride salt ?

Solution: Acid used for getting chloride salt is HCl because this acid provides chloride ion to form chloride salt.

For example :



Exercise | Q 4.2 | Page 88

Give answers

By squeezing lemon on a piece of rock the gas liberated turned lime water milky. which compound is present in the rock ?



Solution: Compound presents in the rock is either a compound of carbonate or bicarbonate because acids react with carbonate or bicarbonate and liberate CO_2 . This carbon dioxide turns lime water milky.

Exercise | Q 4.3 | Page 88

Give answers

The label on the bottle of chemical is spoiled. How will you find whether the chemical is acidic or not ?

Solution: The chemical is acidic or not checked by two ways :

1. By use of litmus paper :

If the given solution is acidic, it turns blue litmus to red litmus.

If the given solution is basic, it turns red litmus to blue litmus.

If the given solution is neutral, there is no effect on litmus paper.

2. By use of indicators :

If the given solution is acidic, it turns methyl orange to red.

If the given solution is basic, it turns methyl orange to yellow

If the given solution is neutral, there is no effect on methyl orange indicator.

Exercise | Q 5.1 | Page 88

Answer the following question.

Explain the difference between acid and alkali.

Solution:

Parameter	Acid	Alkali
Nature of oxides	metal oxides are generally alkaline in nature	non-metal oxides are basic in nature
Arrhenius Definition	substance which when dissolved in water gives hydrogen ion	substance which when dissolved in water can accept hydrogen ions
Bronstead Lowry Definition	substance which donates a proton	substance which accepts a proton



Strength	depends on the concentration of the hydronium ions	depends on the concentration of the hydroxide ions
Characteristics (Physical)	- depend upon the temperature as it can be solid, liquid or in the form of gas - have a sour taste	- solid in nature except ammonia which is gaseous - have a bitter taste - slippery in touch
Dissociation	would release hydrogen ions (H^+) when mixed with water	would release hydroxide ions (OH^-) when mixed with water
pH value	less than 7.0	greater than 7.0
Litmus paper	blue litmus paper turns red	red litmus paper turns blue
Chemical Formula	has a chemical formula with H at the beginning of it. For example, HCl (Hydrochloric Acid). There is one exception to this rule, CH_3COOH = Acetic Acid (vinegar)	has a chemical formula with OH at the end of it. For example, NaOH (Sodium Hydroxide)

Exercise | Q 5.2 | Page 88

Answer the following question.

Why indicator does not get affected by salt?

Solution: Indicators do not get affected by salts because salts are neutral in nature. Indicators work only with acidic and basic substances.

For example:

Indicator	Acidic substance	Basic substance
Phenolphthalein	colourless	turns pink
Methyl orange	methyl orange turns red	methyl orange turns yellow

Exercise | Q 5.3 | Page 88

Answer the following question.

Which substances are produced by neutralization process?

Solution: Neutralization reaction: A neutralization reaction is a reaction when an acid and a base reacts to form water and a salt. It involves the combination of H^+ ions and OH^- ions to generate water.



The neutralization of a strong acid and strong base has a pH equal to 7. That means salts are neutral in nature.

The neutralization of a strong acid and weak base will have a pH of less than 7. That means salts are acidic in nature.

The neutralization of a strong base neutralizes a weak acid will be greater than 7. That means salts are basic in nature.



Exercise | Q 5.4 | Page 88

Answer the following question.

Which are the industrial uses of acids ?

Solution: Industrial uses of acid are :

1. Sulphuric acid is used in manufacturing fertilizers such as super phosphate, ammonium sulphate etc.
2. Sulphuric acid is used in the manufacture of dyes.
3. Nitric acid is used in the manufacture of paints.
4. Sulphuric acid is used in the manufacture of drugs.
5. Sulphuric acid is used in the manufacture of explosives.
6. Sulphuric acid is used in batteries, which is used in cars etc.
7. Tannic acid is used in the manufacture of ink and leather.
8. Hydrochloric acid is used for making aqua regia, which is used to dissolve noble metals such as gold and platinum.
9. Sulphuric acid is used in the manufacture of jet fuel, kerosene and leather.

Exercise | Q 6.1 | Page 88

Fill in the blanks using appropriate words.

Main constituent of acid is _____.

Solution: Main constituent of acid is H^+ ion.

Exercise | Q 6.2 | Page 88

Fill in the blanks using appropriate words.

Main constituent of alkali is _____.

Solution: Main constituent of alkali is OH^- ion.



Exercise | Q 6.3 | Page 88

Fill in the blanks using appropriate words.

Tartaric acid is a..... acid.

Solution: Tartaric acid is a weak acid.

Exercise | Q 7 | Page 88

Match the pairs.

Group A	Group B
1. Tamarind	a. Acetic acid
2. Curd	b. Citric acid
3. Lemon	c. Tartaric acid
4. Vinegar	d. Lactic acid

Solution:

Group A	Answer
1. Tamarind	a. Tartaric acid
2. Curd	b. Lactic acid
3. Lemon	c. Citric acid
4. Vinegar	d. Acetic acid

Exercise | Q 8.1 | Page 88

State true or false

Oxides of metals are alkaline in nature.

1. True

2. False

Solution: True.

Exercise | Q 8.2 | Page 88

State true or false

Salt is acidic.

1. True

2. False

Solution: False



Exercise | Q 8.3 | Page 88

State true or false.

Metal corrodes due to salts

1. True

2. False

Solution: True

Exercise | Q 8.4 | Page 88

State true or false.

Salts are neutral.

1. True

2. False

Solution: True

Exercise | Q 9 | Page 88

Classify following substances into acidic, basic and neutral group-

HCl, NaCl, MgO, KCl, H₂SO₄, HNO₃, H₂O, Na₂CO₃

Solution: HCl = Acidic

NaCl = Neutral

MgO = Basic

KCl = Neutral

H₂SO₄ = Acidic

HNO₃ = Acidic

H₂O = Neutral

Na₂CO₃ = Basic