Date

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Acids bases & Salts

→ Acids are hydrogen containing substance that is capable of donating a proton (H^+) to another substance — Sour in taste

⇩

Changes blue litmus into red.

→ Bases are substances which dissolves in water to produce OH^- ions. — Bitter in taste — Soapy to touch.

⇩

Changes Red litmus into blue.

What are Alkalis? ↳ Bases which are soluble in water.

→ Salt is the product of Acid and Base. — PH = 7

→ Natural Indicators :- Red Litmus, Blue Litmus

→ Non-Mode Indicators :- Phenolphthalein, Methyl orange.

The harder you work for something, the greater you feel when you achieve it.

→ Acid + Bases ⟶ Salt + Water
→ Acid + Metal ⟶ Salt + H_2
→ Acid + Metal oxide ⟶ Salt + H_2O
(Basic)
→ Acid + Metal Carbonate / Metal hydrogencarbonate ⟶ Salt + H_2O + CO_2
→ Base + Metal ⟶ Salt + H_2
→ Base + Non-Metal oxide ⟶ Salt + H_2O
(Acidic)

→ When the water is mixed into Concentrated Acid to make it weak, this Process is called Dilution.

Important

→ Acids and Bases are good Conductor of Electricity. They produce ions in water Solution.

→ Acids Release —— H^+ ions
→ Bases Release —— OH^- ions

→ Acids in water Solution dissociate H^+ ions.
→ Bases in water produce OH^- ions.
} Exothermic Reaction.

→ Strong Acids ⟶ H^+ ions ↑ (Concentration)
Weak Acids ⟶ H^+ ions ↓ (Concentration)

→ Strong Base ⟶ OH^- ions ↑ (Concentration)
Weak Base ⟶ OH^- ions ↓ (Concentration)

-☼- Ph Scale ⟶ 7

→ Ph less than 7 —— Acidic
→ Ph More than 7 —— Base
→ Ph = 7 —— Neutral

→ Substances which detect their nature by odour are called Olfactory Indicators.

Date

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→ Those Indicators that not only detect the nature of chemicals but also detect their strength are called Olfactory Indicators.

- Neutralisation Reaction :-
  - Strong Acid + Strong Base ⟶ Salt + Water
  - Strong Acid + Weak Base ⟶ Acidic Salt + Water
  - Weak Acid + Strong Base ⟶ Basic Salt + Water

Salts

Common Salt △	$NaCl$
Sodium Hydroxide	$2NaOH$
Bleaching Powder	$CaOCl_2$
Baking Soda	$2NaHCO_3$
Washing Soda	$Na_2CO_3 \cdot 10H_2O$
Plaster of Paris	$CaSO_4 \cdot \frac{1}{2}H_2O$

Life Process

→ The process of maintaining of life on the planet is called life process.

→ The process by which living organisms obtain and utilise their food is called Nutrition.

Autotrophic Nutrition — make their own food.

Heterotrophic Nutrition — Can't make their own food

→ Plants make their food by the process of Photosynthesis.
↓
Chlorophyll

→ H_2O moves into guard cells — Stomata open.

→ H_2O moves out of guard cells - Stomata closes.

$$6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

Date

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Nutrition In Human Beings

mouth → Oesophagus → stomach ↓

(Villi absorb all the food) Small intestine ↓→ Large intestine (Absorb water) ↓ anus

→ The process by which the digested food break down to form energy is called **Respiration.**

Aerobic Respiration presence of O_2

Anaerobic Respiration absence of O_2

→ Absence of O_2 → Ethanol + CO_2 + ATP

Lack of O_2 → Lactic Acid + ATP

Presence of O_2 → CO_2 + H_2O + ATP

→ Nassal Passage → Trachea → Bronchi → Bronchioles ↓ (Gaseous exch.) Alveoli

→ Alveoli Consists large network of blood vessels by which gaseous exchange takes place.

→ The process by which the digested and absorbed food transported in whole body is called **Transportation**.

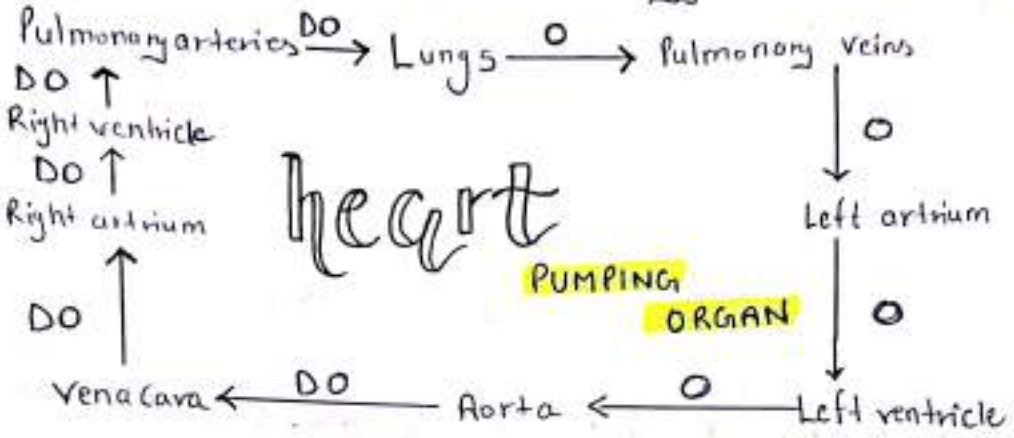
→ Circulatory System

Vessels **Heart** **Blood** — Connective Tissue – Contain Food, O_2, CO_2 etc.

→ Arteries - Blood pressure - High ⇒ Contain oxygenated blood. - Aorta (largest)

→ Veins - Blood pressure – Low ⇒ Contain deoxygenated blood. - Vena Cava (largest)

→



→ Lymph is a **Colourless Fluid** — Fluid Balance — Boost Immune System — Fat Transport

→ Transportation in Plants takes place through **Xylem & Phloem**

→ Xylem - **Water & Minerals**
Phloem - **Food Materials**

→ The **Kidney** is the filtration organ which filter blood.

→ **Nephrons** are the major unit of Filtration.

→ The Process of Filtration is :-

Glomerular Filtration — bowman's capsule
Selectively Re-absorption — tubular part
Secretion — urethra

→ In the plants the **excretion** takes place through Stomata, Resin and Gums, process of diffussion etc.

Acids, Bases and Salts

Acids :→ Acids are Sour in taste

→ It change Blue litmus to Red.

→ It produces H^+ ions in water.

→ Strong Acids :- HCl, H_2SO_4,

weak Acids: CH_3COOH, oxalic acid etc.

Base :→ Bases are Bitter in taste

→ It changes blue litmus to Red

→ It produces OH^- ions in water

→ Strong Base : $NaOH$, $Ca(OH)_2$

weak Base : KOH

Indicators

Substances that detect the nature of substance whether it is acidic or Basic by change in smell, colours, taste are called indicators.

Indicators

- **Natural**
  - Made up of Natural flowers such as Hydrangea, Petunias & Geranium
- **Synthetic**
  - Made up of chemicals in factories such as Blue litmus, Red litmus, pH paper
- **Olfactory**
  - Indicators which detect Acidic & Basic Nature of substance by change in smell

→ Reaction of Acids and Metals

Acid + Metal ⟶ Salt + hydrogen gas

Eg. - $2HCl + Zn \longrightarrow ZnCl_2 + H_2$

→ Reaction of Acids with Carbonates and hydrogen carbonates

Date :
Page no.

Chemistry Ch-2 Acid, Bases And Salts

→ Oswaal Question Bank :-

1) Solution Y is a stronger acid as Strength of red colour is more than Orange on the universal Indicator Scale 1.

2) When Milk changes into curd its pH will decreage. Because curd Consists of lactic acid, so H^+ ions Concentration increase and the pH will decreases.

3) When the acid is dilluted then the concentration of H^+ ions decreases, therefore, the Ph increases.

When the base is dilluted then the Concentration of OH^- ions decreases, therefore, the Ph decreage.

4) Solution of pH 2 will be more stronger acid due to high concentration of H^+ ions in Comparison to other one.

5) 1m HCl has higher Concentration of H^+ ions because it dissolves into the water and dissociate completely into ions while 1m CH_3COOH has lower Concentration of H^+ ions because because it ~~doesn't~~ dissolves into the water but not dissociate Completely into ions.

6) Test Tube A :-
Hydrochloric acid turns blue litmus red.

7) i) The pH of the acidic solution ~~will Consi~~ have slightly high pH than the actual one.

ii) The pH of the ~~act~~ basic solution slightly decreases pH level

Date :
Page no.

than the actual one.

8.) The common salt ~~is produced~~ and water are produced with the emmission of Carbon dioxide gas.

$$Na_2CO_3 + 2HCl \longrightarrow 2NaCl + H_2O + CO_2$$

9.) i) The pH of the vinegar increase.
ii) The acidity of the vinegar decrease.

10.) i) $NaOH(aq) + Zn(s) \longrightarrow Na_2ZnO_2(aq) + H_2(g)$
(Sodium zincate)

ii) $CaCO_3(s) + H_2O(l) + CO_2(g) \longrightarrow Ca(HCO_3)_2(aq)$

iii) $HCl(aq) + H_2O(l) \longrightarrow H_3O^+ + Cl^-$
(Hydronium)

11.) i) Neutralisation of one mole of Na_2CO_3 with HCl

$$HCl(aq) + Na_2CO_3(s) \longrightarrow 2NaCl(aq) + H_2O(aq) + CO_2(g)$$

ii) Neutralisation of one mole of $NaHCO_3$ with HCl

$$HCl(aq) + NaHCO_3(s) \longrightarrow NaCl(aq) + H_2O(aq) + CO_2(g)$$

Hence, the CO_2 gas is realeased in both case and the amount of salt in (I) is twice than (II).

12.) $2NaOH(aq) + Zn(s) \longrightarrow Na_2ZnO_2 + H_2$

Thus, In this reaction hydrogen gas is evolved.

Date :
Page no.

As the gas pass through the soap solution bubbles filled with hydrogen gas come out. Bring a candle near these bubbles evolved the bubble bursts and gas inside it starts burning with a pop sound & extinguishes the candle. This tests the presence of H_2 gas in them

If we take 2 ml of HCl on the place of base then the Reaction is :-

$$2HCl + Zn \longrightarrow ZnCl_2 + H_2$$

Hence, H_2 gas will also evolved in a reaction of metal with acid.

13) Wet Blue litmus paper.

As we know In Water the acid produces H^+ ions and makes H_3O^+ ions inside the water.

Without water acid can't shows its acidic nature such that there will be no change in dry Blue litmus paper.

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

Hence, The nature of the evolved gas is acidic due to the presence of H_3O^+ ions.

14) a) $Mg + 2HCl \longrightarrow MgCl_2 + H_2 \uparrow$
Hydrogen is evolved.

b) $HCl + NaOH \longrightarrow NaCl + H_2O$
Neutralisation Reaction.

Date :
Page no.

c) $2HCl(aq) + CaCO_3(s) \longrightarrow CaCl_2(aq) + H_2O(aq) + CO_2(g)$
Calcium chloride is formed and Carbon dioxide is evolved.

15.) Milk of Magnesia = 10
Crastric Juices = 1
Brine = 7
Aqueous Sodium hydroxide = 13

Baking Soda undergoes through thermal decomposition reaction to form Na_2CO_3, H_2O and CO_2

CO_2 makes the cake soft and fluffy.

$NaHCO_3 \xrightarrow{heat} Na_2CO_3 + CO_2 + H_2O$

Uses:-

i) Used as an Antacid.
ii) Used in fire extinguisher.

16.) i) Observation :- Bubbles of soapy solution burnt with a pop sound

Reason :- It happens due to the presence of hydrogen gas in it.

ii) No, because there metal is only a part of salt.

iii) The difference between them is dissolving metal is a chemical change and dissolving sugar is a physical change.

17.) i) Universal indicators are the indicators which don't show the nature of an acid or a base but also detect the

Date :
Page no.

Strength of an Acid or a Base which means it shows which Acid is Strong or weak and which Base is strong or weak.
Eg. - pH paper.

ii) pH value of 3.0 will convert Bromes Solution blue to red which means Solution A is acidic.

pH value of 9.5 will convert Phenophthalein solution colourless to pink, which means Solution B is basic.

iii) If we put a few drops of distilled water on pH paper we will see green colours which shows that distilled water is neutral.

18) a) If the H^+ ion Concentration is more, then pH will be decrease and vice-versa. Therefore, pH paper is inversely proportional to H^+ ion Concentration.

$pH \propto 1/H^+$ ion Concentration

b) The Solution is Neutral.

c) 1M NaOH has a higher pH-value because it is a base.

d) When the pH of mouth is below 5.5, bacteria present in the mouth produces acids by degradation of Sugar and Corrode the tooth enamel. It can be prevented by using toothpaste which are generally basic.

e) H^+ ions exist in water as H_3O^+ ions or hydronium ion.

$$H^+ + H_2O \longrightarrow H_3O^+$$

Date :
Page no.

Ch-2 Acid Bases and Salts

→ Important Reactions :-

1.) $2NaOH(aq) + Zn(s) \longrightarrow Na_2ZnO_2(s) + H_2(g)$
{Sodium zincate}

2.) $Na_2CO_3(s) + 2HCl(aq) \rightarrow 2NaCl(aq) + H_2O(l) + CO_2(g)$

3.) $NaHCO_3(s) + HCl(aq) \rightarrow NaCl(aq) + H_2O(l) + CO_2(g)$

4.) $Ca(OH)_2(aq) + CO_2(g) \longrightarrow CaCO_3(s) + H_2O(l)$
{Lime water} {White precipitate}

5.) $CaCO_3(s) + H_2O(l) + CO_2(g) \longrightarrow Ca(HCO_3)_2(aq)$
{Soluble in water}

6.) $NaOH(aq) + HCl(aq) \longrightarrow NaCl(aq) + H_2O(l)$

7.) $HCl + H_2O \longrightarrow H_3O^+ + Cl^-$

8.) $H^+ + H_2O \longrightarrow H_3O^+$

9.) $NaOH(s) \xrightarrow{H_2O} Na^+(aq) + OH^-(aq)$

10.) $KOH(s) \xrightarrow{H_2O} K^+(aq) + OH^-(aq)$

11.) $Mg(OH)_2(s) \xrightarrow{H_2O} Mg^{2+}(aq) + 2OH^-(aq)$

12.) $2NaCl(aq) + 2H_2O(l) \longrightarrow 2NaOH(aq) + Cl_2(g) + H_2(g)$

13.) $Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O$

14.) $NaCl + H_2O + CO_2 + NH_3 \longrightarrow NH_4Cl + NaHCO_3$
{Ammonium Chloride}

Date :
Page no.

15.) $2NaHCO_3 \xrightarrow{Heat} Na_2CO_3 + H_2O + CO_2$

{Sodium hydrogencarbonate} {Sodium Carbonate}

16.) $NaHCO_3 + H^+ \longrightarrow CO_2 + H_2O +$ Sodium salt of acid

{From any acid}

17.) $Na_2CO_3 + 10H_2O \longrightarrow Na_2CO_3 . 10H_2O$

18.) $CaSO_4 . \frac{1}{2} H_2O + 1\frac{1}{2} H_2O \longrightarrow CaSO_4 . 2H_2O$

{Plaster of Paris} {Gypsum}