Base

Long Answer Type Questions

37. (a) Define an acid and a base . Give two examples of each.

(b) Give the names and formulae of two strong bases and two weak bases.

(c) What type of ions are formed :

(i) When an acid is dissolved in water?

(ii) When a base (or alkali) is dissolved in water?

(d) Write the neutralisation reaction between acids and bases in terms of the ions involved.

(e) Write any two important uses of bases.

Ans : (a)**acid :** The substance which is dissociates into ions to gives more concentrations of hydrogen ions is called acid.

- Generally acids shows sour taste.
- Following indicator shows colour change in acid solution.

Blue litmus : turns red in acid solution

Methyl orange : shows red colour in acid .

Phenolphthalein: No colour changes or colourless solution occurs in acid.

Example : acetic acid CH_3COOH, Nitric acid [HNO_3].

Base : The substance which is dissociates into ions to gives more concentration of hydroxide ions (OH-) is called base.

- Generally bases shows bitter taste.
- Following indicator shows colour changes in basic solution.

Red litmus : turns blue in basic solution.

Methyl orange : shows yellow colour in base.

Phenolphthalein : gives pink colour in basic solution.

Example : sodium carbonate [Na_2CO_3] , sodium hydroxide [NaOH].

(b) Strong base : The base which gives the pH value at the range 8- 10 is strong base.

Name of strong base.

I) Sodium hydroxide :

Chemical formula of sodium hydroxide is NaOH.

ii) Calcium oxide.:

Chemical formula of calcium oxide is $Ca(OH)_2$.

Name of weak base :

i) Zinc hydroxide.

Chemical formula of zinc hydroxide is $Zn(OH)_2$

ii) Copper hydroxide.

Chemical formula of copper hydroxide is $Cu(OH)_2$.

(c)i) When an acid dissolved in water it gives an hydrogen ions.

Example : when nitric acid is dissolved in water, it gives hydrogen ions and nitrate ions

HNO_3 ……….> $H^+ + NO_3^-$

ii) When an base (or alkali) is dissolved in water, it gives hydroxide ions (OH-).

Example : When sodium hydroxide dissolved in water it gives sodium ions & hydroxide ions ,

NaOH ………..> $Na^+ + OH^-$

(d) when acid react with base to form salt & water . Simply acid neutralise the base & base neutralise the acid.

Actually when hydrogen ions in acid is reacts with hydroxide ions (OH^-) to form water H_2O.

$H^+_{(aq)}$+ $OH^-_{(aq)}$$H_2O(l)$……>Hydrogen ions + hydroxide ions + water.

(e)

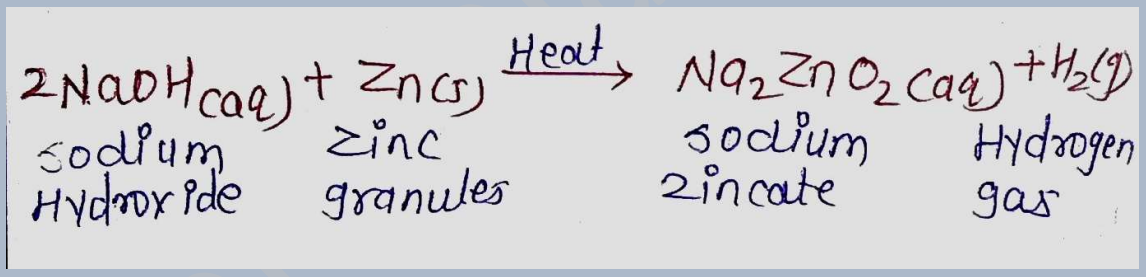
1) Mostly base are use in industry to make artificialtextiles fibres, paper.

2) bases are use in metal extraction process .also it is use in oil refining & making dyes.

38. (a) What happens when zinc granules are heated with sodium hydroxide solution? Write equation of the reaction which takes place.

(b) What happens when bases react with non-metal oxides? Explain with the help of an example. What does this reaction tell us about the nature of non-metal oxides?

Ans : (a) When a zinc granules are heated with sodium hydroxide solution to form sodium zincate salt with evolution of hydrogen gas.



Chemical equation :

(Heat)

2 NaOH (aq) + Zn (s) ……..> Na_2Zno_2 (aq) + H_2 (g)

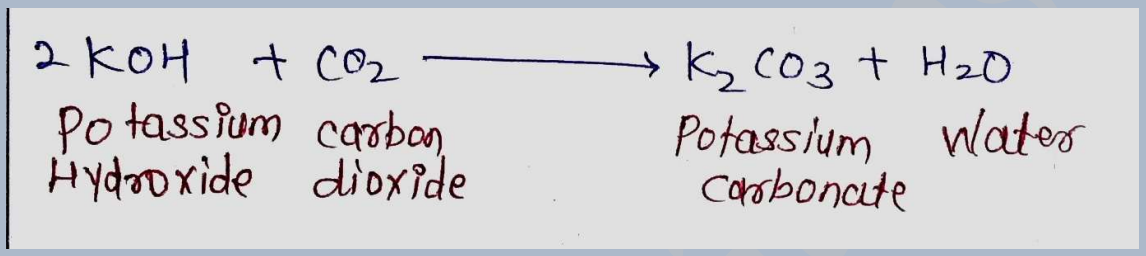
(Sodium Hydroxide) (Zinc granules) (Sodium zincates) (Hydrogen gas)

(b) When a base reacts with non-metal oxide to form a salt & water because non metal is acidic in nature .base

neutralises the non – metal as well as non metal neutralise the base. Basic and acidic character is neutralised each other to form water & salt.

Non metal + base …..> salt + water

Example : When potassium hydroxide is reacts with the carbon dioxide to gives potassium carbonate and water



molecule.

2 KoH + CO_2 …..> K_2CO_3 + H_2O

Potassium hydroxide is base. CO_2 is non metal.

39. (a) What effect does the concentration of H+ (aq) ions have on the nature of solution?

(b) what effect does the concentration of OH- ions have on the nature of a solution?

(c) Someone put some universal indicator paper into vinegar. The pH is 3. What does this tell you about the vinegar?

(d) someone put some universal indicator paper onto wet soap. The pH is 8 . what does this tell you about the soap?

(e) state whether a solution is acidic , alkaline or neutral if its pH is :

i) 9
ii) 4
iii) 7
iv) 1
v) 10
vi) 3

Ans : (a) Higher concentration of $H^{+}_{(aq)}$ ions in a solution indicate that the solution is more acidic in nature. It is strong acid .

less concentration of $H^{+}_{(aq)}$ ions in a solution indicate that the solution is weak by acidic in nature. It is weak acid.

(b) excess concentration of $OH_{(aq)}$ ions in a solution indicate that the solution is highly basic in nature. It is strong base.

Less amount of concentration of $OH^{-}_{(aq)}$ ions in a solution indicate that the solution is weakly basic in nature. it is weak base.

(c) when universal indicator paper put into vinegar , its show pH at 3. It is lower pH value. Lower pH value indicate the formation of higher concentration of hydrogen ions and strong acidic nature. Hence the vinegar is acidic in nature.

(d) when universal indicator paper put onto a wet soap ,it gives pH at 8 . it is higher pH value. Higher pH value denoted the formation higher concentration hydroxide ions and basic nature.

Hence the wet soap is basic in nature.

(e)

i) 9-basic nature

ii) 4- acidic nature

iii)7- basic nature

iv)1-acidic nature

v) 10- basic nature

vi) 3-acidic nature