Bases

Short Answer Type Questions

19. Fresh milk has a pH of 6 . When it changes into curd (yogurt), will its pH value increase or decrease ? Why?

Ans : When a fresh milk is change into curd (yogurt) its pH is decreases. It is less than 6.

Milk is in acidic in nature. It is change into curd due to the action of bacteria. when the action of bacteria takes place in milk, The lactic acid is produced in the curd. And curd becomes more acidic than the milk .due to the increase in acidity in the curd, The pH value is decreases or less than milk pH.

20. (a) What is a universal indicator? For what purpose is it used?

(b) How does a universal indicator work?

(c) Water is a neutral substance. What colour will you get when you add a few drops of universal indicator to a test-tube containing water?

Ans : (a) Universal indicator is a mixture of many different dyes or indicator , which shows the different colours at different pH values of the entire pH scale. In simple way we called that, universal indicator is a mixture of many indicator.

- Universal indicator used to measurement of pH of solution.
- Universal indicator gives different colour at different concentration. Hence it is used to identify between acids and bases.

- Universal indicator shows different colour on the basis of intensity of colour, it easily differentiate into strong acids to weak acids and strong bases to weak bases.

(b) Universal indicator work by giving different colours at the different pH.

If we added a acid & base solution on universal indicator. It shows a colours. This colour is compare with the pH scale .after comparing, it shows the pH value for the colour and indicate that the acidic & basic nature.

(c) Water is neutral substance. It means that its pH is 7. At pH= 7,Universal indicator shows green colour.

When we add a few drops of universal indicator in a test tube containing water it gives green colour. It indicate that water pH is 7.

21. Which chemical is injected into the skin of a person:

(a) during an ant's sting?

(b) during the nettle leaf hair sting?

How can the effect of these stings be neutralised?

Ans : (**a) during an ants stings :** when the ant stings is injects the sting, methanoic acid is release into the skin which cause the pain irritation or itching sensation at the infected area.

After applying the baking soda solution [basic solution] at the infected areas it gives relief from irritation. Baking soda is basic in nature and irritation occurs due to acid. Baking soda neutralised acid to from salts. After formation of salts itching sensation and Pain is reduced.

(b**) <u>Nettle leaf hair sting</u>** : the Nettle leaf hair sting insert into the skin. the stinging hairs of nettle leaves released methanoic acid into the skin .due to this burning sensation and pain occurre at infected areas.

This burning sensation is neutralised by applying baking soda solution at the infected place.

22. (a) Explain pH change as the cause of tooth decay. How can tooth decay caused by pH change be prevented?

(b) Explain how pH change in the lake water can endanger the lives of aquatic animals (like fish). What can be done to lessen the danger to the lives of aquatic animals in the lake?

Ans : (a) In the mouth, most of the bacteria is present . this bacteria form acid in the mouth and pH is decreases .pH of mouth fallsUpto 5.5, due to the decrease of pH tooth decay occurs.

Tooth is made up of enamel. Enamel and acidReacts and it get corroded due to corrosion of tooth decay occurs.

<u>Prevention</u>: Tooth decay is prevented by using tooth pastes. Tooth pastes is basic in nature. It neutralise the acid present in mouth.

By brushing using tooth paste regularly and cleaningtooth regularly with carefully is the best way to preservation for tooth decay.

(b) pH range of lake water is medium. at the medium range, the living organism is easily survive but when the acid rain(which pH is lower than 5.6) is mixed in lake water. The pH range is disturbed and lake water become acidic in nature . The existence of living organism is difficult in acidic water. It is harmful to living organism, may be living organism die at this low pH.

To control this problem, calcium carbonate **[$CaCO_3$]** is mixed in lake water. Calcium carbonate is basic in nature and neutralise the acidity present in lake water. Due to this aquatic animal easily survive.

23. (a) What happens during a bee sting ? what is its remedy?

(b) What happens during a wasp sting? What is its remedy?

Ans: (a) When a bee stings a person. It release methanoic acid on the skin. Because of methanoic acid, skin is infected and irritation occurs at the infected area . And also occurs pain & burning sensation .

Irritation& pain is reduced by using remedy of baking soda solution. Sodium hydrogen carbonate(baking soda) is basic in nature. It neutralised the methanoic acid gives relief from pain.

(b) When a wasp sting a person. It release alkaline liquid into the skin. due to this alkaline liquid, pain &irritation occurs at the surface of infected area. It is reduced by using remedy of weak acid on the infected area. Weak acid such as vinegar is use to neutralised the alkaline[base] gives relief from pain.

24. (a) Why is it wrong to treat a bee sting with vinegar ?

(b) Why is it wrong to treat a wasp sting with baking soda solution.?

Ans: (a) When a bee stings ,it release methanoic acid. Which gives pain and irritation . If we apply vinegar at bee stings area it gives more pain and irritation because vinegar is nothing but acetic acid . it is also acidic in nature . when two acid is react with each other it becomes more acidic. Due to increase in acidity , the pain &irritation also increases.

Hence the vinegar dos not apply to treat bee stings.

(b) When a wasp sting is insert into the skin . pain and burning sensation occurs at the infected area. if baking soda is apply at the infected area . the irritation and pain is increases. Because baking soda is basic in nature and wasp sting is also release alkaline solution .two basic solution is react with each other & increase pain . Hence the baking soda is not apply at the infected area of wasp sting.

25. (a) what does the pH of a solution signify? Three solutions A,B and C have pH values of 6,4 and 10 respectively. Which of the solutions is highly acidic ?

(b) A farmer has found that the pH of soil in his fields is 4.2. Name any two chemical materials which he can mix with the soil to adjust its pH.

Ans : (a) pH scale shows the range from 1 to 17 is signifies the acidic and basic character.

If pH range is lies between 0 to 7 it is acidic in nature.

If pH range is lies between 7 to 14 it is basic in nature.

If pH is at 7 it is neutral solution.

Lower the value of P^H is shows highly acidic nature. the solution B shows pH value 4 which is lowest value of pH than solution of A & B . hence solution B is highly acidic than solution A & B.

(b) The farmer found the pH value of soil at 4.2 . it means that it is acidic in nature ,when basic compound is added in soil it becomes neutral and adjust the pH of soil.

When Soil is treat with basic compound like quick lime (Calcium oxide). Calciumhydroxide (slacked lime) or calcium carbonate. [chalk]. It neutralised the soil and maintain the pH of soil .

26. (a) The pH values of six solutions A to F are given below:

A =0 , B = 11, C =6 , D = 3 , E = 13 , F= 8.

Which of the above solutions are (i) acids (ii) alkalis ?

(b) Name the acids or alkalis used to make (i) car batteries (ii) explosives (iii) soaps (iv) fertilisers.

Ans : (a) The solution pH lies in between 1 to 7 is called acidic in nature. The solution pH lies in between 7 to 14 is called basic in nature.

Acidic solution : solution A whose pH is 0

Solution C where pH is 6

Solution D where pH is 3.

Alkalis solution: solution B where pH is 11

Solution E where pH is 13

Solution F where pH is 8.

(b) i) Car batteries : in car batteries sulphuric acid is used. Sulphuric acid is use to maintained the pH of car batteries at the range to 0.8.

ii) Explosive- in explosive TNT or ammonium Nitrated used.

iii) Soaps : Sodium carbonate [washing soda] is used in soaps.

Iv) fertilizer : Sulphuric acid , hydrochloric acid or Nitric acid is present in Fertilizers. This acids gives H^+ ,which act as fertilizers.

27. (a) The pH of a cold drink is 5. What will be its action on blue and red litmus solutions?

(b) The pH values of three acids A, B and C having equal molar concentrations are 5.0, 2.8 and 3.5 respectively. Arrange these acids in order of the increasing acid strengths.

Ans : (a) pH of a cold drink is 5. This pH value indicate that cold drink is acidic in nature. When acid reacts with blue litmus paper, it show colour changes.

Blue litmus paper turns into red colour and red litmus paper does not show any changes.

Cold drink whose pH is 5. when it is react with blue litmus paper .it immediately changes into red colour. And red litmus paper react with cold drink ,it does not indicate any colour changes.

(b) Acid show value of pH in the range of 1 to 7.

The acid show higher concentration of hydronium ion, is called stronger acidicand it have lower pH value. Simply it means that lower pH value of acid is strong acidic strength .

based on above concept the increasing order of acidic strength is given.

Increasing order **A < C < B**

Solution B molar concentration is 2.8

Solution C molar concentration is 3.5

Solution A molar concentration is 5.0

28. Under what soil conditions do you think a farmer would treat the soil of his fields with quicklime (calcium oxide), or slaked lime (calcium hydroxide) or chalk (calcium carbonate)?

Ans : Quick lime [calcium oxide] , Slaked lime [calcium hydroxide] and chalk [calcium carbonate] are basic in nature. i.e its pH is more than 7. When the soli is acidic in nature this all bases are reacts with soil .Because quick lime, slaked lime & chalk is base and it easily neutralised the acidity in soil.

Hence the conditionat which soil is acidic, chalk, slaked lime & quicklime is react with soil.

29. Which acid is produced in our stomach ? what happens if there is an excess of acid in the stomach? How can its effect be cured?

Ans : In the stomach hydrochloric acid (HCl) is produced . this hydrochloric acid is useful for stomach but due to the indigestioni.e . Overeating. The excess of acid is produced in stomach.

This excess of hydrochloric acid cause pain and acidity in stomach . to cure this pain and acidity antacid is used . antacid is basic in nature when antacid is react with hydrochloric acid it neutralised the acids gives relief from pain.

Other base like magnesium hydroxide also use for the acidity.

30. The soil in a field is highly acidic. Name two materials which can be added to this soil to reduce its acidity. Give the reason for your choice.

Ans : The soil in the field is acidic . the basic nature material is added to this soil for reduce the acidic nature.

Basic nature material like calcium oxide[chalk] calcium hydroxide [slaked lime] or calcium carbonate [chalk] is added in acidic soil to destroy the acidic nature of soil.

This basic nature material is used because it neutralise the acidity of soil.

31. What is meant by strong bases and weak bases? Classify the following into strong bases and weak bases:

NH_4OH , $Ca(OH)_2$, NaOH, KOH, $Mg(OH)_2$

Ans : **<u>Strong base</u>** : The substance which is completely dissociates in water to gives large amount of hydroxide ions (OH-) is called strong base .

Strong base pH range is 8,9,10.

<u>Weak base :</u> The substance which is incompletely dissociates in water to gives small amount of hydroxide ions (OH-) is called weak base .,

Weak base pH range is 11, 1, 13, 14.

Classification of strong base & weak base is given below :

Strong base : **NaOH, KOH.**

Weak base : **NH_4OH , $Ca(OH)_2$, $Mg(OH)_2$.**

32. What ions are present in the solutions of following substances ? write the symbols only .

i) Hydrochloric acid ii) Nitric acid iii) Sulphuric Acid iv) Sodium hydroxide v) Potassium hydroxide vi) Magnesium hydroxide.

Ans : i) **Hydrochloric acid** : Hydrochloric acid is dissociates into the hydrogen ions (H^+)and chlorine ions (Cl^-)

HCl .....> H^+ + Cl^-

ii) **Nitric acid** : Nitric acid is dissociates into the hydrogen ions (H^+) and Nitrate ions ($NO3^-$)

HNO_3 .....> H^+ + $NO3^-$

iii) Sulphuric acid : Sulphuric acid is dissociates into hydrogen ions ($H^{+)}$ and sulphate ions (SO_4^-)

H_2SO_4 .....> $2H^+$ + $SO4^{-.}$

iv) Sodium hydroxide : Sodium hydroxide is dissociates into sodium ions (Na^+) and hydroxide ions (OH^-) .

NaOH.....> Na^+ + OH^-

v**) Potassium hydroxide** : Potassium hydroxide is dissociates into the potassium ions (K^+) and hydroxide ions (OH^-)

KOH.....> K^+ + OH^-

vi) Magnesium hydroxide : magnesium hydroxide is dissociates into the magnesium ions [Mg^{2+}] and hydroxide ions (OH^-).

$Mg(OH)_2$ .....>Mg^{2+}+ OH^-

33) (a) What would you expect the pH of pure water to be ?

(b) What colour would the universal indicator show in an aqueous solution of sugar? Why ?

A sample of rain water turned universal indicator paper yellow. What would you expect its pH to be ? is it a strong or a weak acid?

Ans-(a) pH of water is 7, because the pure water is neutral in nature . and pH range of neutral solution is 7.

Pure water gives the concentration of hydrogen ions is equal to the 7 hence pure water shows neutral natural i.e. not acidic or basic .

(b) universal indicator shows green colour in aqueous solution of sugar . Green colour indicate that the solution of sugar is neutral in nature . i.e. not acidic or basic . it gives concentration of hydrogen ions is 7. Hence it shows green colour.

(c) A sample of rain water turned universal indicator into paper yellow colour, it indicate that the rain water is in acidic in nature. It 's pH is in between 5 to 6. pH value is above 4 shows weakly acidic nature . rain water shows value in between 5 to 6 . it means it is weak acid.

34) (a) What do you think will be the pH in the stomach of a person suffering from indigestion: less than 7 or more than 7?

(b) What do you think will be the pH of an antacid solution : less than 7 or more than 7 ?

(c) How does an antacid work?

(d) Name two common antacids.

Ans : (a) The pH in the stomach of a person suffering from indigestion is less than 7 . because in indigestion process, excess amount of hydrochloric acid is produced in stomach . due to this excess amount of acid , pain occurs in stomach . This excess acid shows pH range below the 7.

(b) The pH of antacid solution is more than 7, becauseantacid is basic in nature and basic nature substance shows pH above 7.

(c) due to the over eating , indigestion occurs in stomach and excess of hydrochloric acid is produce in stomach and pain occur to reduce the pain , antacid solution is taken. Antacid is basic in nature . It neutralise the excess of hydrochloric acid to formsSalt & water in

stomach. Due to the formation of salt, Pain is overcome and irritation is reduces.

(d) Two common antacid is :

I) Sodium carbonate [Na_2CO_3] it is commonly called baking soda.

ii) Magnesium hydroxide [$Mg(OH)_2$] it is commonly called milk of magnesia.

35) Separate the following into substances having pH values above and below 7. How do these influence litmus paper?

i) Lemon juice ii) Solution of washing soda iii) Toothpaste iv) Vinegar v) Stomach juices

Ans : **PH above than 7 :** Solution washing soda, Toothpaste shows pH above than 7.

it is alkali [base] in nature.

When red litmus paper is react with this alkali solution ,it show colour change into blue.

pH below than 7 : solution of lemon juice, stomach juice and vinegar shows pH above than 7.

it is acidic in nature.

when blue litmus paper is react with this acidic solution . It show colour change into red colour.

36) (a) Do basic solutions also have H+ (aq) ions? If yes, then why are they basic?

(b) when a solution becomes more acidic, does the pH get higher or lower?

Ans : (a) Basic solution also have $\mathbf{H^{+}_{(aq)}}$ ions, but it shows basic nature because in basic solution the concentration of hydroxide ions is more than the hydrogen [$H+_{(aq)}$] ions. Due to this higher concentration of hydroxide ions (OH^{-}) it shows basic nature not an acidic .

(b) when a solution becomes more acidic,the pH value of solution is lower. because more acidic solution contain more concentration of hydrogen ions (H^{+}). Higher concentration of hydrogen ions shows lower the pH value hence the more acidic show lower pH value.