Acids, Bases and Salts

1 Mark Questions

---

1. An acid can react with

(a) $AgCl$

(b) Na_2CO_3

(c) $PbSO_4$

(d) Na_2SO_4

Ans. (b) Na_2CO_3

---

2. Which of the following gives CO_2 **on heating?**

(a) Slaked

(b) Quick lime

(c) Lime stone

(d) Soda ash.

Ans. (c) Lime stone

---

3. Plaster of Paris is made from

(a) Lime stone

(b) Slaked Lime

(c) Quick lime

(d) Gypsum

Ans. (d) Gypsum

---

4. Which is a base and not alkali?

(a) $NaOH$

(b) KOH

(c) $Fe(OH)_3$

(d) None

Ans. (c) $Fe(OH)_3$

---

5. Chemical formula of baking soda is

(a) $MgSO_4$

(b) Na_2CO_3

(c) $NaHCO_3$

(d) $MgCO_3$

Ans. (c) $NaHCO_3$

---

6. The H^+ ion concentration of a solution is $1.0\times10^{-5}m$ **. The solution is**

(a) Acidic

(b) Alkaline

(c) Neutral

(d) Amphoteric

Ans. (a) Acidic

---

7. An aqueous solution with pH-zero is

(a) Acidic

(b) Alkaline

(c) Neutral

(d) Amphoteric

Ans. (a) Acidic

---

8. Setting of Plaster of Paris takes place due to

(a) Oxidation

(b) Reduction

(c) Dehydration

(d) Hydration

Ans. (d) Hydration

---

9. The difference of water molecules is gypsum and Plaster of Paris is

(a) $\frac{5}{2}$

(b) 2

(c) $\frac{1}{2}$

(d) $\frac{3}{2}$

Ans. (d) $\frac{3}{2}$

---

10. The odour of acetic acid resembles that of

(a) Rose

(b) Burning Plastic

(c) Vinegar

(d) Kerosene

Ans. (c) Vinegar

---

11. Washing soda has the formula

(a) $Na_2CO_3.7H_2O$

(b) $Na_2CO_3.10H_2O$

(c) $Na_2CO_3.H_2O$

(d) Na_2CO_3

Ans. (b) $Na_2CO_3.10H_2O$

---

12. Plaster of Paris hardens by

(a) Giving off CO_2

(b)Changing into $CaCO_3$

(c) Combining with water

(d) Giving out water

Ans. (c) Combining with water

---

13. Which of the following is evolved when Na_2CO_3 **is heated?**

(a) CO_2

(b) CO

(c) O_2

(d) No

Ans. (d) No

---

14. A drop of liquid sample was put on the pH paper, paper turned blue. The liquid sample must be of

(a) Lemon Juice

(b) HCl

(c) Sodium bicarbonate

(d) Ethanoic acid.

Ans. (c) Sodium bicarbonate

---

15. If pH of solution is 13, it means that if is

(a) Weakly acidic

(b) Weakly basic

(c) Strongly acidic

(d) Strongly Basic

Ans. (d) Strongly Basic

---

16. How is concentration of hydronium ions (H_3O^+) affected when a solution of acid is diluted?

Ans. Concentration of hydronium ions decreased when the solution of an acid is diluted.

---

17. What effect does the concentration of H^+ ions have on the nature of the solution?

Ans. Higher the concentration of H^+ ions, greater is the acidic nature of the solution.

---

18. What effect does the concentration of H^+ ions have on the nature of the solution?

Ans. Higher the concentration of H^+ ions, greater is the acidic nature of the solution.

---

19. What is the common name of the compound $CaOCl_2$?

Ans. Bleaching powder.

---

20. Name the substance which on treatment with chlorine yields bleaching powder.

Ans. Slaked lime or calcium hydroxide.

---

21. Name the sodium compound which is used for softening hard water.

Ans. Sodium carbonate is used for softening hard water.

---

22. A solution turns red litmus blue, its pH is likely to be

(a) 1

(b) 4

(c) 5

(d) 10

Ans. (d) 10

---

23. A solution reacts with crushed egg-shells to give a gas that turns lime-water milkey. The solution contains

(a) NaCl

(b) HCl

(c) LiCl

(d) KCl

Ans. (b) HCl

---

24. 10 mL of a solution of NaOH is found to be completely neutralized by 8 mL of a given solution of HCl. If we take 20 mL of same solution of NaOH, the amount of HCl solution required to neutralize it will be

(a) 4 mL

(b) 8 mL

(c) 12 mL

(d) 16 mL

Ans. (d) 16 mL

---

25. Which one of the following types of medicines is used for treating indigestion?

(a) Antibiotics

(b) Analgesic

(c) Antacid

(d) Antiseptic

Ans. (c) Antacid

---

26. Five solutions A, B, C, D and E when tested with universal indicators showed pH as 4, 1, 11, 7 and 9 respectively. Which solution is:

(a) neutral?

(b) strongly alkaline?

(c) strongly acidic

(d) weakly acidic?

(e) weakly alkaline

Ans. (a) D

(b) C

(c) B

(d) A

(e) E

---

27. 'A' is a soluble acidic oxid and 'B' is a soluble base. Compared to pH of pure water. What will be the pH of (a) solution of A (b) solution of B?

Ans. pH of a will be less than 7 and that of B will be more than 7.

2 Mark Questions

1. What happens to the crystals of washing soda when exposed to air?

Ans. $Na_2CO_3.10H_2O \xrightarrow{air} Na_2CO_3.H_2O + 9H_2O$

Washing soda(White Crystals) $\rightarrow$ Washing Power(White power)

Washing soda undergoes efflorescence.

---

2. What is the chemical name of washing soda? Name three raw materials used in making washing soda by Solvay process?

Ans. Chemical name – Sodium carbonate decahydrate $Na_2CO_3.10H_2O$

Raw materials – Brine, Lime stone, Ammonia

---

3. What is efflorescence? Give an example?

Ans. It in the process of the loss of molecules of water of crystallization from a substance when exposed to air for example

$$Na_2co_3.10H_2o \xrightarrow{Air} Na_2co_3.H_2o + 9H_2o$$

Washing soda(White Crystals) $\rightarrow$ Washing Power(White power)

---

4. Why is sodium hydrogen carbonate an essential ingredient is antacids?

Ans. Sodium hydrogen carbonate is an essential ingredient in antacids because it neutralizes the effect HCl which is released in the stomach. So it is called as an antacid $NaHCO_3 + HCl \rightarrow NaCl + H_2O + CO_2$

---

5. Give the name and formula of two

(i) strong monobasic acids

(ii) two weak dibasic acids

Ans. (i) Hydrochloric acid (HCl), Nitric acid (HNO_3).

(ii) Carbonic acid (H_2CO_3), oxalic acid ($C_2H_4O_4$).

---

6. Why alkalis like sodium hydroxide and potassium hydroxide should not be left exposed to air?

Ans. Alkalis should not be left exposed to air because they are hygroscopic in nature and absorb moisture from atmosphere in which they get dissolved.

---

7. Dry ammonia has no action on litmus paper but a solution of ammonia in water turns red litmus paper blue. Why is it so?

Ans. In dry state Ammonia contains no hydroxyl ions. On dissolving in water, it forms NH_4OH which dissociates to give NH_4^+ and OH^- ions. Thus solution becomes basic and turns red litmus paper blue.

NH_3 (g) + H_2O (l) $\rightarrow$ NH_4OH (aq)

NH_4OH (aq) $\rightarrow$ NH_4^+ (aq) + OH^- (aq)

---

8. Bleaching powder forms a milky solution in water. Explain.

Ans. When bleaching powder gets dissolved in water, the solution turns milky due to the formation of Ca $(OH)_2$

$CaOCl_2 + H_2O \rightarrow Ca(OH)_2 + 2HCl$ (Bleaching powder)

---

9. Why does not an acid show any acidic behavior is the absence of water?

Ans. An acid gets ionized only in aqueous solution which means in the presence of water. Also it releases H^+ ions and show acidic behavior in the presence of water

---

10. Fresh milk has a pH of 6. What will be the PH value if milk changes into a curd Justify.

Ans. When milk changes into a curd, its PH value decreases i.e. lactose gets converted into lactic acid. As more of acid is formed, its PH value decreases.

---

11. What is the reaction between hydrogen in concentration ion concentration of an aqueous solution and pH?

Ans. $PH = -\log[H^+]$ Where H^+ is hydrogen in concentration

12. How will you show that acetic acid is monobasic acid

Ans. When acetic acid reacts with $NaOH$ solution only one it atom of the acid gets replaced which shows acetic acid is a monobasic acid.

$CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$

---

13. Why should curd and sour substance not be kept in brass and copper vessels.

Ans. Brass and copper vessels contain copper and zinc metal that reacts with acids present in curd and sour substance forming soluble salts. These salts are poisonous in nature and make curd unfit for consumption.

---

14. Which gas is usually liberated when an acid reacts with a metal? Illustrate with an example. How will you test for the presence of this gas?

Ans. Usually hydrogen gas is liberated when an acid reacts with a metal. For example

$Zn + Cl_2 \rightarrow ZnCl_2 + H_2$

When a burning candle or matchstick is bought near hydrogen gas it burns with pop sound.

---

15. Why does an aqueous solution of an acid conduct electricity?

Ans. Electricity is conducted in a solution by ions. Acid release H^+ ions in a solution so, it conducts electricity.

---

16. Why does dry HCl gas not change the colour of the dry litmus paper?

Ans. Colour of litmus paper changes only when it come in contact of H^+ ions and H^+ ions is produced only when HCl gas comes in contact with water. Therefore, dry HCl do not change the colour of dry litmus paper.

---

17. While diluting an acid, why it is recommended that the acid should be added to water and not water to the acid?

Ans. Addition of water to acid is an exothermic reaction. If we add water to acid lot of heat is produced that may breaks the glass container or sprout to burns the person adding it. But when acid is added to water with constant stirring, the heat produced is absorbed by water and no harm occurs.

---

18. How is concentration of hydroxide ions (OH^-) affected when excess base is dissolved in a solution of sodium hydroxide?

Ans. Excess base dissolved in a solution of sodium hydroxide will release more hydroxide (OH^-) ions. Therefore, concentration of hydroxide ions (OH^-) will increase.

---

19. Do basic solutions also have H^+ ions? If yes, then why are these basic?

Ans. Acidic and basic solutions both have H^+ ions. The difference is that in acids H^+ ions concentration is more than OH^- ions concentration while in basic solution OH^- ions concentration is more than H^+ ions concentration.

---

20. Do basic solutions also have H^+ ions? If yes, then why are these basic?

Ans. Acidic and basic solutions both have H^+ ions. The difference is that in acids H^+ ions concentration is more than OH^- ions concentration while in basic solution OH^- ions concentration is more than H^+ ions concentration.

---

21. You have two solutions 'A' and 'B'. The pH of solution 'A' is 6 and pH of solution 'B' is 8. Which solution has more hydrogen ions concentration? Which is acidic and which one is basic?

Ans. A solution having pH less than 7 is acidic and that having pH more than 7 is basic. So, solution 'A' is acid and 'B' is basic. Naturally 'A 'which is acidic has greater concentration of hydrogen ions concentrations.

---

22. What will happen if a solution of sodium hydrogen carbonate is heated? Give the equation of reaction involved.

Ans. Sodium hydrogen carbonate solution on heating gives sodium carbonate, carbon dioxide and water.

$2NaHCO_3$ + heat $\quad$ $Na_2CO_3 + CO_2 + H_2O$

---

23. Write an equation to show the reaction between plaster of Paris and water.

Ans. The reaction between plaster of Paris and water is as follows:

$CaSO_4.1/2H2O + 3/2\ H_2O \quad CaSO_4.2H_2O$

---

24. Why does distilled water not conduct electricity, whereas rain water does?

Ans. Rain water contains small amount of acid because of which it conducts electricity. Distilled water is pure water. It does not contain ions. Therefore, it does not conduct electricity.

25. Why do acids not show acidic behavior in the absence of water?

Ans. Acids produce hydrogen ions or hydronium ions only in presence of water. Therefore, it shows acidic behavior only presence of water.

---

26. Equal lengths of magnesium ribbons are taken in test tubes A and B. hydrochloric acid is added to test tube A, while acetic acid is added to test B. In which test tube will the fizzing occur more vigorously and why?

Ans. HCl is stronger acid than CH_3COOH. Therefore, H^+ ions concentration in test tube A will be more than that in test tube B. hence, reaction will take place faster in test tube A than in test tube B. so, fizzing will occur more vigorously in test tube B.

---

27. Fresh milk has a pH of 6. How do you think the pH will change as it turns into curd? Explain your answer.

Ans. Bacteria change the fresh milk into curd by producing lactic acid. Because of the presence of lactic acid in curd, the pH will come down from 6 to lower value.

---

28. Plaster of Paris should be stored in moisture-proof container. Explain why?

Ans. Plaster of Paris reacts with moisture to form gypsum and sets to a hard mass. Therefore, it should be stored in moisture-proof container.

---

29. Kazi and priyam want to prepare dil H_2SO_4 .Kazi added conc. H_2SO_4 to water slowly with Constant stirring & cooling whereas Priyam added water to conc, H_2SO_4.Name the Student Who was correct and why?

Ans. Kazi was correct. If water is added to a concentrated acid, the eat generated may cause the Mixture to splash our and cause burns. The glass container may also break due to excessive local heating.

---

30. A first aid manual suggests that vinegar should be used to treat wasp sting and baking soda for bee stings.

(i) What does this information tell you about the chemical nature of the wasp stings

(ii) If there were no baking soda in the ouse, what other household substance could you use to treat bee stings?

Ans. (i) Since vinegar (acetic acid) is used to heal or neutralize the effect of wasp stings This means that the chemical present in the stings must be some base.

(ii) NH_4OH

---

31. A compound 'X' on electrolysis in aqueous solution produces a strong base. 'Y' along with two gases 'A' and 'B'. 'B' is used in manufacture of bleaching powder. Identify X, Y, A and B. Write chemical equations.

Ans.

$$2NaCl(aq) + 2H_2O(l) \rightarrow 2NaOH(aq) + Cl_2(g) + H_2(g)$$

X **Y** **B** **A**

---

32. A yellow powder X gives a pungent smell if left open in air. It is prepared by the Reaction of dry compound Y with chlorine gas. It is used for

disinfecting drinking Water. Identify X and Y. and write the reaction involved.

Ans.

$$\underset{\textbf{Y}}{Ca(OH)_2} + Cl_2 \rightarrow \underset{\textbf{X}}{CaOCl_2} + H_2O$$

---

33. A few drops of phenolphthalein indicator were added to an unknown solution A. It Acquired pink colour. Now another unknown solution B was added to it drop by Drop and the solution becomes colorless. Predict the nature of A & B.

Ans. Sol 'A' is basic in nature as phenolphthalein has imparted pink colour to it. Sol 'B' is an acid it has made solution A colourless by neutralizing by its basic effect.

3 Mark Questions

1. (a) Name the raw materials used is the manufacture of sodium carbonate by Solvay process?

(b) How is sodium hydrogen carbonate from a mixture of NH_4Cl **and** $NaHCO_3$ **?**

Ans. (a) Raw materials used are – $NaCl$, lime stone or $CaCO_3$ and NH_3

(b) Sodium hydrogen carbonate $(NaHCO_3)$ is sparingly soluble or less soluble in water and it gets separated as a precipitate while NH_4Cl remains in solution. This precipitate is removed by filtration.

---

2. Write equations for the following reactions

(i) Dilute sulphuric acid reacts with zinc granules

(ii) Dilute hydrochloric acid reacts with magnesium ribbon.

(iii) Dilute sulphuric acid reacts with aluminum powder.

Ans. (i) $Zn(S) + H_2SO_4(dil) \rightarrow ZnSO_4(aq) + H_2(g)$

(ii) $Mg(S) + 2HCl(dil) \rightarrow MgCl_2(aq) + H_2(g)$

(iii) $2Al(S) + 3H_2SO_4(dil) \rightarrow Al_2(SO_4)_3(aq) + 3H_2(g)$

---

3. (a) An aqueous solution has a PH value of 7.0. Is this solution acidic, basic or neutral?

(b) If H^+ concentration of a solution is 1×10^{-2} mol L^{-1} what will be its P4 value?

(c) Which has higher PH value: $1-M\ HCl$ **or** $1-M\ NaOH$

Ans. (a) The solution is neutral is nature

(b) $\left[H^+\right] = 1\times10^{-2} mol\ L^{-1} = 10^{-2} M$

$$PH = log\left[\frac{1}{H^+}\right] = -\log\left[H^+\right]$$

$$= -\log\left[10^{-2}\right] = -(-2)\log 10 = 2$$

(c) 1 M NaOH solution (basic) higher PH. Value

1 M HCl solution (acidic) lower PH. Value

---

4. What will you observe when:

(i) Red litmus is introduced into a solution of sodium sulphate.

(ii) Methyl orange is added to dil HCl.

(iii). Blue litmus is introduced into a solution of ferric chloride

Ans. (i) It will undergo any colour change because solution of Na_2SO_4 is water is almost neutral.

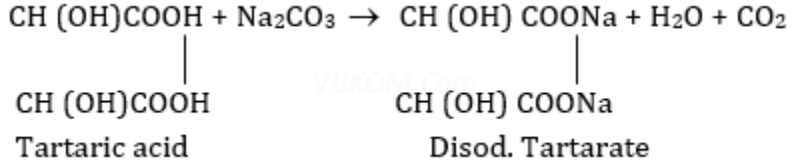
(ii) In the acidic solution, the colour of methyl Orange will change to reddish.
(iii) $FeCl_3$ solution on reacting with water will form ferric hydroxide and hydrochloric acid. Since the acid is strong, the solution will be acidic. Therefore the colour of blue litmus will change to red.

---

5. A first aid manual suggests that vinegar should be used to treat wasp sting and baking soda for bee stings.
(a) What does this information tell you about the chemical name of the wasp sting?
(b) If there were no baking soda in the house, what other house hold substances would you use to treat as stings?
Ans. (a) The chemical present in the sting must be base because vinegar (acetic acid) is used to heal or neutralize the effect of wasp stings.
(b) Since bee stings are treated by backing soda which is a base it means they must contain some acid. If baking soda is not available in the house, solution of ammonium hydroxide NH_4OH can be used for the same purpose.

---

6. Does Tartaric acid helps in making cake or bread fluffy. Justify.
Ans. No, tartaric acid does not evolve any carbon dioxide during baking. Its role is to react with Na_2CO_3 formed when $NaHCO_3$ decomposes.



If this not happens, Na_2CO_3 will impart a bitter taste to the cake.

---

7. Explain why?

(a) Common salt becomes sticky during the rainy season.

(b) Blue vittriol change to white upon heating.

Ans. (a) Common salt contains impurity of magnesium chloride ($MgCl_2$) which is of deliquescent nature. When exposed to atmosphere, it becomes moist. Therefore common salt becomes sticky during the rainy season.

(b) Blue vitriol ($CuSO_4\ 5H_2O$) during heating changes to a anhydrous copper sulphate ($CuSo_4$) which is white in colour.

---

8. A compound X of sodium is commonly used in kitchen for making crispy pakoras. It is also used for curing acidity in the stomach. Identify 'X'. What is its chemical formula? State the reaction that takes places when it is heated during cooking?

Ans. Compound X is a constitute of baking powder. It is also called as baking soda. Chemically, the compound is sodium hydrogen carbonate with formula $NaHCO_3$. Upon heating the compound X releases CO_2 gas

$2NaHCO_3\ (s) \xrightarrow{heat} Na_2CO_3\ (s) + H_2O\ (l) + CO_2\ (g)$

---

9. Explain why-

(i) Anhydrous calcium chloride is used in desiccators

(ii) If bottle full of concentrated H_2SO_4 is left open in the atmosphere by accident, the acid starts flowing out the bottle of its own.

Ans. (a) *Anhydrous* calcium chloride $(CaCl_2)$ is highly hygroscopic in nature it readily absorbs moisture and is therefore used as drying agent.

(b) Concentrated sulphuric acid is highly hygroscopic it absorbs moisture from air and gets diluted. Since the volume increases, the acid starts flowing out of the bottle.

10. How is plaster of Paris chemically different from gypsum? How may these be inter converted? Write one use of plaster of Paris?

Ans. Plaster of Paris is different from Gypsum as it is prepared from heating gypsum. Plaster of Pairs is a major constituent of surgical bandages used for setting fractured bones. Before applying on fractured bone, it is made wet with water and as a result of hydration it changes into gypsum which keeps the bones in position.

These may be interconverted by the reaction.

$$CaSO_4\frac{1}{2}H_2O + \frac{3}{2}H_2O \rightarrow CaSO_4 2H_2O$$

Plaster of Paris gypsum

The use of plaster of Paris are-

(i) It is used for making modules or casts for toys pottery, ceramics etc.

(ii) In surgical bandages for setting fractured bones.

---

11. (a) What is the action of red litmus on

(i) Dry ammonia gas

(ii) Solution of ammonia gas is water?

(b) State the observations you would make on adding ammonium hydroxide to aqueous solution of

(i) furious sulphate

(ii) Aluminium chloride?

Ans. (a) (i) Red Litmus has no action on dry ammonia gas. Because it does not release any hydroxyl ions $(OH)^-$

(ii) When it is passed through water (NH_3) is converted to ammonia

hydroxide (NH_4OH). It dissociates to give hydroxyl ions (OH^-) and the solution is basic in nature. Red litmus acquires a blue colour.

(b) (i) A green precipitate of ferrous hydroxide will be formed by double decomposition reaction.

$$FeSO_4(aq) + 2NH_4OH(aq) \rightarrow Fe(OH)_2 + (NH_4)_2 SO_4(aq)$$

(Green ppt.)

(ii) A white precipitate of aluminum hydroxide will be formed by double decomposition reaction

$$AlCl_3(aq) + 3NH_4OH(aq) \rightarrow Al(OH)_3 + 3NH_4Cl(aq)$$

(White ppt.)

---

12. State the chemical property in each case on which the following uses of baking soda are based

(i) As an antacid

(ii) As a constituent of baking powder.

Give the chemical for baking soda

Ans. (i) It is weakly alkaline is nature and neutralizes acid (HCl) formed is the stomach. $NaHCO_3 + HCl \rightarrow NaCl + H_2O + CO_2$

(ii) It evolves No_2 in the form of bubbles when cake is made by baking. As a result, the cake becomes porous as well as fluffy.

$$2NaHCO_3 \xrightarrow{heat} Na_2CO_3 + H_2O + CO_2$$

The chemical formula of baking soda is $NaHCO_3$

---

13. Metal compound 'A' reacts with dilute hydrochloric acid to produce efferenvescence. The gas evolved extinguishes a burning candle. Write a

balanced chemical equation for the reaction, if one of the compounds formed is calcium chloride.

Ans. As one of the compounds formed is calcium chloride, metal compound 'A' is salt of calcium.

Burning candle is extinguished by carbon dioxide so carbon dioxide gas is produced by reaction of 'A' with hydrochloric acid.

Carbon dioxide is produced by action of HCl on carbonate that means 'A' is calcium carbonate.

$CaCO_3 + HCl \rightarrow CaCl_2 + CO_2 + H_2O$

---

14. Why do HCl, HNO_3 etc. show acidic characters in aqueous solution while solutions of compounds like alcohol and glucose do not show acidic character?

Ans. Compounds like HCl and HNO_3 release hydrogen ions in solution, therefore they shows acidic character.

While compounds like alcohol and glucose do not release hydrogen ions.

Therefore they do not show acidic properties.

---

15. You have two solutions 'A' and 'B'. The pH of solution 'A' is 6 and pH of solution 'B' is 8. Which solution has more hydrogen ions concentration? Which is acidic and which one is basic?

Ans. A solution having pH less than 7 is acidic and that having pH more than 7 is basic. So, solution 'A' is acid and 'B' is basic. Naturally 'A 'which is acidic has greater concentration of hydrogen ions concentrations.

---

16. Under what soil condition do you think a farmer would treat the soil of his field with quicklime (calcium oxide) or slaked lime (calcium hydroxide) or chalk (calcium carbonate).

Ans. The farmer would treat the soil of his field with quicklime (calcium oxide) or slaked lime (calcium hydroxide) or chalk (calcium carbonate) when field has become acidic to neutralize the effect of acid.

---

17. Under what soil condition do you think a farmer would treat the soil of his field with quicklime (calcium oxide) or slaked lime (calcium hydroxide) or chalk (calcium carbonate).

Ans. The farmer would treat the soil of his field with quicklime (calcium oxide) or slaked lime (calcium hydroxide) or chalk (calcium carbonate) when field has become acidic to neutralize the effect of acid.

---

18. A milkman adds a very small amount of baking soda to fresh milk.

(a) Why does he shift the pH of the milk from 6 to slightly alkaline?

(b) Why does this milk take a long time to set a curd?

Ans. (a) The pH of milk changes from 6 to slightly alkaline on addition of a very small amount of baking soda. This is because sodium hydrogen carbonate (baking soda) is basic in nature. This prevents the milk from souring.

(b) Lactic acid formed as a result of fermentation is neutralized by sodium hydrogen carbonate. This prolongs the time taken by milk to set as curd.

---

19. What is a neutralization reaction? Give two examples.

Ans. The reaction between an acid and a base to give salt and water is called neutralization reaction.

For example:

$NaOH + HCl \rightarrow NaCl + H_2O$

$KOH + HNO_3 \rightarrow KNO_3 + H_2O$

---

20. Give two important uses of washing soda and baking soda.

Ans. Uses of washing soda:

(i) As cleansing agent.

(ii) Removing permanent hardness of water.

(iii) Used in glass, soap and paper industries.

Uses of baking soda:

(i) For making baking powder.

(ii) As ingredient of antacid.

---

21. Compound P forms enamel of teeth. It is the hardest substance of the body. It does not dissolve in water but it is corroded when pH in the mouth is below 5.5. How does tooth paste prevent dental decay?

Ans. P = $Ca(PO_4)_2$ Bacteria present in the mouth produce acids by degradation of sugar And food particles remaining in the mouth after eating. Using toothpastes, which Are generally basic, for cleaning the teeth can neutralize the excess acid and prevent Tooth decay.

---

22. The oxide of a metal M was water soluble when a blue litmus strip was dipped in

This solution, it did not go any change in colour. Predict the nature of oxide.

Ans. The Metal oxide (MO) is of basic in nature. It dissolve in water to form metal

Hydroxide as $MO + H_2O \rightarrow M(OH)_2$ Blue litmus does not undergo any change in Colour in the basic medium.

---

23. A road tanker carrying an acid was involved in an accident and its contents spilled on the road, iron drain covers began melting and fizzing as the acid ran over them. A Specialist was called to se if the acid actually leaked into the nearby river.

(a) Explain how the specialist could carry out a simple test to see if the river water contains some acid or not.

(b) The word melting is incorrectly used in the report. Suggest a better name that should have been used.

(c) Explain why drain covers began fizzing as the acid rain over them.

Ans. (a) By dipping a strip of blue limos paper in to the sample of river water. If the colour Changes to red this means that some acid has gone in to the river.

(b) Corrosion.

(c) Iron reacts with acid to evolve hydrogen gas.

---

24. A compound 'A' on heating at 370 K gives 'B' used as plaster for supporting fractured Bones in the right position. 'B' on mixing with water changes to 'A'. Identify 'A' and 'B' And write the chemical reaction.

Ans.

$$CaSO_4 \cdot \frac{1}{2}H_2O + 1\frac{1}{2}H_2O \rightarrow CaSO_4 \cdot 2H_2O$$

(Plaster of Paris) 'B' (Gypsum) 'A'

---

25. A student heated a few crystals of copper sulphate n a dry boiling tube.

(a) What will be the color of the copper sulphate after heating?

(b) Will you notice water droplets in the boiling tube?

(c) Where have these come from

Ans. (a) White

(b) Yes

(c) Copper sulphate crystals which seem to be dry contain water of crystallization.

5 Mark Questions

1. (a) The PH of rain water collected from two cities A and B was found to be 6 and 5 respectively. Water of which city is more acidic? Find out the ratio of hydrogen ion concentration in the two samples of rain water?

(b) Arrange the following in order (ascending) of their P4 values.

$NaOH$ **solution, Blood, lemon Juice.**

Ans. (a) $$PH = -\log\left[H^+\right] = \log\left[\frac{1}{H^+}\right]$$

For city A $$\log\left[\frac{1}{H^+}\right] = 6$$

$$\left[\frac{1}{H^+}\right] = anti\log 6 = 10^6$$

$$H^+ = 10^{-6} \ldots\ldots\ldots (i)$$

For city B

$$\log\left[\frac{1}{H^+}\right] = 5$$

$$\left[\frac{1}{H^+}\right] = anti\log 5 = 10^5$$

$$\left[H^+\right] = 10^{-5}$$

$$\text{Ratio}\,\frac{(\text{from city A})}{(\text{from city B})} = \frac{10^{-6}}{10^{-5}} = \frac{1}{10}$$

(b) Increasing order of PH values

Lemon juice < Blood < NaOH solution.

---

2. (a) Why does an aqueous solution of acid conduct electricity?

(b) How does the concentration of hydrogen ions $[H_3O]^+$ changes when the solution of an acid is diluted with water?

(c) Which has higher pH. A concentrated or dilute solution of HCL?

(d) What would you observe on adding dil HCL acid to

(i) Sodium bicarbonate placed in a test tube.

(ii) Zinc metal in a test tube.

Ans. (a) An aqueous solution of an acid conducts electricity because in water an acid (HCl) dissociates to give ions. Since the current is carried out by the movement of ions, an aqueous solution of acid conducts electricity.

(b) During dilution, more of acid dissociates into ions. Thus concentration of $[H_3O]^+$ ions will increase on dilution.

(c) Even on increasing ions, the number of ions per unit volume decreases. Therefore, ph will increases on dilution.

(d) (i) CO_2 gas will evolves accompanied by brick effervescence.

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

(ii) H_2 gas will evolves accompanied by brick effervescence

$Zn\ (s) + 2HCl\ (aq) \quad ZnCl\ (aq) + H_2O\ (g)$

---

3. A road tanker carrying an acid was involved in an accident and its contents spilled on the road. At the side of the road iron drain cover began melting and fizzing as the acid ran over them. A specialist was called to see if the acid actually leaked into the nearby river.

(a) Explain why specialist could carry out sample test to see of the river water contains some acid or not

(b) Suggest a better report name for the word 'melting'

(c) Explain why the drain covers began fizzing as the acid ran over them.

Ans. (a) It can be done by adding a strip of blue litmus paper into a tube containing a small amount of sample water if the colour changes into red, this means that some acid has gone into the river.

(b) The acid has reacted chemically with the drain cover which is usually made of iron. The correct word is corrosion.

(c) Iron reacts with an acid to evolve gas. Since the gas is released immediately accompanied by large number of bubbles Fizzing of detain covers is expected.

---

4. Write word equations and then balanced equations for the reaction taking place when:

(a) Dilute Sulphuric acid reacts with zinc granules.

(b) Dilute hydrochloric acid reacts with magnesium ribbon.

(c) Dilute Sulphuric acid reacts with aluminum powder

(d) Dilute hydrochloric acid reacts with iron fillings.

Ans. (a) Zinc + Sulphuric acid Zinc sulphate +Hydrogen

$Zn + H_2SO_4 \quad ZnSO_4 + H_2$

(b) Magnesium + Sulphuric acid magnesium chloride +Hydrogen gas

$Mg + HCl \quad MgCl_2 + H_2$

(c) Aluminum + Sulphuric acid Aluminum sulphate +Hydrogen gas

$Al + H_2S0_4 \quad Al_2(S0_4)_3 + H_2$

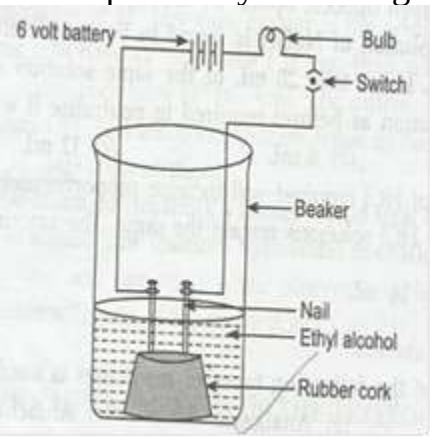
(d) Iron + Hydrochloric acid Iron chloride +Hydrogen

$Fe + 2HCl \quad FeCl_2 + H_2$

---

5. Compound such as alcohols and glucose also contain hydrogen but are not categorized as acids. Describe an activity

Ans. Alcohol and glucose both contain hydrogen but not categorized as acids. This can be proved by following activity.



Material required: – Beaker, nails, battery, connecting wires, bulb, switch and alcohols.

Procedure:

1. Set up the experiment as follows

2. Take ethyl alcohol in the beaker in the beaker.

3. When the switch is turned on, the bulb does not glow.

4. Take glucose solution in place of alcohols but bulb does not glow.

---

6. A compound X is bitter in taste. It is a component of washing powder& reacts with dil. HCI to produce brisk effervescence dur to colourless, odourless gas Y wich turns lime water milky due to formation of Z. When excs of is passed, ilkiness disappears due to formation of P. Identify X, Y, And Z & P.

Ans.

$$Na_2co_3(s) + 2HCI(aq) \rightarrow 2NaCI(aq) + H_2O(l) + CO_2(g)$$

X Y

$$Ca(OH_2)(aq) + CO_2(g) CaCO_3(S) + H_2O(l)$$

(Lime water) (White precipitate)

Z

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

(Soluble in water)

P

---

7. When gas pass through saturated solution of ammonia cal brine, two compound 'X' and 'Y' are form. 'Y' is used as antacid and decomposes to form another solid 'Z'. Identify 'X', 'Y', 'Z' and write chemical equations.

Ans.

$$NaCl + H_2O + CO_2 + NH_3 \rightarrow NH_4Cl + NaHCO_3$$

(Ammonium chloride) 'X' — (sodium hydrogenarbonate) 'Y'

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

(Sodium hydrogencarbonate) — (Sodium carbonate)

---

8. A substance 'X' used in the kitchen for making tasty crispy pakoras and is also an Ingredient of antacid. Name the substance 'X'.

(i) How does 'X' help to make cakes and bread soft and spongy.

(ii) Is the pH value of solution of 'X' is lesser than or greater than 7.0?

Ans.

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

(Sodium hydrogencarbonate) — (Sodium Carbonate)

(i) When CO_2 gas escapes as bubbles it leaves behind pores which make the cake or bread soft and spongy.

(ii) It is a salt of strong base so the pH of the solution will be more than 7.0