Chapter-2
ACIDS BASES AND SALTS

SUB TOPIC: Concepts of Acid, Base and their basic physical and chemical properties and their different sources.Strength of acids and bases.

VERY SHORT QUESTIONS: (1 MARK)

Match the column– Each question contains statements given in two columns which have to be matched. Statements

Q.1 (A, B,C, D) in **column I** have to be matched with statements (p, q, r, s) in **column II**.

Column II gives natural sources for acid mention in column I match them correctly.

Column I	**Column II**
(A) Acetic acid	(p) Tomato
(B) Citric acid	(q) Tamarind
(C) Tartaric acid	(r) Orange
(D) Oxalic acid	(s) Vinegar

Q2. Column II gives nature of acids and bases mention in column I, match them correctly.

Column I	**Column II**
(A) HCl	(p) strong acid
(B) HCN	(q) weak acid
(C) NaOH	(r) weak base
(D) NH	s) strong base

Q3.Column II give acid and base from which salt mention in column I, match them correctly.

Column I	**Column II**
(A) KNO_3	(p) Nitric acid, silver hydroxide
(B) $AgNO_3$	(q) Hydrochloric acid, Magnesium hydroxide
(C) $MgCl_2$	(r)Carbonic acid,Ammonium hydroxide
(D) $(NH_4)_2CO_3$	(s) Nitric acid, potassium hydroxide

SHORT ANSWER TYPE QUESTIONS (3 MARKS)

1. What are the organic sources of following acids :
   A) Ascorbic acid
   B) Oxallic acid
   C) Butyric acid
   D) Malic acid
2. What is the concept of Arrhenius acids ? Give two such examples.
3. Mention five properties of Bases ? How do they vary with respect to litmus solution test for

acids ?

4. What are the common behavior of metal Oxides and non-metal oxides ? Explain giving one such Such example from each.
5. What is the nature of Al2O3 ?Justify this answer with proper reactions.
6. Although Acetic acid carries 4 H-atoms still it shows mono-basic in nature.Why ?

LONG ANSWER TYPE QUESTIONS :(5 MARKS)

1. Explain the behavior of following acids and bases depending upon their strength.
   HCl, CH3COOh, NaOH and NH4OH.

SUB TOPIC: Concentrated and Dilute acids and bases,Indicators(natural and synthetic), Universal indicators and pH scale.

I. VERY SHORT QUESTIONS: (1 MARK)

1.Name the acid-base indicator extracted from lichen.

2.Why a sodium chloride required in our body ?

3What is meant by strong acids and weak acids ? Classify the following into strong acids and weak acids: CH_3COOH, H_2SO_4 , HNO_3 , H_2CO_3 , H_2SO_3

4.Classify each of the following substances as a weak acid, strong acid, weak base, strong base, both a weak acid and a weak base, or neither an acid nor a base :
(a) $HClO_4$, (b) $NaClO_4$, (c) NaOH, (d) CH_3OH, (e) $C_3H_7CO_2H$, and (f) $HSCH_2CH(NH_2)CO_2H$

5.What will be the change in color of following solutions in Methyl Orange and Phenolpthalin Indicators : Caustic soda solution, vinegar and soap solution.

6.What are Olfactory Indicators ? How would you prepare onion peel for testing acidity and basicity of NH4OH aDescribe some natural acid-base indicators, other than litmus.

7. What are olfactory indicators?
8. What do you mean by concentrated and dilute acid solutions?
9. Explain why brass and copper vessels are not used to keep curd and sour substances?
10. Name the gas which is liberated when metals react with an acid. Give an example. How isthe presence of the gas tested?

True-False statements –

1. Ammonium hydroxide is a weak base because – (A) It has low vapour pressure (B) It is only slightly ionized
Q.2 (C) It is not a hydroxide of any metal (D) It has low density
Which of the following is not a Lewis acid –
(A) CO (B) $SiCl_4$ (C) SO_3 (D) Zn^{2+}
Q.3 NaOH is a strong base because –
(A) It gives OH^- ion (B) It can be oxidised

(C) It can be easily ionised (D) Both (A) and (C)

Q.4 Which of the following is not a Lewis acid –
(A) BF_3 (B) $FeCl_3$ (C) SiF_4 (D) C_2H_4

Q.5 An example of a Lewis acid is –
(A) NaCl (B) $MgCl_2$ (C) $AlCl_3$ (D) $SnCl_4$

Q.6 NH_4OH is weak base because –
(A) It has low vapour pressure (B) It is only slightly ionized
(C) It is not a hydroxide of metal (D) It has low density

Q.7 Which of the following is the weakest acid – (A) HF (B) HCl (C) HBr (D) HI

Q.8 The pH is less than 7, of the solution of –
(A) $FeCl_3$ (B) NaCN (C) NaOH (D) NaCl

Q.9 The species among the following, which can act as an acid and a base is –
(A) HSO_4^- (B) SO_4^{2-} (C) H_3O^+ (D) Cl^-

Q.10 The correct order of acid strength is –
(A) $HClO > HClO_2 < HClO_3 < HClO_4$
(B) $HClO_4 > HClO < HClO_2 < HClO_3$
(C) $HClO_2 > HClO_3 < HClO_4 < HClO$ (D) $HClO_4 > HClO_3 < HClO_2 < HClO$

Q.11 Which of the following is the weakest base –
(A) NaOH (B) $Ca(OH)_2$ (C) NH_4OH (D) KOH

SHORT ANSWER TYPE QUESTIONS (3 MARKS)

1. You have been provided with three test tubes. One of them contains distilledwater and the other two contain an acidic solution and a basic solution, respectively. Ifyou are given only red litmus paper, how will you identify the contents of each test tube?

LONG ANSWER TYPE QUESTIONS :(5 MARKS)

1. You have been provided with three test tubes. One of them contains distilledwater and the other two contain an acidic solution and a basic solution, respectively. Ifyou are given only red litmus paper, how will you identify the contents of each test tube?

SUB TOPIC: Reaction of Acids and Bases with Metals, Metals-Oxides, Metal hydroxides,Non-metals, Metal Carbonates and Metal Bicarbonates etc.

I VERY SHORT QUESTIONS: (1 MARK)

You have been provided with three test tubes. One of them contains distilledwater and the other two contain an acidic solution and a basic solution, respectively. Ifyou are given only red litmus paper, how will you identify the contents of each test tube?

Q.1 Why should curd and sour substances not be kept in brass and copper vessels ?
Q.2 With the help of an activity show that metals liberate hydrogen gas on reaction with dilute acids.
Q.3 With the help of an activity show that copper sulphate crystals lose water molecules of crystallisation.
Q.4 Why does dry HCl gas not change the colour of the dry litmus paper ?
Q.5 What effect does the concentration of H^+ (aq) have an acidic nature of the solution ?

Q.6 Why does distilled water not conduct electricity, whereas rain water does ?

Q.7 Fresh milk has a pH of 6. How do you think the pH will change as it turns into curd ? Explain your answer.

Q.8 What is a neutralisation reaction ? Give two examples.

Q.9 Name the acid-base indicator extracted from lichen.

Q.10 Why a sodium chloride required in our body ?

Q.1 Four students were given colourless liquids A, B, C of water, lemon juice and a mixture of water and lemon juice respectively. After testing these liquids with pH paper, following sequences in colour changeof pH paper were reported :

I. Blue, red and green II. Orange, green and green III. Green, red and red IV. Red, and green

The correct sequence of colours observed is –

(A) I (B) II (C) III (D) IV

Q.2 Four solutions I, II, III and IV were given to a student to test their acidic or basic nature by using a pH paper. He observed that the colour of pH paper turned to red, blue, green and orange respectively whendipped in four solutions. The correct conclusion made by the statement would be that :

(A) I, II and III are acidic (B) I and IV are acidic

(C) II, III and IV are basic (D) II and IV are basic

Q.3 A blue litmus paper was first dipped in dil. HCl and then in dil. NaOH solution. It was observed that the colour of the litmus paper –

(A) changed to red (B) changed first to red and then to blue

(C) changed blue to colourless (D) remained blue in both the solutions.

Q.4 The acid used in making of vinegar is –

(A) formic acid (B) acetic acid (C) sulphuric acid (D) nitric acid

Q.5 $CuO + (X) \rightarrow CuSO_4 + H_2O$. Here (X) is –

(A) $CuSO_4$ (B) HCl (C) H_2SO_4 (D) HNO_3

Q.6 Which is correct order of increasing strength of given acids –

(A) HI < HBr < HCl < HF (B) HI < HF < HCl < HBr

(C) HF < HCl < HBr < HI (D) HBr < HF < HCl < HI

Q.7 Reaction of an acid with a base is known as –

(A) decomposition (B) combination (C) redox reaction (D) neutralization

Q.8 When CO_2 is passed through lime water, it turns milky. The milkiness in due to formation of

(A) $CaCO_3$ (B) $Ca(OH)_2$ (C) H_2O (D) CO_2

Q.9 Antacids contain –

(A) weak base (B) weak acid (C) strong base (D) strong acid

Q.10 $2NaOH + MgSO4 \rightarrow$?

(A) $MgO + Na_2SO_4$ (B) $Mg(OH)_2 + Na_2SO_4$ (C) $Mg(OH)_2 + Na_2O$ (D) $MgO + Na_2O$

Q.11 A solution turns red litmus blue. Its pH is likely to be –
(A) 2 (B) 4 (C) 7 (D) 10

Q.12 Methyl orange is –
(A) an acidic indicator (B) a basic indicator (C) a neutral indicator (D) none of these

Q.13 Nature of aqueous solution with pH equal to zero is –
(A) acidic (B) alkaline (C) neutral (D) amphoteric

Q.14 Which is base and not an alkali –
(A) NaOH (B) KOH (C) $Fe(OH)_3$ (D) none is true

Q.15 What will be the pH of 10^{-3} M NaOH –
(A 3 (B) 11 (C) 7 (D) 10

SHORT ANSWER TYPE QUESTIONS (3 MARKS)

Q.1 Why should water be never added dropwise to concentrated sulphuric acid ?

Q.2 Name the gas evolved when dilute sulphuric acid acts on sodium carbonate.

Q.3 Write the name and the chemical formula of the organic acid present in vinegar.

Q.4 Which will be more acidic and why ?
(i) A solution with pH value of 6.0 or(ii) A solution with pH value of 5.0.

Q.5 Write balanced chemical equations for the reactions taking place when dry blue crystals of coppersulphate are dropped into concentrated sulphuric acid.

Q.6 (a) Give Arrhenius definition of an acid and a base.
(a) Choose strong acid and strong base from the following: CH_3COOH, NH_4OH, KOH, HCl

Q.7 What is observed when sulphur dioxide is passed through
(a) water (b) limewater
Also write a chemical equation for the reaction that take place.

Q.8 What is efflorescence ? Given an example.

Q.9 (i) An aqueous solution has a pH value of 7.0. Is this solution acidic, basic or neutral ?
(ii) Which has a higher pH value, 1 M HCl or 1 M NaOH solution ?

LONG ANSWER TYPE QUESTIONS :(5 MARKS)

1. Explain the nature of behavior of reactions of following metals with dil. HCl : Na, Zn and Cu.
2. A) What is Aqua Regia ? How can it attack to least reactive metals like Au and Pt ?
   B) Why no H2 gas is formed during reaction of acids likeH2SO4 with Zn where as it releases H2 gas in case of Mg ? Write their respective reactions.

SUB TOPIC: Salts, different types of Salts, their Preparations and Properties.

VERY SHORT QUESTIONS: (1 MARK)

1. Write two observations you would make when quicklime is added to water.
2. A calcium compound which is a yellowish white powder is used as a disinfectant and also in textile industry. Name the compound. Which gas is released when this compound is left exposed to air ?

3. How is Plaster of Paris chemically different from gypsum? How may they be interconverted ? Write one use of Plaster of Paris.
4. What are alkalies ? Given one example of alkalies ?
5. What happens when crystals of washing soda are left open in dry air ? What is this change named as ? Name two industries based on use of washing soda.
6. "Sulphuric acid is a dibasic acid". Write two reaction equations to justify this statement and name the reaction products in the two cases.
7. Name the gas evolved when dilute sulphuric acid acts as sodium carbonate. Write the chemical equation for the reaction involved.
8. What is the chemical name of washing soda ? Name the three chief raw materials used for making washing soda by the Solvay process.
9. 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.
10. The reaction of metal with acid results in the formation of–
   (A) only hydrogen gas (B) only salt (C) both salt and hydrogen gas (D) none of these
11. Which of the following acid does not react with metals –
   (B) Sulphuric acid (B) Phosphoric acid (C) Carbonic acid (D) Nitric acid
12. Basic salts are formed by neutralisation of –
   (C) strong acid and strong base (B) strong acid and weak base
   (C) weak acid and weak base (D) strong base and weak acid
13. When bitten by an ant, the sting causes irritation due to the presence of –
   (D) a base in the sting (B) formic acid in the sting
   (C) poisonous chemicals (D) Both (A) and (B)
14. When an oxide of a non-metal reacts with water which of the following is formed –
   (E) Acid (B) Base (C) Salt (D) None of these
15. Which of the following is a weak base –
   (F) NaOH (B) KOH (C) NH_4OH (D) None of these
16. The pH of three solutions A, B, C is 6, 4, 8 receptivity which of the following is the correct option –
   (G) A > B > C decreasing acidic strength (B) C > B > A increasing acidic strength
   (C) B > A > C is decreasing acidic strength (D) C > B > A decreasing acidic strength

Q.16 'Alum' is an example of –
   (A) single salt (B) double salt (C) acids (D) none of the above

Q.17 A solution of pH = 2 is more acidic than one with pH 6 by a factor of –
   (A) 4000 (B) 2 (C) 10000 (D) 8000

Q.18 The acid having a highest H^+ ions concentration is one with–
   (A) pH = 7.0 (B) pH = 1.2 (C) pH = 2.3 (D) pH = 8.2

Q.19 Which of the following is 'quicklime' –
   (A) CaO (B) $Ca(OH)_2$ (C) $CaCO_3$ (D) $CaCl_2.6H_2O$

Q.20 Slaked lime is prepared by adding water to –
   (A) bleaching powder (B) lime water (C) milk of lime (D) quicklime

Q.21 Plaster of paris has the formula –
   (A) $CaSO_4.½H_2O$ (B) $CaSO_4.H_2O$ (C) $CaSO_4.1½H_2O$ (D) $CaSO_4.2H_2O$

Q.22 Which of the following compounds is basic in nature –
   (A) $Ca(OH)_2$ (B) $CaCl_2.6H_2O$ (C) NaCl (D) $CuSO_4.5H_2O$

Q.23 Which of the following compounds is neutral to litmus –
   (A) $NaNO_3$ (B) $CuSO_4.5H_2O$ (C) $NaHCO_3$ (D) $Ca(OH)_2$

Q.24 Which of the following compounds is not white –

(A) Anhydrous $CuSO_4$ (B) $BaSO_4$ (C) $CaSO_4.2H_2O$ (D) $CuSO_4.5H_2O$

LONG ANSWER TYPE QUESTIONS (3MARKS)

1. Name the raw materials that are required for the manufacture of washing soda by Solvay process. Describe the chemical reactions involved in the process.
2. (a) Write the formula and chemical name of bleaching powder.
   (b) Write chemical equation to represent the action of atmospheric CO_2 gas on bleaching powder when left exposed in open. (c) State for what purpose is bleaching powder used in water treatment plants.
3. What is observed when – (i) dilute sulphuric acid is added to solid sodium carbonate. (ii) hot concentrated sulphuric acid is added to sulphur. (iii) Sulphur dioxide is passed through lime water ? Also write chemical equations to represent the chemical reaction taking place in each case.
4. (i) Name the raw materials used in the manufacture of sodium carbonate by Solvay process. (ii) How is the sodium hydrogen carbonate formed during Solvay process separated from a mixture of NH_4Cl and$NaHCO_3$? (iii) How is sodium carbonate obtained from sodium hydrogen carbonate ?
5. (i) What is the action on litmus of (a) Dry ammonia gas. (b) Solution of ammonia gas in water.
   (ii) State of observations you would make on adding ammonium hydroxide to aqueous solutions of
   (a) Ferrous sulphate. (b) Aluminium chloride.
6. (a) What is meant by pH of a solution ?
   (b) State one difference between a strong electrolyte and a weak electrolyte. Give one example of each.
7. Write the chemical name and formula of washing soda. What are the raw materials used for its manufacture by Solvay process? What happens when crystals of washing soda are exposed to air ?
8. A compound X of sodium forms a white powder. It is a constituent of baking powder and is used in some antacid prescriptions. When heated, X gives out a gas and steam. The gas forms a white precipitate with limewater. Write the chemical formula and name of X and the chemical equation for its decomposition on heating. What is its role in baking powder and in antacids ?

9. Name the raw materials that are required for the manufacture of washing soda by Solvay process. Describe the chemical reactions involved in the process.
10. (a) Write the formula and chemical name of bleaching powder.
    (c) Write chemical equation to represent the action of atmospheric CO_2 gas on bleaching powder when left exposed in open. (c) State for what purpose is bleaching powder used in water treatment plants.
11. What is observed when – (i) dilute sulphuric acid is added to solid sodium carbonate. (ii) hot concentrated sulphuric acid is added to sulphur. (iii) Sulphur dioxide is passed through lime water ? Also write chemical equations to represent the chemical reaction taking place in each case.
12. (i) Name the raw materials used in the manufacture of sodium carbonate by Solvay process. (ii) How is the sodium hydrogen carbonate formed during Solvay process separated from a mixture of NH_4Cl and$NaHCO_3$? (iii) How is sodium carbonate obtained from sodium hydrogen carbonate ?

LONG ANSWER TYPE QUESTIONS :(5 MARKS)

13. (i) What is the action on litmus of (a) Dry ammonia gas. (b) Solution of ammonia gas in water.
(iii) State of observations you would make on adding ammonium hydroxide to aqueous solutions of (c) Ferrous sulphate. (b) Aluminium chloride.
14. (a) What is meant by pH of a solution ?
(d) State one difference between a strong electrolyte and a weak electrolyte. Give one example of each.
15. Write the chemical name and formula of washing soda. What are the raw materials used for its manufactureby Solvay process? What happens when crystals of washing soda are exposed to air ?
A compound X of sodium forms a white powder. It is a constituent of baking powder and is used in some antacid prescriptions. When heated, X gives out a gas and steam. The gas forms a white precipitate with limewater. Write the chemical formula and name of X and the chemical equation for its decomposition on heating. What is its role in baking powder and in antacid.

SUB TOPIC: Uses of bleaching powder and POP

VERY SHORT QUESTIONS: (1 MARK)

1. Plaster of Paris is made from –
(B) lime stone (B) slaked lime (C) quick lime (D) gypsum
2. Chemical formula of baking soda is –
(C) $MgSO_4$ (B) Na_2CO_3 (C) $NaHCO_3$ (D) $MgCO_3$
3. Washing soda has the formula –
(D) $Na_2CO_3.7H_2O$ (B) $Na_2CO_3.10H_2O$ (C) $Na_2CO_3.H_2O$ (D) Na_2CO_3
4. Plaster of Paris hardens by –
(E) giving of CO_2 (B) changing into $CaCO_3$
(C) combining with water (D) giving out water

5. Bleaching powder is soluble in cold water giving a milky solution due to –
(F) available chlorine (B) lime present in it
(C) calcium carbonate formation (D) the absorption of carbon dioxide from atmosphere
6. 10 mL of a solution of NaOH is found to be completely neutralised by 8 mL of a given solution of HCl. If we take 20mL of the same solution of NaOH, the amount of HCl solution (the same solution as before) required to neutralise it will be –
(G) 4 mL (B) 8 mL (C) 12 mL (D) 16 mL

7. What happens when a solution of sodium hydrogen carbonate is heated ? Write equation of the reactionis involved.
Explain why, Plaster of paris should be stored in a moisture proof container.
8. How do we identify acids ?
9. Write the reaction between dilute NaOH solution and dilute HCl acid.
10. Why does an aqueous solution of an acid conduct electricity ?
11. Write the pH value, after which teeth start decaying ?
12. What do you mean by the family of salts ?
13. Name the products formed from the Chloro-Alkali process.
14. Why does distilled water not conduct electricity, whereas rain-water does ?
15. What is the importance of pH in everyday life ?
16. What is water of crystallisation ? Give some examples of salts having water of crystallisation ?

LONG TYPE QUESTIONS (3MARKS)

1. : Equal lengths of magnesium ribbons are taken in test tubes A and B. Hydrochloric acid (HCl) is added to test tube A, while acetic acid (CH3COOH) is added to test tube B. In which test tube will the fizzing occur more vigorously and why?

2. : A milkman adds a very small amount of baking soda to fresh milk.
(a) Why does he shift the pH of the fresh milk from 6 to slightly alkaline?
(b) Why does this milk take a long time to set as curd?

3.Plaster of Paris should be stored in a moisture-proof container. Explainwhy?

1. An efflorescent white, crystalline substance dissolves in water to produce an alkaline solution. The substance is used as a cleansing agent. Identify the substance and mention two uses it.
2. A white, powdery compound of calcium is used for making toys and casts of statues. It hardens when mixed with water. Identify the compound. Write the chemical equation of its preparation.
3. What is the chemical formula of plaster of paris? How is it prepared? State the common and the chemical names of the compound formed when plaster of paris mixed with water?
4. State two uses of the following:
   (i) Sodium hydroxide
   (ii) Chlorine
   (iii) Hydrogen
   (iv) Hydrochloric acid
5. (a) What is the common name of the compound $CaOCl_2$.
   (b) Name the raw material used for the preparation of plaster of paris.
   (c) Which property of plaster of paris is utilized in making casts for broken limbs in hospitals?
6. What happens when a cold and concentrate solution of sodium chloride reacts with ammonia and carbon dioxide? Write the chemical equation of the reaction which takes place.
7. Write the chemical formula of ammonium chloride. Explain why an aqueous solution of ammonium chloride is acidic in nature? Illustrate your answer with the help of a chemical equation.

LONG TYPE QUESTIONS (5 MARKS)

1. What is plaster of paris? Write its chemical formula.

(b) How is plaster of paris prepared? Write the chemical equation of the reaction involved.

(c) Explain why plaster of paris should be stored in a moisture proof container.

(d) State two important uses of plaster of paris.

2. (a) What is bleaching powder? Write its chemical formula.

(b) How is bleaching powder prepared? Write the chemical equation of the reaction involved.

(c) State two important uses of bleaching powder.

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

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