Chapter 2 Acids, Bases & Salts

MULTIPLE CHOICE QUESTIONS

1.The colour of phenolphthalein in acidic medium is-

(a) Yellow

(b) Pink

(c) Colourless

(d)Blue

2. Generally, when certain metals react with an acid they release gas.

(a) Nitrogen

(b) Oxygen

(c) Hydrogen

d) Argon

3.Milkiness of lime water disappear when excess CO_2 is passed due to the formation of-

(a) Calcium hydroxide

(b)Calcium chloride

(c) Calcium bicarbonate

(d)Calcium carbonate

4. What is formed when zinc reacts with sodium hydroxide?

(a) Zinc hydroxide and sodium

(b) Sodium zincate and hydrogen gas

(c) Sodium zinc-oxide and hydrogen gas

(d) Sodium zincate and water

5.The common name for the substance used as antacid-

(a) Washing soda

(b) Plaster of Paris

(c) Bleaching powder

(d) Baking soda

6. Rain is called acid rain when it's:

(a) pH falls below 7

(b) pH falls below 6

(c) pH falls below 5.6

(d) pH is above 7

7.When you clean a metal vessel with tamarind the reaction taking place is:

Metaloxide+X-------- Salt+Water. What is X here?

(a)Acid

(b)Base

(c)Hydrogen

(d)Carbon dioxide

8. Sodium hydroxide turns phenolphthalein solution

(a) pink

(b) yellow

(c) colourless

(d) orange

9.Sodium carbonate is a basic salt because it is a salt of a

(a) strong acid and strong base

(b) weak acid and weak base

(c) strong acid and weak base

(d) weak acid and strong base

10. Which one of the given is true, if a substance has a pH value of 7?

(a) The substance is a base

(b) The substance is an acid

(c) The substance is a neutral substance

(d) Either (A) or (B)

ASSERTION AND REASON QUESTIONS:

DIRECTION: Each of these questions contains an Assertion followed by Reason. Read them carefully

and answer the question on the basis of following options. You have to select the one

that best describes the two statements.

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true and R is not the correct explanation of A.

(c) A is true but R is false.

(d)A is false but R is true.

1. Assertion (A) : The acid must be added to water with constant stirring.

Reason(R) : Mixing of an acid with water decreases the concentration of H+ ions per unit volume.

2. Assertion (A): On heating, colour of hydrated copper sulphate changes from blue to white.

Reason (R) :On strong heating , Copper sulphate crystals lose all the water of crystallisation and form anhydrous salt.

3. Assertion(A): The aqueous solution of glucose and alcohol do not show acidic character.

Reason(R): Aqueous solution of glucose and alcohol do not give H+ ions .

4. Assertion (A): HCl gas does not change the colour of dry blue litmus paper.

Reason (R): HCl gas dissolves in the water present in wet litmus paper to form H+ ions

5. Assertion(A): Weak acids have low electrical conductivity.

Reason(R): Strong acids and weak acids have equal concentration of H+ ions in their solutions.

CASE STUDY BASED QUESTIONS:

1 A copper vessel gets tarnished due to formation of an oxide layer on its surface. On rubbing lemon on the vessel, the surface is cleaned, and the vessel begins to shine again. This is due to the fact that it reacts with the acid present in lemon to form a salt which is washed away with water. As a result, the layer of copper oxide is removed from the surface of the vessel and the shining surface is exposed.

1.Which of the following acids is present in lemon?

(a) Formic acid (b) Acetic acid (c) Citric acid (d) Hydrochloric acid

2.The nature of copper oxide is

a) acidic b) basic c) neutral d) amphoteric

3.Name the salt formed in the above reaction

a) copper carbonate b) copper chloride

c)copper citrate d) copper citrate

4.The phenomenon of copper getting tarnished is

a) corrosion b) rancidity c) displacement d)none of these

2. Taj Mahal, the seventh wonder of the world, is made of white stone. This white stone contains the same substance ‘A’ that is present in chalk powder and lime-stone. It is turning yellow due to polluted air. If it is cleaned by an acidic cleaner, a gas ‘B’ is released, which when passed through a solution ‘C’, forms the same substance which is present in the white stone that was used to make Taj mahal.

1. The substance A is-

A.) Ca_3CO_2

B.) $CaCO_3$

C.) $Ca(OH)_2$

D.) $CaSO_4$

2. Gas B is-

A..) Hydrogen

B.) Nitrogen

C.) Chlorine

D.) Carbon dioxide

3. Solution C is-

A.) $CaCl_2$

B.) B. $CaCO_3$

C.) $Ca(OH)_2$

D.) $CaSO_4$

4.What is the nature of the substance A?

A.) Acidic

B.) Basic

C.) Neutral

D.) None

5.The polluted air around Taj mahal leads to the following problem because of which it is getting Marble cancer:

A.) Global Warming

B.) Acid Rain

C.) GreenHouse Effect

D.) All are correct

3. Salt of a strong acid and strong base is neutral with a pH value of 7. NaCl common salt is formed by a combination of hydrochloric acid and sodium hydroxide solution. This is the salt that is used in food. Some salt is called rock salt which was formed when seas of bygone ages dried up. The common salt thus obtained is an important raw material for various materials of daily use, such as sodium hydroxide, baking soda, washing soda, and bleaching powder.

1. Which of the following does not form an acidic salt?

a) Phosphoric acid

b) Carbonic acid

c)Hydrochloric acid

d) Sulphuric acid

2. Which of the following salts has no water of crystallization?

a) Copper sulphate

b) Washing soda

c)Baking soda

d) Gypsum

3.The formula of baking soda is

a) NaCl

b) KHCO3

c) NaHCO3

d) Na2CO3

4.Which of the following is treated with chlorine to obtain bleaching powder

a) Ca SO4

b) Ca (OH)2

c) Mg (OH)2

d) KOH

VERY SHORT ANSWER TYPE QUESTIONS

1. Name an olfactory indicator?

2. The pH of an aqueous solution decreases from 3 to 2. What will happen to the nature of the solution ?

3. A cloth strip dipped in onion juice is used for testing a liquid ‘X. The liquid ‘X changes its odour. Which type of an indicator is onion juice?

4. Which bases are called alkalies? Give an example.

5. A milkman adds a very small amount of baking soda to fresh milk. Why?

6. Name the hardest substance in the body.

7. Acidic and basic solutions in water conduct electricity. Why?

SHORT ANSWER TYPE QUESTIONS

1. With the help of an example explain what happens when a base reacts with a non-metallic oxide. What do you infer about the nature of non-metal Oxide?

2. An old man complained of acute pain in stomach. Doctor gave him a small antacid tablet and he got immediate relief. What actually happened?

3. A gas X reacts with lime water and forms a compound Y which is used as a bleaching agent in the chemical industry. Identify X and Y. Give the chemical equation of the reaction involved.

4. A doctor applied surgical bandages on the fractured bones of a patient after making it wet. What changes are likely to occur?

5. A sample of bleaching powder was kept in an airtight container. After a month, it lost some of its chlorine content. How will you account for it?

6. Salt A commonly used in bakery products on heating gets converted into another salt B which itself is used for removal of hardness of water and a gas C is evolved. The gas C when passed through lime water, turns it milky. Identify A, B and C.

7. When electricity is passed through a common salt solution, sodium hydroxide is produced along with the liberation of two gases ‘X’ and T. The gas ‘X’ burns with a pop sound whereas T is used for disinfecting drinking water.

(i) Identify X and Y.

(ii) Give the chemical equation for the reaction stated above.

(iii) State the reaction of Y with dry slaked lime.

8. Mohan and Priyanka were playing in the garden. Priyanka was stung by a bee and started crying and returned home. Her mother immediately observed the affected area and applied a thin coating of toothpaste as first aid, then took her to the nearest doctor.

(i) Why did Priyanka cry?

(ii) Name the chemical substance present in bee sting.

(iii) How is toothpaste effective in such an incident?

9. Fresh milk has pH of 6. When it changes to curd, will its pH value increase or decrease? Why?

10. The oxide of a metal M was water soluble. When a blue litmus trip was dipped in this solution, it did not undergo any change in colour .Predict the nature of the oxide.

LONG ANSWER TYPE QUESTIONS

1 (a) Name the raw materials used in the manufacture of Sodium carbonate in Solvay process?

(b) How is sodium bi carbonate formed during the Solvay process separated from a mixture of NH_4Cl and $NaHCO_3$?

(c)How is sodium carbonate obtained from Sodium bi Carbonate?

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

(b) How does the concentration of hydrogen ion changes the solution of an acid is diluted with water?

(c) Which has a higher pH value ; a concentrated or dilute HCl?

(d) What would you observe on adding dilute HCl to

(i) Sodium bicarbonate placed in a test tube.

(ii) Zinc metal in a test tube.

ANSWERS:

MULTIPLE CHOICE QUESTIONS

1 C

2 C

3 C

4 B

5 D

6 C

7 A

8 A

9 D

10 C

ASSERTION AND REASON QUESTIONS

1 B

2 A

3 A

4 C

5 C

CASE STUDY BASED QUESTIONS

1

i) C

ii) B

iii) D

iv) A

2

i) B

ii) D

iii) C

iv) B

v) B

3

i) B

ii) C

iii) C

iv) B

VERY SHORT ANSWER TYPE QUESTIONS

Q.1. Name an olfactory indicator?

Ans- Onion

Q.2. The pH of an aqueous solution decreases from 3 to 2. What will happen to the nature of the solution ?

Ans- The acidic character of the solution will further increases.

Q.3. A cloth strip dipped in onion juice is used for testing a liquid ‘X. The liquid ‘X changes its odour. Which type of an indicator is onion juice?

Ans - Olfactory indicator

Q.4. Which bases are called alkalies? Give an example.

Ans - Water soluble bases are called alkalies. e.g.- NaOH

Q.5. A milk man adds a very small amount of baking soda to fresh milk. Why?

Ans- It is done to prevent the formation of lactic acid which spoils the milk.

Q.6. Name the hardest substance in the body.

Ans- Tooth enamel (Calcium phosphate).

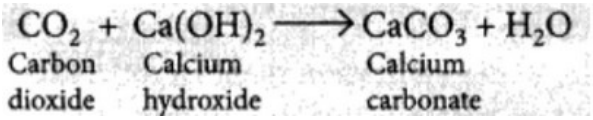
Q.7. Acidic and basic solutions in water conduct electricity. Why?

Ans- Because they produce hydrogen and hydroxide ions respectively.

SHORT ANSWER TYPE QUESTIONS

1 With the help of an example, explain what happens when a base reacts with a non- metallic oxide. What do you infer about the nature of non-metal oxide?

Ans: Oxides of non-metals react with bases to form salt and water. For example, the reaction between carbon dioxide and calcium hydroxide. Calcium hydroxide, which is a base, reacts with carbon dioxide to produce salt and water. Hence, oxides of non-metals are acidic in nature.



2 An old man complained of acute pain in stomach. Doctor gave him a small antacid tablet and he got immediate relief. What actually happened?

Ans: The old man was suffering from acute acidity. Antacid tablet contains NaHCO3. It reacts with the acid HCl formed because of acidity and neutralizes its effect.

3. **A gas X reacts with lime water and forms a compound Y which is used as a bleaching agent in the chemical industry. Identify X and Y. Give the chemical equation of the reaction involved.**

Ans: X is chlorine Y is CaOCl2 (calcium oxychloride) used as bleaching agent.

Ca (OH) 2+ Cl2 ----------CaOCl2 +H2O

4. A doctor applied surgical bandages on the fractured bones of a patient after making it wet. What changes are likely to occur?

Ans: Surgical bandages are made from plaster of Paris. When applied on the fractured bones after making them wet , it changes into a hard mass called Gypsum.

CaSO4.1/2 H2O + 3/2 H2O------- CaSO4.2H2O

5. A sample of bleaching powder was kept in an airtight container. After a month, it lost some of its chlorine content. How will you account for it?

Ans: Bleaching powder if kept even in an air tight container will slowly decompose of its own and form calcium chlorate and calcium chloride. The reaction is called auto oxidation. This will result in decrease in its Chlorine contents.

6CaOCl2 -----Ca(ClO3)2 + 5CaCl2

6. Salt A commonly used in bakery products on heating gets converted into another salt B which itself is used for removal of hardness of water and a gas C is

evolved. The gas C when passed through lime water, turns it milky. Identify A, B and C.

Ans: Baking soda is a salt used in bakery products. It gives sodium carbonate and carbon dioxide gas on heating. Sodium carbonate is used to remove the hardness of water. Carbon dioxide turns lime water milky. Therefore,

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

• Salt A is sodium bicarbonate

• Salt B is sodium carbonate, which is used to remove hardness of water.

• The C is carbon dioxide gas which turns lime water milky.

7. When electricity is passed through a common salt solution, sodium hydroxide is produced along with the liberation of two gases 'X' and T. The gas 'X' burns with a pop sound whereas T is used for disinfecting drinking water.

(i) Identify X and Y.

(ii) Give the chemical equation for the reaction stated above.

(iii) State the reaction of Y with dry slaked lime.

Ans:

(i) The gas X' is H2 and gas 'Y' is Cl2.

(ii) The chemical equation for the reaction is:

$$2NaCl(aq) + 2H_2O(l) \xrightarrow{(Electric\ current)} 2NaOH\ (aq) + H_2(g) + Cl_2(g)$$

(iii) Cl2 reacts with slaked lime to form bleaching powder.

Ca (OH)2 + Cl2 → CaOCl2 + H2O

8. Mohan and Priyanka were playing in the garden. Priyanka was stung by a bee and started crying and returned home. Her mother immediately observed the affected area and applied a thin coating of toothpaste as first aid, then took her to the nearest doctor.

(i) Why did Priyanka cry?

(ii) Name the chemical substance present in bee sting.

(iii) How is toothpaste effective in such an incident?

9. Fresh milk has a pH of 6. When it changes to curd, will its pH value increase or decrease? Why?

Ans- When fresh milk changes to curd, the pH of the solution is likely to decrease. Actually, lactose present in milk gets converted to lactic acid when curd is formed from milk. Therefore, the medium becomes more acidic and its pH decreases.

10. The oxide of a metal M was water soluble. When a blue litmus trip was dipped in this solution, it did not undergo any change in colour .Predict the nature of the oxide.

Ans- The metal oxide (MO) is of basic in nature. It dissolves in water to from metal hydroxide as follow.

MO + H2O-----M(OH)2

A blue litmus does not undergo any change in color in the basic medium.

LONG ANSWER TYPE QUESTIONS

1 (a) Name the raw materials used in the manufacture of Sodium carbonate in Solvay process?

(b) How is sodium bi carbonate formed during the Solvay process separated from a mixture of NH4Cl and NaHCO3?

(c)How is sodium carbonate obtained from Sodium bi Carbonate?

Ans- (a) The raw materials used are: NaCl, Lime stone or CaCO3 and NH3

(b) NaHCO3 is sparingly soluble or less soluble in water and gets separated as a precipitate while NH4Cl remains in solution. The filtrate is removed by filtration.

(c) NaHCO3 is converted to sodium carbonate upon heating.

2NaHCO3 ---- Na2CO3 + H2O + CO2

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

(b) How does the concentration of hydrogen ion changes the solution of an acid is diluted with water?

(c) Which has a higher pH value ; a concentrated or dilute HCl?

(d) What would you observe on adding dilute HCl 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 dissociates to give ions. Since current is carried by the movements of ions, a.q. solution of acid conduct electricity.

(b) Upon dilution, more of acid dissociates into ions Therefore concentration of hydrogen ion increases.

(c) Although more H+ ions are formed upon dilution , but the number of ions per unit volume decrease. Therefore, pH will increase upon dilution.

(d) (i) CO_2 gas would evolve accompanied by brisk effervescences.

$NaHCO_3 + HCl$ ------$NaCl + CO_2 + H_2O$

(ii) Hydrogen gas would evolve accompanied by brisk effervescences.

$Zn + 2HCl$ --- $ZnCl_2 + H_2$