

CHAPTERWISE QUESTION

ACIDS, BASES AND SALTS

CLASS X

Time : 1½ hrs.

SET A

Mark : 40

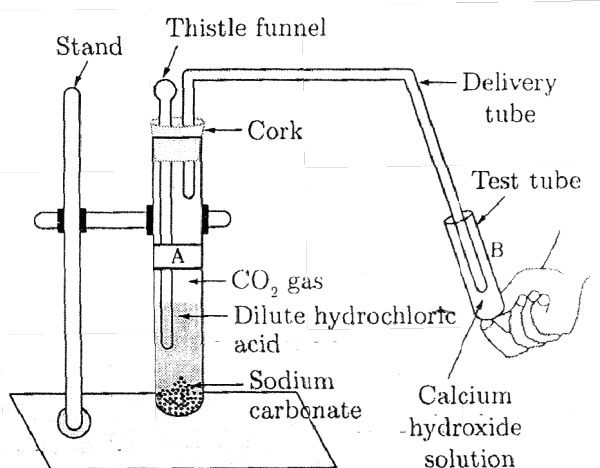
SECTION - A OBJECTIVE TYPE

8 × 1 = 8

1. When aqueous sodium carbonate (Na_2CO_3) reacts with $\text{HCl}(\text{aq})$, it gives
 - a) NaOH , $\text{H}_2(\text{g})$ and $\text{CO}_2(\text{g})$
 - b) NaCl , H_2O and $\text{CO}_2(\text{g})$
 - c) NaHCO_3 , $\text{H}_2(\text{g})$ and $\text{CO}_2(\text{g})$
 - d) NaHCO_3 , H_2O and $\text{CO}_2(\text{g})$
2. Which of the following is (are) true when $\text{HCl}(\text{g})$ is passed through water?
 - i. It does not ionise in the solution as it is a covalent compound
 - ii. It ionizes in the solution
 - iii. It gives both hydrogen and hydroxyl ion in the solution
 - iv. It forms hydronium ion in the solution due to the combination of hydrogen ion with water molecule
 - a) Only i
 - b) Only iii
 - c) ii and iv
 - d) iii and iv

3. A student takes two test tubes A and B and arrange the test tubes according to the figure.

Student takes about 0.5 g of sodium carbonate (Na_2CO_3) in test tube A and about 0.5 g of sodium hydrogen carbonate (NaHCO_3) in test tube B. After this student add about 2 ml of dilute HCl to both the test tubes.



Which of the following gas is evolved in this experiment?

- a) Carbon dioxide
 - b) Carbon monoxide
 - c) Oxygen
 - d) Carbon chloride
4. Arrange the following acids on their basicity in the table :

A = H_2SO_4 , B = HNO_3 , C = H_3PO_4

Type of acid	Acid
1. Monobasic	
2. Dibasic	
3. Tribasic	

- a) 1-A, 2-B, 3-C
- b) 1-C, 2-B, 3-A
- c) 1-A, 2-C, 3-B
- d) 1-B, 2-A, 3-C

5. To a sample of turmeric adulterated with metanil yellow, concentrated hydrochloric acid was added. The colour of the reaction mixture.
 - a) became green
 - b) became blue
 - c) remained the same
 - d) disappeared
6. In an experiment to study the properties of acetic acid, a student takes about 2 ml of acetic acid in a dry test tube. He adds about 2 ml of water to it and shakes the test tube well. What will he observe?
 - a) The acetic acid dissolves readily in water
 - b) The solution becomes light orange
 - c) Water floats over the surface of acetic acid
 - d) Acetic acid floats over the surface of water
7. Which of the following statement is incorrect for acids?
 - a) They give pink colour with phenolphthalein
 - b) They give H^+ ions in water
 - c) They are sour in taste
 - d) They turn blue litmus red
8. A metal carbonate X on treatment with a mineral acid liberates a gas which when passed through an aqueous solution of a substance Y on reaction with the gas obtained at anode during electrolysis of brine gives a compound Z which can decolourise coloured fabrics. The compounds X, Y and Z respectively are
 - a) $CaCO_3$, $Ca(OH)_2$, $CaOCl_2$
 - b) $Ca(OH)_2$, CaO , $CaOCl_2$
 - c) $CaCO_3$, $CaOCl_2$, $Ca(OH)_2$
 - d) $Ca(OH)_2$, $CaCO_3$, $CaOCl_2$

In the following questions (No. 9-10) a statement of Assertion followed by a statement of Reason is given. Choose the correct answer out of the following choices. $2 \times 1 = 2$

- a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
 - b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
 - c) Assertion is true but reason is false
 - d) Assertion is false but reason is true.
9. Assertion (A) : Salts are the products of an acid-base reaction.
Reason (R) : Salt may be acidic or basic.
 10. Assertion (A) : The process of dissolving an acid or a base in water is a highly exothermic one.
Reason (R) : Water must always be added slowly to acid with constant stirring.

SECTION - B

11. A white chemical compound becomes hard on mixing proper quantity of water. It is also used to maintain joints in fixed position. Name the chemical compound and write its chemical formula. Write the chemical equation to show what happens when water is added to this compound in proper quantity. **2**
12. a) Write the name given to the bases that are highly soluble in water. Give an example.
b) Why does bee sting causes pain and irritation? Rubbing of baking soda on the sting area gives relief. How? **2**
13. An aqueous solution of sodium chloride is neutral but an aqueous solution of sodium metal is basic. Justify the statement. **2**

OR

State in brief the preparation of washing soda from baking soda. Write balanced chemical equation of the reaction involved.

SECTION - C

14. pH has a great importance in our daily life. Explain by giving three examples. **3**
15. Answer the following questions :
a) State the colour of phenolphthalein in soap solution.
b) Name the by-product of chlor-alkali process which is used for the manufacture of bleaching powder.
c) Name one indicator which specifies the various levels of H^+ ion concentration. **3**
16. What is neutralisation reaction? Give two examples. **3**

OR

Name the products formed in each case when :

- a) Hydrochloric acid reacts with caustic soda
b) Granulated zinc reacts with caustic soda
c) Carbon dioxide is passed through lime water
17. A student prepared solutions of (i) an acid and (ii) a base in two separate beakers. She forgot to label the solutions and litmus paper is not available in the laboratory. Since, both the solutions are colourless, how will she distinguish between the two? **3**
18. In one of the industrial processes for manufacture of sodium hydroxide, a gas X is formed as by-product. The gas X reacts with lime water to give a compound Y which is used as a bleaching agent in chemical industry. Identify X and Y giving the chemical equation of the reactions involved. **3**

SECTION - D

19. State the reason for the following statements :

- a) Tap water conducts electricity whereas distilled water does not.
- b) Dry hydrogen chloride gas does not turn blue litmus red whereas dilute hydrochloric acid does.
- c) During summer season, a milk man usually adds a very small amount of baking soda to fresh milk.
- d) For dilution of an acid, acid is added to water and not water to acid.
- e) Ammonia is a base but it does not contain hydroxyl group.

5

OR

- a) Explain why is hydrochloric acid a strong acid and acetic acid, a weak acid. How can it be verified?
- b) Explain why aqueous solution of an acid conducts electricity?
- c) You have four solutions A, B, C and D. The pH of solution A is 6, B is 9, C is 12 and D is 7.
 - i) Identify the most acidic and most basic solutions respectively.
 - ii) Arrange the above four solutions in the increasing order of H^+ ion concentration.
 - iii) State the change in colour of pH paper on dipping in solution C and D.

SECTION - E - (COMPETING BASED QUESTIONS)

20. Read the following and answer the questions.

4 × 1 = 4

A compound 'X' of sodium forms a white powder. It is a constituent of baking powder and is used in some antacids. When heated it gives a compound 'Y' which is anhydrous and absorbs water to become a hydrated salt. When this salt is kept in open air, it loses water molecules in a process called efflorescence. When dissolved in water it forms a strong base and a weak acid 'Z'.

- i) What is the compound Z and Y?
- ii) What is the nature of the solution formed by dissolving Y in water?
- iii) Identify the compound Z.
- iv) Sodium Carbonate is a basic. Why?

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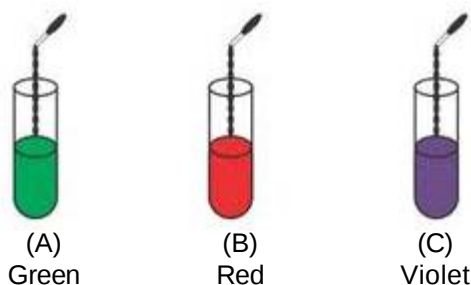
SET B

Mark : 40

SECTION - A OBJECTIVE TYPE

8 × 1 = 8

- An acid (A) with sodium hydrogen carbonate is used in making the cakes fluffy and spongy. It is due to the release of (B) gas in the reaction. Here, A and B are :
 - A : Oxalic acid : B : CO₂
 - A : Tartaric acid : B : O₂
 - A : Succinic acid : B : H₂
 - A : Tartaric acid : B : CO₂
- Identify the correct representation of reaction occurring during chlor-alkali process.
 - $2\text{NaCl}_{(l)} + 2\text{H}_2\text{O}_{(l)} \rightarrow 2\text{NaOH}_{(l)} + \text{Cl}_{2(g)} + \text{H}_{2(g)}$
 - $2\text{NaCl}_{(aq)} + 2\text{H}_2\text{O}_{(aq)} \rightarrow 2\text{NaOH}_{(aq)} + \text{Cl}_{2(g)} + \text{H}_{2(g)}$
 - $2\text{NaCl}_{(aq)} + 2\text{H}_2\text{O}_{(l)} \rightarrow 2\text{NaOH}_{(aq)} + \text{Cl}_{2(aq)} + \text{H}_{2(aq)}$
 - $2\text{NaCl}_{(aq)} + 2\text{H}_2\text{O}_{(l)} \rightarrow 2\text{NaOH}_{(aq)} + \text{Cl}_{2(g)} + \text{H}_{2(g)}$
- On adding a few drops of universal indicator to three unknown colourless solutions (A), (B) and (C), taken separately in three test tubes shown in the following diagrams, a student observed the changes in colour as green in (A), red in (B) and violet in (C).



The decreasing order of pH of the solutions taken is

- A > B > C
 - C > A > B
 - B > A > C
 - C > B > A
- Which of the following pair is not correct?

Acid	Example
a) Monobasic acid	HNO ₃
b) Dibasic acid	H ₃ PO ₃
c) Tribasic acid	H ₃ PO ₄
d) Monobasic acid	H ₂ SO ₄

- Which one of the following is used for bleaching cotton and linen in textile industry?
 - Caustic soda
 - Bleaching powder
 - Baking soda
 - Washing soda

6. In a locality, hard water, required for an experiment, is not available. However, the following salts are available in the school laboratory.

- | | |
|-------------------------|------------------------|
| i. Sodium sulphate | ii. Calcium sulphate |
| iii. Magnesium chloride | iv. Sodium chloride |
| v. Calcium chloride | vi. Potassium sulphate |

Which of the above may be dissolved in water to obtain hard water for the experiment?

- a) ii, iii and v b) i, ii and v c) i, ii, iv and vi d) iii and v only

7. Which of the following is not true for acids?

- a) Acid react with copper (II) oxide to produce a blue solution
- b) Acid liberate carbon dioxide gas when reacted with sodium carbonate
- c) Acid liberate hydrogen gas when reacted with magnesium ribbon
- d) Acid produces hydrogen molecules when dissolved in water

8. A silvery white metal 'X' reacts with water at room temperature to produce a water soluble compound 'Y' and a colourless gas 'Z'. The reaction is highly exothermic and the 'Z' catches fire immediately during the reaction. The solution of 'Y' in water on reacting with stoichiometric amount of dilute solution of hydrochloric acid gives a solution of pH = 7.0. The compounds 'X', 'Y' and 'Z' respectively are :

- | | |
|---|--------------------------------|
| a) Al, Al(OH) ₃ and H ₂ | b) Ag, AgOH and H ₂ |
| c) K, KCl and H ₂ | d) Na, NaOH and H ₂ |

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- c) Assertion is true but reason is false.
- d) Assertion is false but reason is true.

9. Assertion (A) : Plaster of Paris is used by doctors by setting fractured bones.

Reason (R) : When Plaster of Paris is mixed with water and applied around the fractured limbs, it sets into a hard mass.

10. Assertion (A) : Baking soda creates acidity in the stomach.

Reason (R) : Baking soda is alkaline.

SECTION - B

11. The pH of soil 'A' is 7.5, while that of soil 'B' is 4.5. Which of the two soils A or B should be treated with powdered chalk to adjust the pH and why? 2

12. A student detected the pH of four unknown solutions A, B, C and D as follows :
11, 5, 7 and 2. Predict the nature of these solutions. **2**
13. State the observations you would make on adding sodium hydroxide to an aqueous solution of
a) ferrous sulphate b) aluminium chloride **2**

OR

How do you distinguish between baking powder and washing soda by heating?

SECTION - C

14. 2 mL of sodium hydroxide solution is added to a few pieces of granulated zinc metal taken in a test tube. When the contents are warmed, a gas evolves which is bubbled through a soap solution before testing. Write the equation for the chemical reaction involved and the test to detect the gas. Name the gas which will be evolved when the same metal reacts with dilute solution of a strong acid. **3**
15. a) Define pH scale. Draw a figure showing variation of pH with change in concentration of $H^+(aq)$ and $OH^-(aq)$ ions.
b) Mention the pH of acidic, basic and neutral solutions respectively. **3**
16. a) The blue colour of crystals of a substance on heating in a closed test tube gets changed but the colour was regained after sometime on cooling. Name that substance and write its chemical formula. Explain the phenomenon involved.
b) Write name and chemical formulae of two such compounds whose one unit is associated with ten and two water molecules respectively. **3**

OR

A substance 'X' is used as antacid reacts with hydrochloric acid to produce a gas 'Y' which is used in fire extinguishers :

- a) Name the substance X and Y.
b) Write a balanced equation of the reaction between X and hydrochloric acid.
17. What are strong and weak acids? In the following list of acids, separate strong acids from weak acids.
Hydrochloric acid, citric acid, acetic acid, nitric acid, formic acid, sulphuric acid. **3**
18. For making cake, baking powder is taken. If at home your mother uses baking soda instead of baking powder in cake.

- a) How will it affect the taste of the cake and why?
- b) How can baking soda be converted into baking powder?
- c) What is the role of tartaric acid added to baking soda?

3

SECTION - D

19. Equal length of magnesium ribbon are taken in two test tubes A and B. H_2SO_4 is added to test tube 'A' and H_2CO_3 is added in test tube 'B' in equal amounts :

- a) Identify the test tube showing vigorous reaction.
- b) Give reason to support your answer.
- c) Name the gas liberated in both the test tubes. How will you prove its liberation?
- d) Write chemical equations for both the reactions.
- e) Out of two acids taken above, which one will have lower pH value and lower H^+ ion concentration respectively?

5

OR

- a) Dry pellets of a base 'X' when kept in open absorbs moisture and turns sticky. The compound is also formed by chlor-alkali process. Write the chemical name and formula of X. Describe chlor-alkali process with balanced chemical equations. Name the type of reaction occurs when X is treated with dilute hydrochloric acid. Write the relevant chemical equation.
- b) While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid?

SECTION - E - (COMPETING BASED QUESTIONS)

20. Read the following and answer the questions.

4 × 1 = 4

Take solutions of glucose, alcohol, hydrochloric acid, sulphuric acid, etc. Fix nails on a cork and place the cork in a 100 mL beaker. Connect the nails to the two terminals of a 6 volt battery through a bulb and a switch. Now pour some dilute HCl in the beaker and switch on the current. Repeat with dilute sulphuric acid. Repeat the experiment separately with glucose and alcohol solutions.

- i) What was the changes occur in case of acids i.e., HCl, H_2SO_4 ?
- ii) Why do glucose and alcohol do not conduct electricity?
- iii) Why do acids do not show acidic behaviour in absence of water?
- iv) Does rain water or distilled water will conduct electricity?

OR

Why do aqueous solution of acids conduct electricity?