

CHEMISTRY

BOOKS - ZEN CHEMISTRY (KANNADA ENGLISH)

ACIDS, BASES, AND SALTS

Questions Sections In Text Questions

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

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2. Why should curd and sour substances not be kept in brass and copper vessels ?

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3. 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 ?

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4. Metal compound A reacts with dilute hydrochloric acid to produce effervescence. The gas evolved extinguishes a burning candle. Write a balanced chemical equation for the reaction if one of the compounds formed is calcium chloride.

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

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

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7. Why does dry HCl gas not change the colour of the dry litmus.

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

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

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

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11. 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 ion concentration ? Which of this is acidic and which one is basic ?

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12. What effect does the concentration of H^+ (aq) ions have on the nature of the solution ?

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13. Do basic solutions also have H^+ aq ion ? If yes, then why are these basic ?

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14. Under what soil condition do you think a farmer would treat the soil of his fields with quick lime (calcium oxide) or slaked lime (calcium hydroxide) or chalk (calcium carbonate) ?

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15. Agricultural scientists have suggested to add a certain amount of lime powder to an agricultural field. What may be the reason for this ? Explain.

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

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

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

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

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20. Write an equation to show the reaction between Plaster of Paris and water.

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Questions Sections Textual Exercise

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

A. 1

B. 4

C. 5

D. 10

Answer: D

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2. A solution reacts with crushed egg-shells to give a gas that turns lime-water milky.

The solution contains

A. NaCl

B. HCl

C. LiCl

D. KCl

Answer: B



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3. 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 20 mL of

the same solution of NaOH, the amount HCl solution (the same solution as before) required to neutralise it will be

- A. 4 mL
- B. 8 mL
- C. 12 mL
- D. 16 mL

Answer: D

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

- A. Antibiotic
- B. Analgesic

C. Antacid

D. Antiseptic

Answer: C

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5. 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 aluminium powder

D. dilute hydrochloric acid reacts with iron filings.

Answer:

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6. Compounds such as alcohols and glucose also contain hydrogen but are not categorised as acids. Describe an Activity to prove it.

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

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8. Why do acids not show acidic behaviour in the absence of water ?

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9. Five solutions A, B, C, D and E when tested with universal indicator show 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 ?

Arrange the pH in increasing order of hydrogen ion concentration.

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10. 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 (CH_3COOH) is added to test tube B. Amount of concentration taken for both acids are same. In which test tube will the fizzing occur more vigorously and why ?



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



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12. 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 ?



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13. Plaster of Paris should be stored in a moisture-proof container.

Explain why ?

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

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15. Give two important uses to washing soda and baking soda.

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Zen Additional Questions Sections Multiple Choice Questions

1. A student prepared 20% NaOH solution in a beaker containing water. The observations made by him are as follows :

- (i) NaOH are in the form of pellets.
- (ii) It dissolves readily in water.
- (iii) The beaker appears cold from outside.
- (iv) Red litmus paper turns blue when dipped in the solution.

The correct observations are :

- A. i,ii,iii
- B. i,iv,iii
- C. iii, iv,i
- D. i,ii and iv

Answer: D



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2. In an experiment to test the pH of a given sample using pH paper, four students recorded the following observations :

	Sample taken	pH paper colour turned to
i	Water	Blue
ii	Dilute HCl	Red
iii	Dilute NaOH	Blue
iv	Dilute ethanoic acid	Orange

Which one of the observations is correct ?

- A. i
- B. ii
- C. iii
- D. iv

Answer: C



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3. When a student added zinc granules to dilute HCl, a colourless and odourless gas was evolved. When it was tested with a burning match stick, it was observed that :

- A. The match stick continued to burn brilliantly
- B. The match stick burnt slowly with a blue flame
- C. The match stick extinguished and the gas burnt with pop sound
- D. The match stick burnt with an orange flame

Answer: C

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4. On adding acetic acid to $NaHCO_3$ in a test tube, a student observes

- A. No reaction
- B. A colourless gas has with pungent smell
- C. Bubbles of a colourless and odourless gas
- D. A strong smell of vinegar.

Answer: C

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5. Select the correct pair of properties of acetic acid.

- A. Smell-like vinegar, turns red litmus to blue
- B. Smell-like vinegar, turns blue litmus to red
- C. Smell-like orange, turns red litmus to red
- D. Smell-like orange, turns red litmus to blue

Answer: B

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6. An aqueous solution turns red litmus solution blue. Excess addition of which of the following solution would reverse the change ?

- A. Baking powder
- B. Lime
- C. Ammonium hydroxide solution
- D. Hydrochloric acid

Answer: D

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7. During the preparation of hydrogen chloride gas on a humid day, the gas is usually passed through the guard tube containing calcium chloride. The role of calcium chloride taken in the guard tube is to

- A. absorb the evolved gas
- B. moisten the gas
- C. absorb moisture from the gas
- D. absorb Cl^- ions from the evolved gas

Answer: C

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8. Which of the following salts does not contain water of crystallisation ?

- A. Blue vitriol
- B. Baking soda
- C. Washing soda
- D. Gypsum

Answer: B

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

- A. strong acid and strong base
- B. weak acid and weak base
- C. strong acid and weak base
- D. weak acid and strong base

Answer: D

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10. Calcium phosphate is present in tooth enamel. Its nature is

- A. basic
- B. acidic
- C. Neutral
- D. amphoteric

Answer: A

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11. A sample of soil is mixed with water and allowed to settle. The clear supernatant solution turns the pH paper yellowish-orange. Which of the following would change the colour of this pH paper to greenish-blue ?

- A. Lemon juice
- B. Vinegar
- C. Common salt
- D. An antacid

Answer: D



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12. Which of the following gives the correct increasing order of acidic strength ?

A. Water < Acetic acid < Hydrochloric acid

B. Water < Hydrochloric acid < acetic acid

C. Acetic acid < Water < Hydrochloric acid

D. Hydrochloric acid < Water < Acetic acid

Answer: A



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13. If a few drops of a concentrated acid accidentally spills over the hand of a student, what should be done ?

A. a)Wash the hand with saline solution

B. b)Was the hand immediately with plenty of water and apply
a paste of sodium hydrogencarbonate

C. c)After washing with plenty of water apply solution of sodium hydroxide on the hand

D. d)Neutralise the acid with a strong alkali

Answer: B

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14. One of the constituents of baking powder is sodium hydrogencarbonate, the other constituent is

A. a)hydrochloric acid

B. b)tartaric acid

C. c)acetic acid

D. d)sulphuric acid

Answer: B

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15. To protect tooth decay we are advised to brush our teeth regularly. The nature of the tooth paste commonly used is

- A. a)acidic
- B. b)neutral
- C. c)basic
- D. d)corrosive

Answer: C

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16. The pH of the gastric juices released during digestion is

A. a)less than 7

B. b)more than 7

C. c)equal to 7

D. d)equal to 0

Answer: A



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17. Which one of the following can be used as acid-base indicator by a visually impaired student ?

A. a)Litmus

B. b)Turmeric

C. c)Vanilla essence

D. d)Petunia leaves

Answer: C

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18. Which of the following substance will not give carbon dioxide on treatment with dilute acid ?

A. a)Marble

B. b)Limestone

C. c)Baking soda

D. d)Lime

Answer: D

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19. Which of the following is acidic in nature ?

- A. a)Lime juice
- B. b)Human blood
- C. c)Lime water
- D. d)Antacid

Answer: A

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20. Which of the following is used for dissolution of gold ?

- A. a)hydrochloric acid
- B. b)Sulphuric acid

C. c)Nitric acid

D. d)Aqua regia

Answer: D

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21. Which of the following is not a mineral acid ?

A. a)hydrochloric acid

B. b)Citric acid

C. c)Sulphuric acid

D. d)Nitric acid

Answer: B

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22. Which among the following is not a base ?

A. a)NaOH

B. b)KOH

C. c) NH_4OH

D. d) C_2H_5OH

Answer: D



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23. Which of the following statements is not correct ?

A. a)All metal carbonates react with acid to give a salt, water and carbon dioxide

B. b)All metal oxides react with water to give salt and acid

C. c)Some metals react with acids to give salt and hydrogen

D. d)Some non-metal oxides reacts with water to form an acid

Answer: B

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24. Equal volumes of hydrochloric acid and sodium hydroxide solutions of same concentration are mixed and the pH of the resulting solution is checked with a pH paper. What would be the colour obtained ? (You may use colour guide given in the Exemplar book.)

A. a)Red

B. b)Yellow

C. c)Yellowish green

D. d)Blue

Answer: C

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25. Which of the following statements is true for acids ?

A. a)Bitter and change red litmus to blue

B. b)Sour and change red litmus to blue

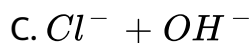
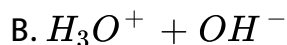
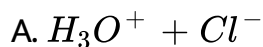
C. c)Sour and change blue litmus to red

D. d)Bitter and change blue litmus to red

Answer: C

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26. Which of the following are present in dilute aqueous solution of hydrochloric acid ?



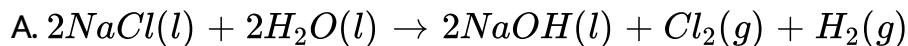
D. unionised HCl

Answer: A

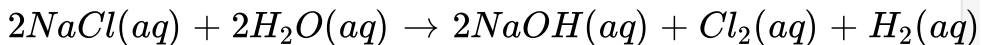


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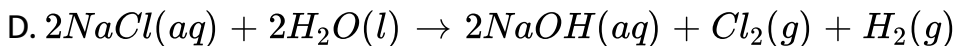
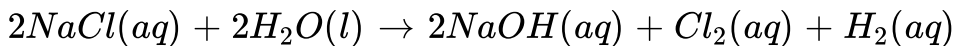
27. Identify the correct represents of reaction occurring during chloralkali process



B.



C.



Answer: D



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28. As the pH value of a neutral solution increases

A. a) basic property decreases and number of OH^- ions increases

B. b) acidic property increases and number of H^+ ions decreases

C. c)basic property increases and number of OH^- ions increases

D. d)acidic property decreases and number of H^+ ions increases.

Answer: C

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Zen Additoinal Questions Sections Very Short Answer Type Questions

1. How will you test for the gas which is liberated when hydrochloric acid reacts with an active metal ?

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2. A student finds the pH of a sample of vegetable soup was 6.5.

How is this soup likely to taste ?

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3. Which bases are called alkalies ? Give an example for alkali.

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4. Write the balanced chemical equation for the reaction between sodium carbonate and hydrochloric acid indicating the physical states of reactants and products.

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5. Which of the following is used for dissolution of gold ?



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Zen Additoinal Questions Sections Short Answer Type Questions I

1. How does the pH affects the curdling of milk ?



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2. Brushing teeth twice a day helps to have healthy habit. Why is it a good habit ?



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3. Classify the following salts as acidic, basic and neutral :
Potassium sulphate, ammonium chloride , sodium carbonate,

sodium chloride.

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4. When you add sodium hydrogen carbonate to acetic acid in a test tube, a gas liberates immediately with brisk effervescence.

Name this gas. Describe the method of testing this gas.

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5. Define water of crystallisation with two examples. How will you prove their existence in the examples given by you ?

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6. What is meant by water of Crystallisation ? How do you show that copper sulphate crystal contains water of crystallisation ?

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7. List any two uses of plaster of Paris.

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8. How are salts formed ? What determines their pH value in aqueous solutions ?

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9. Write the chemical formula of bleaching powder, How is bleaching powder prepared ? For what purpose it is used in drinking water ?

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10. A compound X of sodium is commonly used in kitchen for making Cripsy Pakoras. It is also used for curing acidity in the stomach. Identify X. What is its chemical formula. State the reaction which takes place when it is heated during cooking.

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11. A student prepared solution of (i) acid and (ii) base in two separate beakers but forgot to table the solution and litmus paper is not available in the lab. Since both solution are

colourless how will you distinguish between there using (a) phenolphthalein (b) methyl orange.

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12. Name the acids present in

(i) Tomato (ii) Vinegar (iii) Tamarind.

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13. 15 ml of water and 10 ml of Sulphuric acid are mixed in a beaker.

(i) State the method that should be followed with reason.

(ii) What is the process called ?

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

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15. Write the chemical formula of washing soda. How is it obtained from baking soda? Name one use of washing soda, other than washing clothes.

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16. While eating food, you spill some curry on your shirt. You immediately scrub with soap, what happens to its yellow colour on scrubbing with soap? What happens to the stain when the shirt is washed with plenty of water?



17. Match the acids given in Column (A) with their correct source given in Column (B)

Column (A)

- a] Lactic acid
- b] Acetic acid
- c] Citric acid
- d] Oxalic acid

Column (B)

- i] Tomato
- ii] Lemon
- iii] Vinegar
- iv] Curd

18. Match the important chemicals given in Column (A) with the chemical formulaw given in Column (B)

Column (A)

- a] Plaster of Paris
- b] Gypsum
- c] Bleaching Powder
- d] Slaked Lime

Column (B)

- i] $\text{Ca}(\text{OH})_2$
- ii] $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$
- iii] $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
- iv] CaOCl_2

19. Name the acid present in ant sting and give its chemical formula. Also give the common method to get relief from the discomfort caused by the ant sting.

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20. What happens when nitric acid is added to egg shell ?

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21. How would you distinguish between baking powder and washing soda by heating ?

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22. There is no change in the colour of red litmus and blue litmus paper when introduced into an aqueous solution of sodium chloride. After passing direct current through the same solution, red litmus changes to blue colour. Which product is responsible for this change ? Mention any two uses of this product.



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23. Name the gas liberated when an acid reacts with metallic carbonate. Write the chemical equation of the reaction when this gas is passed through lime water. What is the colour of the precipitate obtained in this reaction ?



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24. Name the products of chlor-alkali process. Write one use of each.

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25. Draw the diagram of the apparatus to show that acid solution in water conducts electricity. Label the following parts :

(i) Dil, HCl solution (ii) Rubber cork.

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26. Draw the diagram of arrangement of the apparatus to show the reaction of zinc granules with blue sulphuric acid and testing hydrogen gas by burning. Label the following parts :

(i) Test tube (ii) Soap solution.

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Zen Additoinal Questions Sections Short Answer Type Questions li

1. When electricity is passed through a common salt solution, sodium hydroxide is produced along with the liberation of two gases X and Y. X burns with a pop sound whereas Y 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.

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2. How is baking powder formed ? List any two uses of baking powder.

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3. State what happens when :

(a) Gypsum is heated at $373K$

(b) Blue crystals of copper sulphate are heated

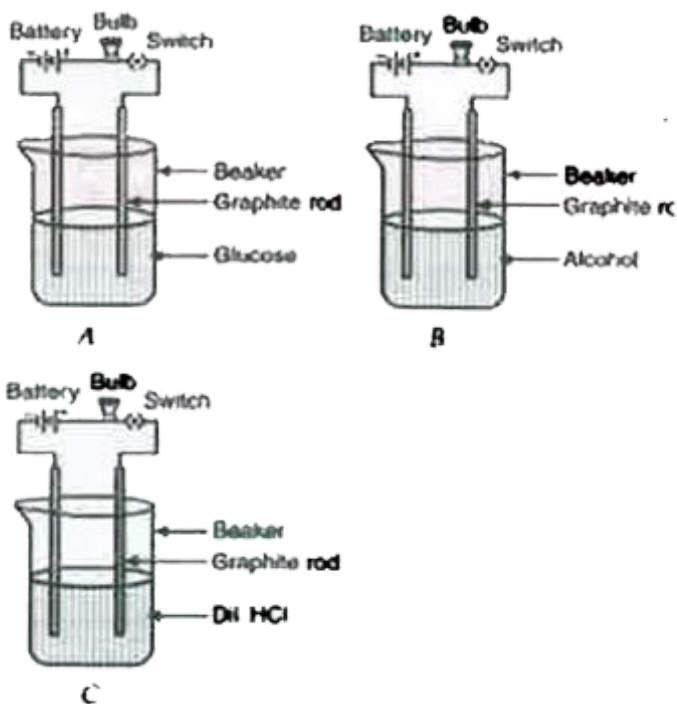
(c) Excess of CO_2 is passed through lime water.

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4. "pH has a great importance in our daily life". Explain by giving three examples.

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5. Observe the following set up :



(a) Which of the bulb glows ?

(b) Give reason for each of the case.

(c) What would be the change observed if the content of the beaker B is replaced by NaOH solution ?

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6. 2 ml of NaOH 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.

(i) Write the equation of the chemical reaction involved and the test to detect the gas.

(ii) Name the gas which will be evolved when the same metal reacts with dilute solution of a strong acid.

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7. The pH of a salt used to make tasty and crispy pakoras is 14. Identify the salt and write a chemical equation for its formation. List its two uses.

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8. A student adds a spoon full of powdered sodium hydrogen carbonate to a flask containing ethanoic acid. List two main observations he must note in his note book, about the reaction that takes place. Also write chemical equation for the reaction.

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9. You have two solutions A and B. the pH of solution A is 6 and pH of solution B is 8.

(a) Which solution is acidic and which is basic ?

(b) which solution has more H^+ concentration ?

(c) Why is HCl a stronger acid than acetic acid ?

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10. How the following substances will dissociate to produce ions in their solution ?

(i) Hydrochloric acid (iv) Sodium Hydroxide

(ii) Nitric acid (v) Potassium Hydroxide

(iii) Sulphuric acid (vi) Magnesium Hydroxide

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11. What is tooth enamel chemically ? State the condition when it starts corroding. What happens when food particles left in the mouth after eating degrades ? Why do doctor suggest the use of tooth powder/tooth paste to prevent tooth decay ?

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12. Answer the following :

What happens when crystals of washing soda are left open in dry air ?

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13. Name the change that takes place. Which two industries are based on the use of washing soda ?

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14. With the help of a balanced chemical equation, state the reaction that takes place when sodium hydrogen carbonate is heated during cooking.

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15. How is plaster of Paris chemically different from Gypsum ? How can they be inter -converted ? Write two uses of plaster of paris.

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16. Define olfactory indicators.

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17. Choose the strong acids, from the following

CH_3COOH , H_2SO_4 , H_2CO_3 , HNO_3

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18. Explain the action of dilute hydrochloric acid on the following with chemical equation.

(a) Magnesium ribbon (b) Sodium hydroxide

(c) Crushed egg shells

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19. On passing excess carbon dioxide gas through lime water, it first turns milky and then becomes colourless, explain why? Write all the chemical equation related to it.

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20. A white powder is added while baking bread and cakes to make them soft and fluffy. Write the name of the powder. Name its

main ingredients. Explain the function of each ingredient. Write the chemical reaction taking place when the powder is heated.

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21. What will be the action of the following substances on litmus paper ?

Dry HCl gas, Moistened NH_3 gas, Lemon juice, carbonated soft drink, Curd, Soap solution.

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22. 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.

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23. In one of the industrial processes used for manufacture of sodium hydroxide, a gas X is formed as byproduct. 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.

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24. Fill in the missing data in the reactions table :

Name of the salt	Formula	Salt obtained from	
		Base	Acid
i] Ammonium chloride	NH_4Cl	NH_4OH	
ii] Copper sulphate			H_2SO_4
iii] Sodium chloride	NaCl	NaOH	
iv] Magnesium nitrate	$\text{Mg}(\text{NO}_3)_2$		HNO_3
v] Potassium sulphate	K_2SO_4		
vi] Calcium nitrate	$\text{Ca}(\text{NO}_3)_2$	$\text{Ca}(\text{OH})_2$	

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25. 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.

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26. When zinc metal is treated with a dilute solution of a strong acid, a gas is evolved, which is utilised in the hydrogenation of oil. Name the gas evolved. Write the chemical equation of the reaction involved and also write a test to detect the gas formed.

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1. Name the substance that is produced from baking soda and is used in the removal of permanent hardness of water.

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2. Write the chemical formula of washing soda. How is it obtained from baking soda ? Name one use of washing soda, other than washing clothes.

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3. What happens when sodium metal is dropped in water?

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4. Plaster of Paris should be stored in a moisture-proof container.

Explain why ?

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

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

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7. 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 the most basic of the solutions.
- (ii) Arrange the above four solutions in the increasing order of the H^+ ion concentration.
- (iii) State the change in colour of pH paper on dipping in solution C and D.

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8. Name the chemical which is injected into the skin of a person :

- (a) During an ant's sting
- (b) During the nettle leaf sting.

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9. How can three resistors of resistances 2Ω , 3Ω and 6Ω be connected to give a total resistance of a] 4Ω . b] 1Ω ?

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10. How can the change in pH in the river water affect the living organisms ?

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11. State reasons for the following :

(a) Tap water conducts electricity, distilled water does not.

(b) Dry hydrogen chloride does not turn blue litmus to red where as 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 acid, acid is added into water and not water into acid.

(e) Ammonia is a base but does not contain hydroxyl group.

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12. 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 (CH_3COOH) is added to test tube B. Amount of concentration taken for both acids are same. In which test tube will the fizzing occur more vigorously and why?

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13. State the chemical properties on which the following uses of baking soda are based.

(i) as an antacid

(ii) as soda-acid fire extinguisher

(iii) To make bread and cake soft and spongy

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14. How washing soda is obtained from baking soda ? Write the balanced chemical equations.

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15. The pH value 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 pH ? Why ?

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16. Name the chemical which is injected into the skin of a person :

- (a) During an ant's sting
- (b) During the nettle leaf sting.

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17. How can the change in pH in the river water affect the living organisms ?

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18. Baking powder I used for baking. If your mother uses baking soda instead.

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



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19. A metal carbonate X on reacting with an acid gives a gas which when passed through a solution Y gives the carbonate back. On the other hand, a gas G that is obtained at anode during electrolysis of brine is passed on dry Y, gives a compound Z, Z is used for disinfecting drinking water. Identify X, Y, G and Z.



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20. A dry pellet of a common base B, when kept in open absorbs moisture and turns sticky. The compound is also a by-product of chloralkali process. Identify B. What type of reaction occurs when B is treated with an acidic oxide? Write a balanced chemical equation for one such solution.



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21. The pH of a salt used to make tasty and crispy pakoras is 14.

Identify the salt and write a chemical equation for its formation.

List its two uses.



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