



Textual Questions

1. Five solutions A, B, C, D and E when tested with universal indicator showed pH as 4, 1, 11, 7 and 9, respectively, which solution is (AS1)

(a) neutral (b) strongly alkaline (c) strongly acidic (d) weakly acidic (e) weakly alkaline

Arrange the pH in increasing order of hydrogen ion concentration.

- Ans:** (a) Solution D – Neutral
(b) Solution C – Strongly alkaline
(c) Solution B – Strongly acidic
(d) Solution A – Weakly acidic
(e) Solution E – Weakly alkaline

Increasing order of hydrogen ion concentration is $C < E < D < A < B$

2. What is a neutralization reaction? Give two examples. (AS1)

Ans: The reaction of an acid with a base to give a salt and water is known as a neutralization reaction.

Examples: 1) $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
2) $\text{Mg}(\text{OH})_2 + \text{H}_2\text{SO}_4 \rightarrow \text{MgSO}_4 + 2\text{H}_2\text{O}$

3. What happens when an acid or base is mixed with water? (AS1)

Ans: Decrease in the concentration of ions per unit volume

4. Why does tooth decay start when the pH of mouth is lower than 5.5? (AS1)

- Ans:** i) Tooth decay starts when the pH of the mouth is lower than 5.5.
ii) Tooth enamel, made of calcium phosphate is the hardest substance in the body.
iii) But is corroded when the pH in the mouth is below 5.5.
iv) Bacteria present in the mouth produce acids by degradation of sugar and food particles remaining in the mouth.
v) The best way to prevent this is to clean the mouth after eating food. Using tooth pastes, which are generally basic neutralize the excess acid and prevent tooth decay.

5. Why does not distilled water conduct electricity? (AS2)

Ans: In Distilled water, the concentration of both H_3O^+ and OH^- is same. Hence they do not form as ions, so distilled water can be treated as neutral solution. As there is no flow of ions, distilled water do not conduct electricity.

6. Why pure acetic acid does not conduct electricity ? (AS2)

Ans: Pure acetic acid not containing the H^+ ions. As there is no flow of ions, pure acetic acid do not conduct electricity.

7. A milkman adds a very small amount of baking soda to fresh milk. (AS2)

- 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?

Ans: a) When milkman adds a little baking soda to fresh milk to make it slightly alkaline. So the pH of the fresh milk shifts to 6. Thus the spoilage of milk can slow down.
b) Curd form from the milk by the action of lactic acid produced by bacteria in the milk. Then more lactic acid is needed to convert milk into curd. So it takes more time.

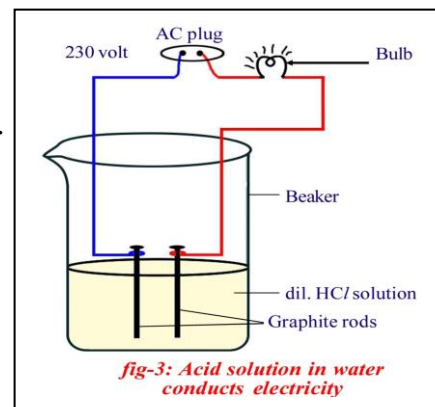
8. Plaster of Paris should be stored in moisture – proof container. Explain why? (AS2)

Ans: Plaster of Paris is a white powder and on mixing with water or presence of moisture, it sets into hard solid mass due to the formation of gypsum. So Plaster of Paris should be stored in moisture – proof container.

9. Compounds such as alcohols and glucose contain hydrogen but are not categorized as acids. Describe an activity to prove it. (AS3)

Ans: i) Prepare solutions of glucose, alcohol, hydrochloric acid and sulphuric acid etc.,

- ii) Connect two different coloured electrical wires to graphite rods separately in a 100 ml beaker as shown in figure.
- iii) Connect free ends of the wire to 230 volts AC plug and complete the circuit as shown in the fig by connecting a bulb to one of the wires.
- iv) Now pour some dilute HCl in the beaker and switch on the current.
- v) We observe that the bulb glows.
- vi) Repeat activity with dilute sulphuric acid and glucose and alcohol solutions separately.
- vii) You will notice that the bulb glows only in acid solutions but not in glucose and alcohol solutions.
- viii) Glowing of bulb indicates that there is flow of electric current through the solution. Acid solutions have ions and the movement of these ions in solution helps for flow of electric current through the solution.
- ix) The positive ion (cation) present in HCl solution is H^+ . This suggests that acids produce hydrogen ions H^+ in solution, which are responsible for their acidic properties.
- x) In glucose and alcohol solution the bulb did not glow indicating the absence of H^+ ions in these solutions. The acidity of acids is attributed to the H^+ ions produced by them in solutions.

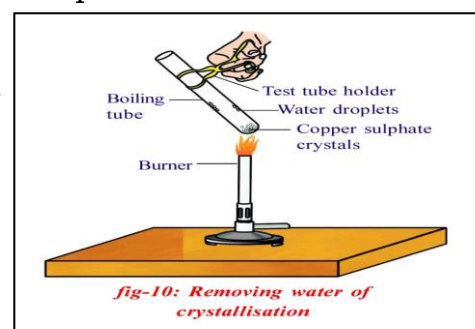


10. What is meant by “water of crystallization” of a substance? Describe an activity to show the water of crystallisation. (AS3)

Ans: Water of crystallization is the fixed number of water molecules present in one formula unit of a salt.

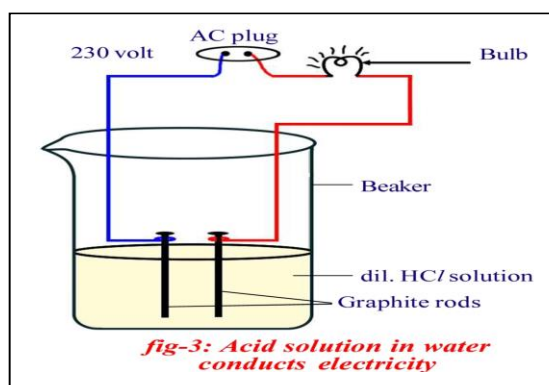
Activity:

- i) Take a few crystals of blue colour copper sulphate in a dry test tube and heat the test tube.
- ii) We observed that blue colour salt turns white and water droplets on the walls of the test tube.
- iii) Add 2-3 drops of water on the sample of copper sulphate obtained after heating.
- iv) We observed that blue colour of salt is restored.
- v) From this activity we conclude that some water molecules are fixed in the blue coloured copper sulphate crystals.



11. Draw a neat diagram showing acid solution in water conducts electricity. (AS5)

Ans:



12. How does the flow of acid rain into a river make the survival of aquatic life in a river difficult? (AS6)

Ans: When pH of rain water is less than 5.6, it is called acid rain. When acid rain flows in to the rivers, it lowers the pH of the river water, the survival of aquatic life in such rivers becomes difficult.

13. What is baking powder? How does it make the cake soft and spongy? (AS6)

Ans: Baking powder is a mixture of baking soda and tartaric acid. When baking powder is heated or mixed in water it liberates CO_2 gas. This CO_2 gas causes bread or cake to rise making them soft and spongy

14. Give two important uses of washing soda and baking soda. (AS6)

Ans: Uses of washing soda

- i) It is used in glass, soap and paper industries.
- ii) It is used in the manufacture of sodium compounds such as borax.
- iii) It is used as a cleaning agent for domestic purposes.
- iv) It is used for removing permanent hardness of water.

Uses of baking soda

- i) It is used to prepare baking powder
- ii) It is also an ingredient in antacids.
- iii) It is also used as soda-acid in fire extinguishers
- iv) It acts as mild antiseptic.

Fill in the blanks

1. i. _____ taste is a characteristic property of all acids in aqueous solution.

Ans: Sour

ii. Acids react with some metals to produce _____ gas.

Ans: hydrogen

iii. Because of aqueous acid solutions conduct electricity, they are identified as _____

Ans: Electrolytes or Conductors

iv. Acids react with bases to produce a _____ and water.

Ans: salt

v. Acids turn methyle orange into _____ colour.

Ans: red

2. i. Bases tend to taste _____ and feel _____

Ans: bitter ,soapy to touch

ii. Like acids, aqueous basic solutions conduct _____, and are identified as _____.

Ans: electricity, electrolytes

iii. Bases react with _____ to produce a salt and _____.

Ans: acids, water

iv. Bases turn Phenolphthaleinto _____ colour.

Ans: pink

3. Match the following:

- | | | |
|---------------------|-----|---|
| a) Plaster of Paris | () | 1) CaOCl_2 |
| b) Gypsum | () | 2) NaHCO_3 |
| c) Bleaching powder | () | 3) Na_2CO_3 |
| d) Baking soda | () | 4) $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$ |
| e) Washing soda | () | 5) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ |

Ans: a-4, b-5, c-1, d-2, e-3

Multiple Choice Questions

1. The colour of methyl orange indicator in acidic medium is []
a) yellow b) green c) orange d) red

Ans: d

2. The colour of phenolphthalein indicator in basic solution is []
a) yellow b) green c) pink d) orange

Ans: c

3. Colour of methyl orange in alkali conditions? []
a) orange b) yellow c) red d) blue

Ans: b

4. A solution turns red litmus blue, its pH is likely to be []
a) 1 b) 4 c) 5 d) 10

Ans: d

5. 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

Ans: b

6. If a base dissolves in water by what name is it better known? []
a) neutralization b) basic c) acid d) alkali

Ans: d

7. Which of the following substances when mixed together will produce table salt? []
a) Sodium thiosulphate and sulphur dioxide b) Hydrochloric acid and sodium hydroxide

- c) Chlorine and oxygen d) Nitric acid and sodium hydrogen carbonate

- Ans:** b
8. What colour would hydrochloric acid (pH=1) turn universal indicator? []
 a) orange b) purple c) yellow d) red
- Ans:** d
9. Which one of the following types of medicines is used for treating indigestion? []
 a) antibiotic b) analgesic c) antacid d) antiseptic
- Ans:** c
10. What gas is produced when magnesium is made to react with hydrochloric acid? []
 a) hydrogen b) oxygen c) carbon dioxide d) no gas is produced
- Ans:** a
11. Which of the following is the most accurate way of showing neutralization? []
 a) Acid + base acid → base solution b) Acid + base → salt + water
 c) Acid + base → sodium chloride + hydrogen d) Acid + base → neutral solution
- Ans:** b

Try these

- 1. Dry hydrogen chloride gas does not turn blue litmus to red whereas hydrochloric acid does. Why? (AS1)**
Ans: Dry hydrochloride gas is not produce H^+ ions, so it does not turn blue litmus to red. Hydrochloric acid acid is produce H^+ ions, it turn blue litmus to red.
- 2. Fresh milk has a pH of 6. Explain why the pH changes as it turns into curd? (AS3)**
Ans: (i) Fresh milk has a P^H of 6. Hence it is a weak acid.
 (ii) To turn the milk as curd, we have to add yeast in the form of some curd. The fermentation takes place. During this process, the P^H decreases and set as curd.
- 3. 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 tube B. Amount and concentration of both the acids is same. In which test tube will the fizzing occur more vigorously and why?(AS4)**
Ans: Test tube A
 Hydrochloric acid having more H_3O^+ ions than Acetic acid. Hydrochloric acid is strong acid and reaction will be faster in test tube A.
- 4. How do you prepare your own indicator using beetroot? Explain. (AS5)**
Ans: Preparation of own indicator
 i) Take the beetroots and peel them with the help of a knife.
 ii) Chop them into pieces.
 iii) Put those pieces into a mixy jar and make a paste.
 iv) Add some water to the paste. Now filter this and collect only juice from this.
 v) Now add 5 to 6 drops of this juice to orange juice and mix it.
 vi) We observed that acidic nature of orange juice colour change.

Additional Questions

½ Mark Questions

1. What is the pH value of freshly distilled water?
Ans: 7
2. Base : NaOH :: Acid : _____
 A) $Mg(OH)_2$ B) $NaHCO_3$ C) HCl D) NH_4Cl
Ans: C
3. Which of the following is the correct formula of gypsum?
 A) $CaSO_4 \cdot 2H_2O$ B) $CaSO_4 \cdot 1/2H_2O$ C) $MgSO_4 \cdot 7H_2O$ D) $MgSO_4 \cdot 2H_2O$
Ans: A
4. Which gas is released when metals reacts with acids.
Ans: Hydrogen
5. Arjun: Baking powder and Baking soda, both are same
 Arun: Baking powder and Baking soda are not the same
 Which one of the above you supports?

Ans: Arun

6. A: Antacids participate in neutralise reaction

R: Antacids are bases in nature

- A) Both A and R are true and R is correct explanation of A
B) Both A and R are true and R is not correct explanation of A
C) A is true but R is false D) A is false but R is correct

Ans: A

7. Match the following

- | | | |
|---------------------|----------|---|
| i) Plaster of Paris | () | a) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ |
| ii) Gypsum | () | b) NaHCO_3 |
| iii) Baking Soda | () | c) $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$ |

Ans: i-c, 2-a, 3-b

8. Vani added a few drops of methyl orange indicator to sodium hydroxide solution. What colour may she observed ?

Ans: Yellow

9. Match the following:

Section-A

A) $p^H > 7$

B) $p^H = 7$

C) $p^H < 7$

Section-B

p) Neutral solution

q) Basic solution

r) Acidic solution

Ans: A-q, B-p, C-r

10. How many number of water molecules are present in one formula unit of washing soda?

Ans: 10

11. Take 2 ml of NaOH in a test tube, add two drops of phenolphthalein solution and then add few drops of dil. HCl to it.

What is your observation with respect to colour?

Ans: Pink colour disappear

12. The correct observation when blue coloured copper sulphate crystals heated

A) crystals becomes liquid

B) flames comes out

C) colour disappears

D) Brisk effervescence took place

Ans: C

13. What type of reaction takes place in stomach when an antacid tablet is consumed?

Ans: Neutralisation

14. How many water molecules are present in Gypsum

Ans: 2

15. Identify the gas that burns with pop sound ?

A) CO_2

B) N_2

C) O_2

D) H_2

Ans: D

16. What is the colour of Phenolphthalein in Caustic soda solution ?

Ans: Pink

17. What is the colour of litmus in neutral solution?

Ans: No colour

18. What is the Chemical name of milk of magnesium?

Ans: $\text{Mg}(\text{OH})_2$

19. Write the formula of the sodium Zincate?

Ans: Na_2ZnO_2

20. If you heat blue coloured copper sulphate crystals in a test tube, what do you observe on sides of the test tube?

Ans: Water droplets

21. The incorrect statement about acids is

a. They give H^+ ions in water

b. They are sour to taste

c. They turn blue litmus to red

d. They give pink colour with phenolphthalein.

Ans: d

22. Ahalya: All metal oxides are acidic in nature

Akshitha: metal oxides are basic in nature

Which statement is correct?

Ans : Akshitha's statement is correct

23. Which salt is used in the manufacture of borax?

Ans: Washing Soda

24. Arrange in descending order of PH value.

(i) Weak acid (ii) weak base (iii) Strong acid (iv) Strong base

Ans: Strong base > Weak base > weak acid > Strong acid

25. Who am I?

I give different smell in acid and base solution.

Ans: Olfactory indicators

26. Which gas evolves, when metal carbonate or metal hydrogen carbonate react with acids []

A) Hydrogen B) Oxygen C) Nitrogen D) Carbon dioxide

Ans: D

27. Complete the following equation

Acid + Base \rightarrow Salt + _____

Ans: Water

28. Identify the correct statement

X: Acids react with metals and produce H₂ gas

Y: Acids react with carbonates and produce CO₂ gas

Ans: X, Y

29. "I am produced by the action of chlorine on dry slaked lime and used as a reagent in the preparation of chloroform." Who am I ?

Ans: Bleaching powder

1 Mark Questions

1. What it is to be formed when an acid or base mixed with water ?

Ans: When an acid or base mixed with water to formed as H₃O⁺ ions or OH⁻ ions

2. Write any two uses of plaster of Paris.

Ans: Plaster of paris is used for making toys, materials for decoration and for making surfaces smooth

3. Sandeep added few milli liters of dilute hydrochloric acid to zinc granules. What would be his observations?

Ans: Zinc chloride and hydrogen gas

4. What is meant by "water of crystallization" of a substance?

Ans: Water of crystallization is the fixed number of water molecules present in one formula unit of salt.

5. How do you test for Carbon dioxide Gas ?

Ans: Lime water [Ca(OH)₂] is used to test CO₂ gas. If CO₂ gas passes through lime water it turns to milky.

6. Write the importance of pH of the soil?

Ans: Plants required a specific p^H range for their healthy growth.

7. What are the apparatus used in the experiment "Reaction of Acids and Metals ".

Ans: Test tube, delivery tube, glass trough, candle, soap water, dil. HCl and zinc granules.

8. Madhuri mother stored pickles in a metal vessel. Madhuri told her not to store pickle in a metal vessel. Guess the reason?

Ans: Pickles contain acids which react with metal and form poisonous substances.

9. Which chemical substance is used by doctors as a plaster for supporting broken bones? Write its chemical formula.

Ans : Plaster of Paris – CaSO₄.½ H₂O.

10. What is the chemical name and formula of table salt?

Ans: Sodium chloride - NaCl

11. What is the range of p^H scale.

Ans: 0 to 14

12. How is plaster of paris obtained from gypsum?

Ans: On careful heating of gypsum at 373K, it loses water molecules partially to become plaster of paris

13. Which salt is used in the manufacture of borax?

Ans: Washing soda(Sodium carbonate)

14. Bases which are soluble in water are called as ?

Ans: Alkali

2 Marks Questions

1. What are the materials required to conduct an activity to show that the reaction of carbonates

and metals hydrogen carbonates with acids produced carbon dioxide gas.

Ans: Stand, Test tubes, Two holed rubber cork, Thistle funnel, stand, Na_2CO_3 , NaHCO_3 , dil. HCl , Delivery tube, lime water

2. Write the uses of bleaching powder.

- Ans:** 1. It is used in textile industries.
2. Used as an oxidizing agent.
3. Used for disinfecting drinking water to make it free of germs.
4. Used as a reagent in the preparation of chloroform.

3. Answer the following questions based on the information given in the table.

Substance	Blue litmus	Red litmus	Methyl Orange	Phenolphthalein
A	Red		Red	
B		Blue	Yellow	?

- a) What is the nature of the substance A ?
b) Which color shows substance 'B' in Phenolphthalein indicator ?

Ans: A) Acidic B) Pink

4. Write short note on pH scale?

Ans: A scale for measuring hydrogen ion concentration in a solution is called pH scale. pH values from 0 to 14
The pH is an indication of concentration of H^+ .

pH value	0 to below 7	7	Above 7 to 14
Nature of Solution	Acidic	Neutral	Basic

5. What is acidity? How do you decrease acidity? (AS1)

Ans: During indigestion the stomach produces too much acid and this causes pain and irritation. This is called acidity.

These antacids neutralize the excess acid in the stomach

6. What are Olfactory indicators? Give two examples.

Ans: Some substances whose odour changes in acidic or basic media are called Olfactory indicators. Ex:- Onion, Vanilla essence and Clove oil

7. What is the role of pH in our digestive system?

Ans: Our stomach produces hydrochloric acid. It helps in the digestion of food without harming the stomach.

8. Why pickles and sour substances are not stored in brass and copper vessels?

Ans: Pickles and sour substances contain citric acid. Acids react with vessels and form blue-green substance which is injurious to health. So pickles and sour substances are not stored in brass and copper vessels

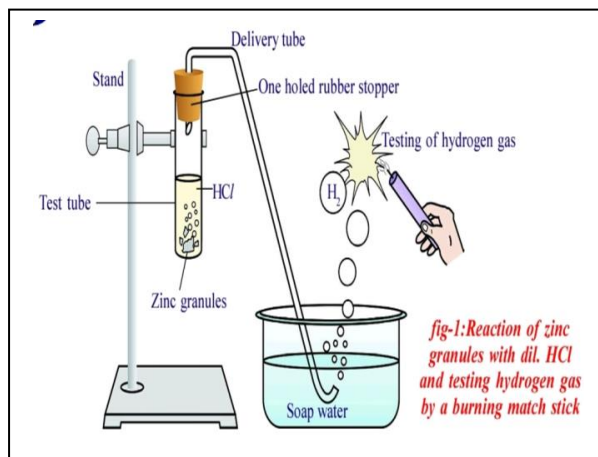
9. What happens when acid react with metal hydrogen carbonate?

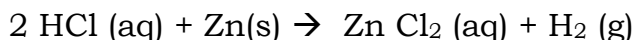
Ans: Salt and CO_2 gas are formed

4 Marks Questions

1. Draw a neat diagram shows the reaction between zinc granules and dilute hydrochloric acid. Write a balanced chemical equation for this reaction. (or) "2ml 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". Draw a neat labeled diagram of arrangements of apparatus for the above experiment

Ans:





2. Show that acids produce hydrogen gas when react with metals (or) Show that acids produce hydrogen gas when react with metals. (or) What are the material / substance required to produce hydrogen gas in your lab? Write the process(AS3)

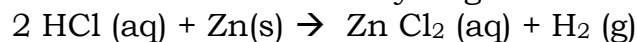
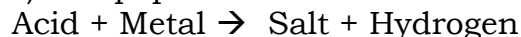
Ans:

Aim: To show that acid produce hydrogen gas reacted with metals.

Materials required: test tube, delivery tube, glass trough, candle, soap water, dil. HCl, and zinc granules.

Procedure:

- i) Set the apparatus as shown in figure.
- ii) Take about 10ml of dilute HCl in a test tube and add a few zinc granules to it.
- iii) We observe a gas is evolved from the zinc granules
- iv) Pass the gas being evolved through the soap water.
- v) We observe some bubbles formed in the soap solution.
- vi) Bring a burning candle near the gas filled bubble.
- vii) The candle turn off with a pop sound
- viii) The pop sound indicates that the gas evolved in H₂



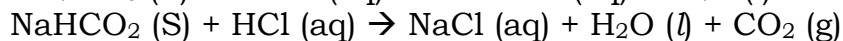
- ix) Repeat this experiment with remaining acids

Conclusion: We conclude that hydrogen gas is produced when acid reacts with metals.

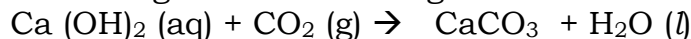
3. Write an activity of reaction of acids with metal carbonates are hydrogen carbonates with diagram (AS3)

Ans: Procedure:

- i) Take two test tubes; label them as A and B.
- ii) Take about 0.5 gm of sodium carbonate (Na₂CO₃) in test tube A and about 0.5 gm of sodium hydrogen carbonate (NaHCO₃) in test tube B.
- iii) Add about 2 ml of dilute HCl to both the test tubes.
- iv) Pass the gas produced in each case through lime water (calcium hydroxide solution) and record your observations
- v) The reactions occurring in the above activities are as follows:

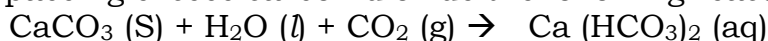


Pass the gas evolved through lime water.



(White precipitate)

On passing excess carbon dioxide the following reaction takes places:



Conclusion: The reaction of metal carbonates and hydrogen carbonates with acids give a corresponding salt, carbon dioxide and water.

4. Observe the table and answer the following questions (AS4)

Liquid/Solution	pH
P	7
Q	6
R	11
S	2
T	8

- a) Which solution(s) turn into pink by adding phenolphthalein ?

Ans: R

- b) Which solution(s) turn into red by adding methyl orange?

Ans: Q,S

- c) Which is strong acid?

Ans: S

- d) Which one indicates pure water?

Ans: P

- e) If P^H=7, then find the [H]⁺

Ans: 10⁻⁷

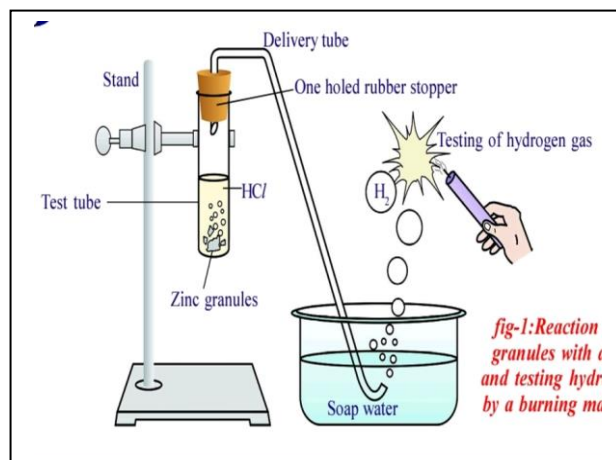


fig-1: Reaction granules with dilute HCl and testing hydrogen gas by a burning candle

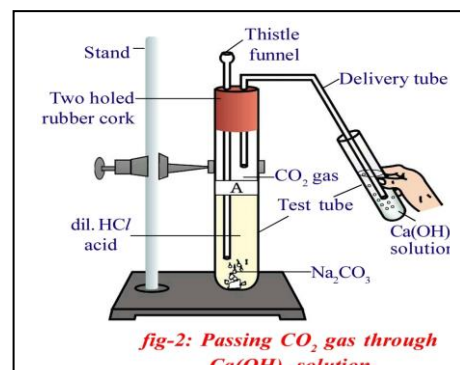


fig-2: Passing CO₂ gas through Ca(OH)₂ solution

f) Which solutions are acidic solutions?

Ans: Q,S

g) Which colour given by solution Q with universal indicator?

Ans: Red

h) Which colour gives by blue litmus paper when it is dipped in solution S?

Ans: Red

5. Observe the table and answer the following questions

Solution	A	B	C	D	E	F	G	H
p ^H value	4	1	12	7	8	9	2	13

i) Which solution is Neutral ?

ii) Which solutions are strong Alkali ?

iii) Which solutions are strong Acids ?

iv) Which solutions are weak Alkali ?

Ans: i) D

ii) C, H

iii) B, G

iv) E, F

6. Define and give example to the following

i) strong acid ii) strong base iii) weak acid iv) weak base

Ans: i) An acid which dissociates completely when dissolved in water is strong acid.

Ex- HCl

ii) A base which dissociates completely when dissolved in water is strong base.

Ex- NaOH

iii) An acid which dissociates only partially when dissolved in water is weak acid.

Ex- CH₃COOH

iv) A base which dissociates only partially when dissolved in water is weak base.

Ex- NH₄OH

7. Read the information given in the table and answer the following.

Solution	HCl	Gastric Fluid	CH ₃ COOH	Distilled water	Blood	Saliva	NaHCO ₃	Na ₂ CO ₃	NaOH
p ^H Value	1	1.2	3	7	7.3	7.6	8.3	13	14

i) List the acid solutions in the above table ?

ii) Which is more basic between Na₂CO₃ and NaHCO₃ ?

iii) Give the H⁺ ion concentration of distilled water ?

iv) Name the body fluid which is nearly neutral ?

Ans: i) HCl, Gastric fluid, CH₃COOH

ii) Na₂CO₃

iii) 10⁻⁷

iv) Blood

8. What are the applications of p^H in daily life (AS6)

Ans:

1. Plants and animals has sensitive p^H values

i)When pH of rain water is less than 5.6, it is called acid rain.

ii)When acid rain flows in to the rivers, it lowers the pH of the river water, the survival of aquatic life in such rivers becomes difficult.

2. Tooth decay

i)Tooth decay starts when the pH of the mouth is lower than 5.5.

ii)Tooth enamel, made of calcium phosphate is the hardest substance in the body.

iii)But is corroded when the pH in the mouth is below 5.5.

3. p^H in our digestive system

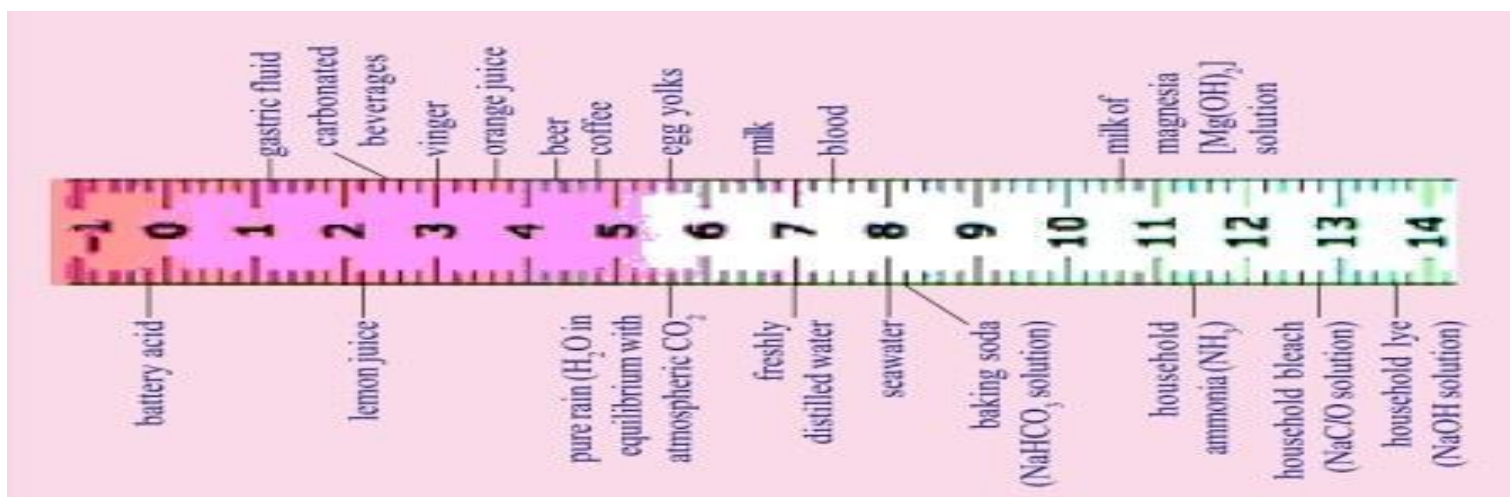
i)During indigestion the stomach produces too much acid and this causes pain and irritation.

ii)To get rid of this pain, people use bases called antacids.

4. p^H of the soil

i)Plants require a specific pH range for their healthy growth.

9) Observe the table and answer the following questions



a) What is the nature of blood?

Ans: basic nature

b) Which of the substances in the scale are used as antacids?

Ans: Milk of magnesia

c) Which substance is neutral from above scale?

Ans: Freshly distilled water

d) Which substance acts as strong base?

Ans: Household lye

e) Which substance acts as strong acids?

Ans: Battery acid

f) What is the P^H range of bases?

Ans: Above 7 to 14

g) What is the p^H value of neutral solution?

Ans: 7

h) What is the chemical name of milk of magnesia?

Ans: Magnesium hydroxide

i) What is nature of gastric juice based on strength?

Ans: Strong acid