

**Q. When a drop of orange juice is added to pure water, how the pH value will vary for water? If a drop of lemon juice is also added, will there be any more change in the pH value?** [CBSE 2010, 11]

**Ans.** Orange and lemon are citrus fruits which contain citric acid in their juices. When these juices are added to pure water the acid will release H<sup>+</sup> ions on dissociation and the pH value will decrease from 7 as the acidity increases.

**Q. A knife, which is used to cut a fruit, was immediately dipped into water containing drops of blue litmus solution. If the colour of the solution is changed to red, what inference can be drawn about the nature of the fruit and why?** [CBSE 2010, 11, 13]

**Ans.** The fruit may be a citrus fruit or its juice may contain an acid, that is why the traces of acid remained in the knife that turned the blue litmus red.

**Q. HCl and HNO<sub>3</sub> show acidic characteristics in aqueous solution while alcohol and glucose solutions do not. Give reasons.** [CBSE 2010, 11]

**Or Why do HCl, HNO<sub>3</sub>, etc., show acidic characters in aqueous solutions while solutions of compounds like alcohol and glucose do not show acidic character?** [NCERT, CBSE 2010]

**Ans.** HCl and HNO<sub>3</sub> produce H ions in aqueous solution. Hence they show acidic characteristics.

Alcohol and glucose do not produce H<sup>+</sup> ions in aqueous solution, hence they do not show acidic characteristics.

**Q. How will you test for the gas which is liberated when hydrochloric acid reacts with an active metal?** [CBSE 2011]

**Ans.** When burning candle is brought near to the jar filled with hydrogen gas, it burns explosively with a pop sound.

**Q. (i) Explain why is hydrochloric acid a strong acid and acetic acid, a weak acid. How can it be verified.**

**(ii) Explain why aqueous solution of an acid conducts electricity.**

**(iii) 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.**

**(a) Identify the most acidic and most basic solutions.**

**(b) Arrange the above four solutions in the increasing order of H<sup>+</sup> ion concentration.**

**(c) State the change in colour of pH paper on dipping in solution C and D.**

**Ans.** (i) HCl will give rise to more H<sup>+</sup> ions and CH COOH produces less H<sup>+</sup> ions on dissociation. The colour of pH paper depends on the concentration of H ion. Colour becomes red for high H concentration.

**(ii) Aqueous solution of acids have H which carry electric current through the solution.**

**(iii) (a) Most acidic - A, Most basic-C (b) C, B, D, A or C < B < D < A**

**(c) Blue color in solution C and green color in solution D.**

**Q. Which gas is evolved when dilute hydrochloric acid reacts with zinc? Write the molecular formula of this gas.** [CBSE 2012]

**Ans.** Hydrogen gas. Molecular formula is H.

**Q. How is the pH of a solution of an acid influenced when it is diluted?** [CBSE 2012]

**Ans.** On dilution, the concentration of hydrogen ions per unit volume decreases and hence pH of the solution increases. Since pH is the negative logarithmic value of the concentration of hydrogen ions.

**Q. Differentiate between strong and weak acids. Identify the strong and weak acids from the following list of acids: hydrochloric acid, acetic acid, formic acid, nitric acid.** [CBSE 2012]

**Ans.** Acids which ionise completely in aqueous solution-strong acids.

Acids which ionise partially in aqueous solution-weak acids.

Hydrochloric acid, nitric acid-strong acid Acetic acid, formic acid-weak acid.

**Q. What effect does an increase in concentration of H (aq) in a solution on the pH of solution?** [CBSE 2013]

**Ans.** The pH of a solution decreases with the increase in the concentration of H<sup>+</sup> (aq). It is so because pH is the negative logarithmic value of H(aq) in a solution. More are the H<sup>+</sup> (aq) in a solution, more is the acidity, and less is the pH value of that solution.

**Q.(a) What will you observe when dilute hydrochloric acid is added to a small amount of copper oxide in a beaker?** [CBSE 2013]

**(b) Aqueous solution of HCl shows acidic character. But the aqueous solution of glucose fail to do so. Why?**

**(c) Why curd and sour substances not be kept in brass and copper vessels?**

**Ans.(a)** The colour of the solution becomes blue green and the copper oxide dissolves  
 $CuO + 2HCl \rightarrow CuCl_2 + H_2O$

**(b)** Aqueous solution of HCl can produce Hions. Therefore, they show acidic character. But aqueous solution of glucose do not produce H<sup>+</sup> ions ie., they fail to evolve hydrogen gas and do not show any acidic character.

**(c)** Curd and sour substances have acids which react with copper present in brass and form compound which are poisonous.

**Q. A compound 'P' forms the enamel of teeth. It is the hardest substance of the body. It doesn't dissolve in water but gets corroded when the pH is lowered below 5.5.**

**(a) Identify the compound 'P'.**

**(b) How does it undergo damage due to eating of chocolate and sweets? What should we do to prevent tooth decay?** [CBSE 2014]

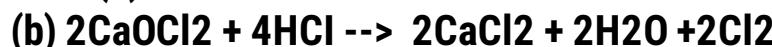
**Ans.(a)** The compound 'P' is calcium phosphate.

**(b)** It undergo damage when the bacteria present in the mouth work on the left over food particles and produce acid. To prevent tooth decay, toothpastes (basic) are used which neutralises the excess acid.

**Q. Write balanced chemical equations for the following:**

**[CBSE 2014]**

- (a) Calcium carbonate reacts with hydrochloric acid.
- (b) Calcium oxychloride reacts with hydrochloric acid.
- (c) Sodium hydroxide reacts with zinc.



**Q. Which gas is usually liberated when an acid reacts with a metal? [CBSE 2014, 17]**

Ans. Hydrogen gas.

**Q. How chloride of lime differs chemically from calcium chloride? [CBSE 2014]**

Ans. Chloride of lime is  $\text{CaOCl}_2$  while calcium chloride is  $\text{CaCl}_2$ .

**Q. State reason for the following: [CBSE 2015]**

(i) A tarnished copper vessel begins to shine again when rubbed with lemon.

(ii) All alkalis are bases but all bases are not alkalis.

(iii) Use of a mild base like baking soda on the honey-bee stung area gives relief.

Ans.(i) Copper is tarnished in presence of air, moisture, etc., and form copper oxide which is basic in nature. On rubbing it with lemon which contains citric acid, neutralisation reaction takes place and tarnished copper vessel begins to shine again.

(ii) Bases which are soluble in water are called alkalies. So all alkalies are bases but all bases are not alkalies.

(iii) Honey-bee stung area contains methanoic acid ( $\text{HCOOH}$ ). So applying a mild base like baking soda ( $\text{NaHCO}_3$ ) on the area neutralises it and gives relief.

**Q. (i) State the purpose of developing pH scale.**

**[CBSE 2014]**

(ii) Mention the pH range for acids.

(iii) What is the pH of acid rain and how it affects the aquatic life?

Ans.(i) The purpose of developing pH scale was to quantify the amount of H or OH ions in a solution.

(ii) The pH range for acids is 0-7.

(iii) When pH of rain water is less than 5.6, it is called acid rain. It lowers the pH of river water. Thus, the survival of aquatic life becomes difficult.

**Q. While eating food, you happen to spill some curry on your white shirt. You immediately scrub it with soap. What happens to its yellow colour on scrubbing with soap? Why? What happens to this stain when the shirt is washed with plenty of water?**

**[CBSE 2014]**

- Ans.** (i) On scrubbing, its colour changes from yellow to reddish brown.  
(ii) It happens because soap is basic in nature and the colour of turmeric changes from yellow to reddish brown in basic medium.  
(iii) When the shirt is washed with plenty of water, the stain turns yellow again.

**Q. Give suitable reasons for the following statements:** [CBSE 2014]

- (a) Rain water conducts electricity but distilled water does not.
- (b) We feel burning sensation in the stomach when we overeat.
- (c) A tarnished copper vessel regains its shine when rubbed with lemon.
- (d) The crystals of washing soda change to white powder on exposure to air.
- (e) An aqueous solution of sodium chloride is neutral but an aqueous solution of sodium carbonate is basic.

**Ans.** (i) Distilled water does not conduct electricity because it does not contain any ionic compound like acids, bases or salts dissolved in it.

(ii) When we overeat, excess of acid is produced in the stomach which causes burning sensation.

(iii) Copper vessels tarnish due to formation of basic copper carbonate which gets neutralized when rubbed with lemon and the copper vessel regains its shine.

(iv) Washing soda is sodium carbonate decahydrate which when exposed to air loses 10 molecules of water and changes to white powder.

(v) Sodium chloride is a salt of strong acid HCl and strong base NaOH, so it is neutral. Sodium carbonate is a salt of weak acid HCO<sub>3</sub> and strong base NaOH, so it is basic.

**Q. Identify the acid and the base from which sodium chloride is obtained. Which type of salt is it? When is it called rock salt? How is rock salt formed?** [CBSE 2019]

**Ans.** The acid and the base from which sodium chloride is obtained are HCl and NaOH respectively.

It is a neutral salt as pH of its aqueous solution is 7.

Sodium chloride is also found in nature in solid form (large crystals). These large crystals are often brown due to impurities. This is called as rock salt. Beds of rock salt were formed when seas of bygone ages dried up.

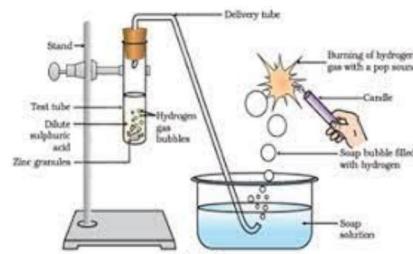
**Q. In three test tubes A, B and C, three different liquids namely, distilled water, underground water and distilled water in which a pinch of calcium sulphate is dissolved, respectively are taken. Equal amount of soap solution is added to each test tube and the contents are shaken. In which test tube will the length of the foam (lather) be longest? Justify your answer.** [CBSE 2019]

**Ans.** The length of the foam (lather) will be longest in test tube A.

Reason: Soap produces good lather with soft water (distilled water) only. Both test tubes B and C contain hard water and soap forms scum in hard water.

**1. Rajveer took apparatus as shown in the given figure and added 5ml of dilute sulphuric acid in a test tube and added a few pieces of zinc granules to it. He passed gas A in soap solution which forms bubbles. When a burning match stick brought near to bubbles they burst with pop sound. Identify the gas A evolved in the figure?**

- (a) Oxygen
- (b) Carbon
- (c) Hydrogen
- (d) Sulphur

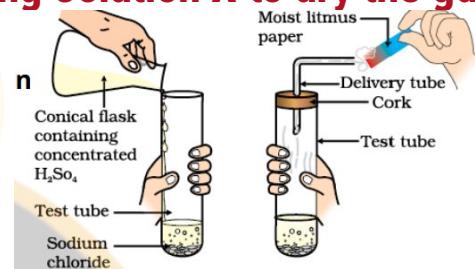


**2. Rani passed carbon dioxide through carbon dioxide. She observed a white precipitate A is evolved in the reaction. Identify the precipitate A.**

- (a) Calcium oxide
- (b) Calcium carbonate
- (c) Calcium bicarbonate
- (d) All of these

**3. During annual practicals the climate was very humid. Despite of this teacher demonstrated the reaction between sodium chloride and sulphuric acid. She pass the gas Conical Bank through a guard tube containing solution X to dry the gas. containing concentrated Identify the gas A**

- (a) Calcium Oxide
- (b) Calcium Phosphate
- (c) Calcium Oxychloride
- (d) Calcium Chloride



**4. The atmosphere of venus is made up of thick white and yellowish clouds of which acid?**

- (a) Hydrochloric
- (b) Nitric
- (c) Sulphuric
- (d) Acetic Acid

**5. 10 mL of a solution of NaOH is found to be completely neutralized by 8 mL of HCl. If we take 20 mL of the same solution of NaOH, the amount of HCl solution required to a given solution of neutralize it will be**

- a. 8ml
- b. 12ml
- c. 4ml
- d. 16ml

**6. Reema added a base X while she was making crispy pakoras for her child Rammu. She also added this base X along with mild edible acid in Cake which she was making. Identify the base X.**

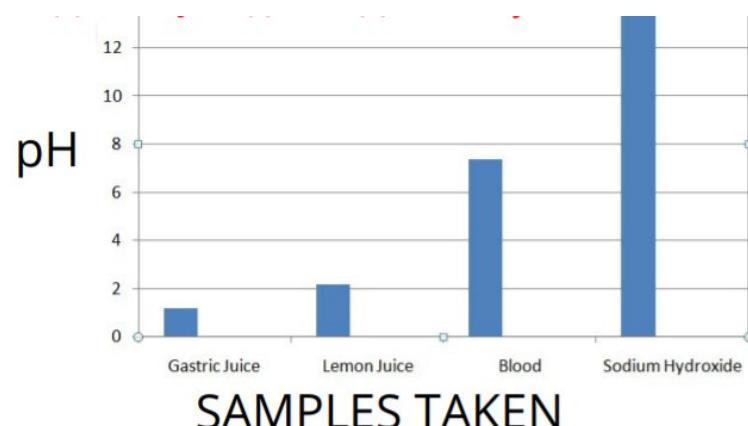
- (a) Sodium Bicarbonate
- (b) Sodium Carbonate
- (c) Sodium Hydrogen Carbonate
- (d) Sodium Sulphate Decahydrate

**7. Which of the following don't have water molecules of crystallization?**

- (a) POP
- (b) Washing Soda
- (c) Gypsum
- (d) Blue vitrol

**8. Which of the following has highest concentration of hydrogen ion?**

- (a) Gastric Juice
- (b) Lemon Juice
- (c) Blood
- (d) Sodium Hydroxide



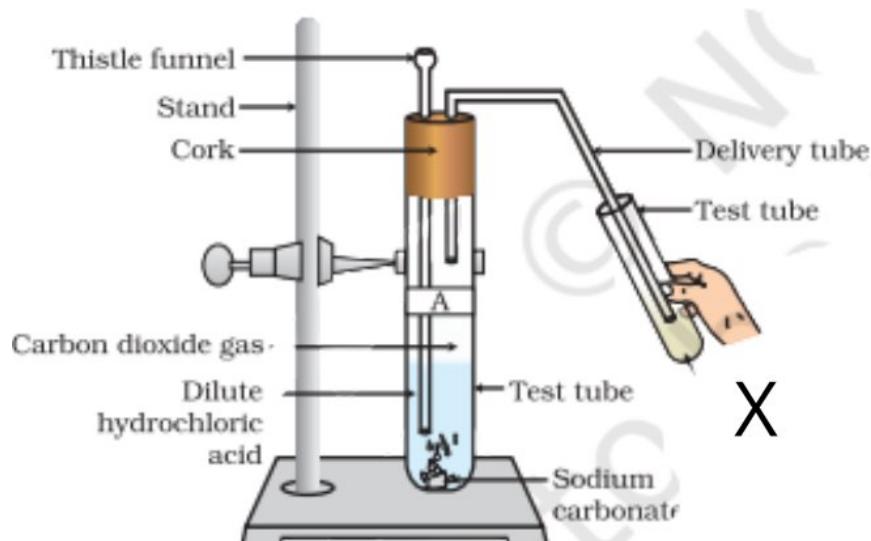
**9. Varun observed that the stain of curry on a white shirt becomes reddish-brown when soap is scrubbed on it, but it turns yellow again when the shirt is washed with plenty of water. What might be the reason for his observation?**

- i. Soap is acidic in nature
- ii. Soap is basic in nature
- iii. Turmeric is a natural indicator which gives reddish tinge in bases
- iv. Turmeric is a natural indicator which gives reddish tinge in acids

- (a) i and ii
- (b) ii and iii
- (c) i and iv
- (d) ii and iv

**10. Identify the solution X in the fig.**

- (a) Calcium oxide
- (b) Calcium carbonate
- (c) Calcium bicarbonate
- (d) Calcium Hydroxide



**11. Soham took a small amount of copper oxide in a beaker and add dilute hydrochloric acid slowly while stirring. Which of the following is not the observation of reaction?**

- (a) Colour of solution becomes blue green
- (b) metal oxide is formed
- (c) Copper chloride(l) is formed
- (d) None of these

**12. Shamu took few crystals of copper sulphate in dry boiling tube. Which of the following is/are correct option? (multi correct)**

- (a) Crystals will gain water molecules of crystallization
- (b) Crystals will loose water molecules of crystallization
- (c) Salt formed is white
- (d) Salt formed is Blue

**13. Assertion: When common salt is kept open it absorb moisture from air**

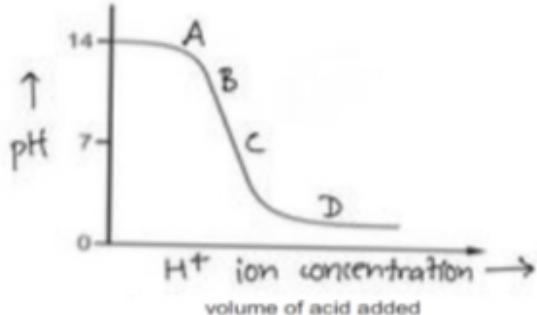
**Reason:** Common salt contains magnesium chloride

**14. Assertion: If the pH inside the mouth decreases below 5.5, the decay of tooth enamel begins.**

**Reason:** The bacteria present in mouth degrades the sugar and left over food particles and produce acids that remains in the mouth after eating

**15. At which point among A,B,C,D H<sup>+</sup> ion concentration is OH-ion concentration**

- (a) A
- (b) B
- (c) C
- (d) D



**16. What happens when a solution of an acid is mixed with a solution of a base in a test tube?**

- (i) The temperature of the solution increases
- (ii) The temperature of the solution decreases
- (iii) The temperature of the solution remains the same
- (iv) Salt formation takes place
  - (a) (i) only
  - (b) (i) and (iii)
  - (c) (ii) and (iii)
  - (d) (i) and (iv)

**17. 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

**18. 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

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

- (a) Wash the hand with saline solution
- (b) Wash the hand immediately with plenty of water and apply a paste of sodium hydrogencarbonate
- (c) After washing with plenty of water apply solution of sodium hydroxide on the hand
- (d) Neutralise the acid with a strong alkali

**20. Sodium hydrogencarbonate when added to acetic acid evolves a gas. Which of the following statements are true about the gas evolved?**

- (i) It turns lime water milky
- (ii) It extinguishes a burning splinter
- (iii) It dissolves in a solution of sodium hydroxide
- (iv) It has a pungent odour

- (a) (i) and (ii)
- (b) (i), (ii) and (iii)
- (c) (ii), (iii) and (iv)
- (d) (i) and (iv)

**21. Which of the following statements is correct about an aqueous solution of an acid and of a base?**

- (i) Higher the pH, stronger the acid
- (ii) Higher the pH, weaker the acid
- (iii) Lower the pH, stronger the base
- (iv) Lower the pH, weaker the base

- (a) (i) and (iii)
- (b) (ii) and (iii)
- (c) (i) and (iv)
- (d) (ii) and (iv)

**22. Which of the following gives CO<sub>2</sub> on heating?**

- a. Quick lime
- b. Limestone
- c. Slaked lime
- d. soda ash

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# Case-Based Questions

SCAN  
& DONATE



A student takes three solutions P, Q, and R and make the reaction of all these solution with phenolphthalein indicator and methyl orange indicator. He gets the following result:

Solutions	Colour change with phenolphthalein indicator	Colour change with methyl orange indicator
P	Pink	Yellow
Q	Colourless	Orange
R	Colourless	Red

23. The acidic solution is

- (a) P
- (b) Q
- (c) R
- (d) None of these

24. Solutions P and Q could be

- (a) HCl and NaOH
- (b) NaOH and NaCl
- (c) CH<sub>3</sub>COOH and CH<sub>3</sub>COONa
- (d) HCl and Na<sub>2</sub>CO<sub>3</sub>

25. When solution P added to the China rose indicator, the colour of the solution P changes to

- (a) Green
- (b) Dark red
- (c) Pink
- (d) Colourless

26. 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

27. Sodium hydrogencarbonate when added to acetic acid evolves a gas. Which of the following statements are true about the gas evolved?

- (i) It turns lime water milky
- (ii) It extinguishes a burning splinter
- (iii) It dissolves in a solution of sodium hydroxide
- (iv) It has a pungent odour

- (a) (i) and (ii)
- (b) (i), (ii) and (iii)
- (c) (ii), (iii) and (iv)
- (d) (i) and (iv)

**28. Common salt besides being used in kitchen can also be used as the raw material for making**

- (i) washing soda
  - (ii) bleaching powder
  - (iii) baking soda
  - (iv) slaked lime
- (a) (i) and (ii)
  - (b) (i), (ii) and (iv)
  - (c) (i) and (iii)
  - (d) (i), (iii) and (iv)

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

- (a) hydrochloric acid
- (b) tartaric acid
- (c) acetic acid
- (d) sulphuric acid



**30. The chemical name of bleaching powder is:**

- (a) Calcium oxychloride
- (b) Calcium chloride
- (c) Calcium carbonate
- (d) Calcium sulphate

**31. Washing soda is**

- A. sodium chloride
- B. hydrated sodium carbonate
- C. sodium dicarbonate
- D. calcium carbonate

**32. Assertion: Nettle leaves have stinging hair, which cause painful stings when touched accidentally**

**Reason: This is due to the methanoic acid secreted by them**

# ANSWERS

- 1.C
- 2.B
- 3.D
- 4.C
- 5.D
- 6.C
- 7.D
- 8.A
- 9.B
- 10.D
- 11.C
- 12.B,C
- 13.Both A and R are true and R is correct explanation of A
- 14.Both A and R are true and R is correct explanation of A
- 15.D
- 16.D
- 17.C
- 18.D
- 19.B
- 20.B
- 21.D
- 22.A
- 23.C
- 24.B
- 25.A
- 26.D
- 27.B
- 28.C
- 29.B
- 30.A
- 31.B
- 32.Both A and R are true and R is correct explanation of A