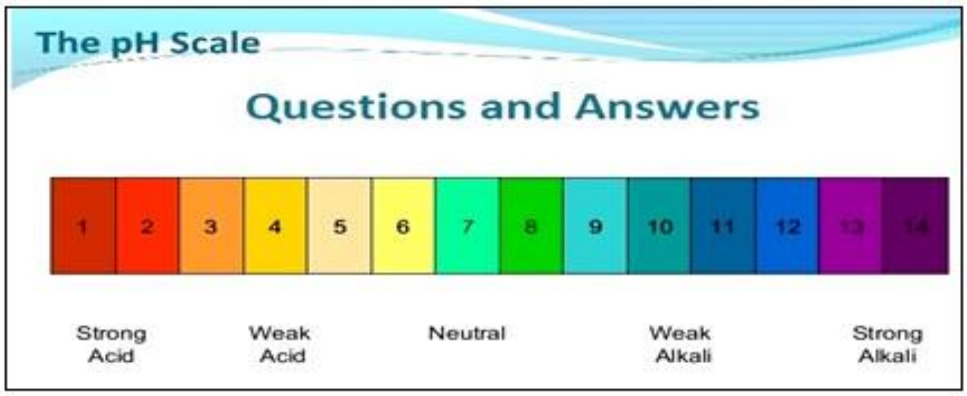
1. Acid – base indicators are dyes or mixtures of dyes which are used to indicate the presence of acids and bases. Examples are litmus, phenolphthalein, methyl orange etc. these indicators tell us whether a substance is acidic or basic by change in colour. There are some substances whose odour changes in acidic or basic media. These are called olfactory indicators. Onion is an example of olfactory indicator. Acidic nature of a substance is due to the formation of H^+ ions in solution whereas formation of OH^- ions in solution is responsible for basic nature of a substance.
   a) What is the colour of phenolphthalein in acidic medium? (pink, yellow, colourless, blue)
   b) Name an olfactory indicator other than onion.
   c) What happens to the concentration of H^+ ions when an acidic solution is diluted with water?
   d) Can you distinguish between acetic acid and HCl of same concentration using above mentioned indicators? If not, what should be used instead?
2. A reaction in which an acid and a base react to form salt and water is called neutralization reaction. Nature provides neutralization options. Nettle plant causes painful stings when touched. This is due to methanoic acid secreted by them. A remedy is rubbing this area with the leaf of dock plant which often grows beside nettle in the wild.

a) Which acid is present in tomato? (lactic acid, methanoic acid, oxalic acid, citric acid)
b) Under what soil conditions does a farmer treat the soil in fields with quick lime?
c) If you mix 10 mL NaOH and 10mL HCl of equal strengths, what will be the pH of the resultant solution? (=7, >7, <7, ≈7)

3. Water of crystallization is the fixed no. of water molecules chemically attached to each formula unit of salt in its crystalline form. There are many salts with water of crystallization, blue coloured copper sulphate, washing soda, Plaster of Paris, gypsum are some of the examples. When we heat these crystals, they become anhydrous and lose some of its properties.

a) Why is formula of Plaster of Paris written as $CaSO_4 \frac{1}{2} H_2O$?
b) Blue coloured copper sulphate crystals loses its colour on heating to white. Can this be considered a physical or chemical change? Justify your answer.
c) Write an equation to show the reaction between Plaster of Paris and water.
d) What is the chemical name of washing soda?

4. The pH value of any solution is a number which simply represents the acidity and basicity of that solution. The pH value of any solution is numerically equal to the logarithm of the inverse of the hydrogen ion (H+) concentration.



a) What will be the pH value for distilled water?

b) Using above picture can you predict the colour of pH paper when dipped in lime juice?

c) Why do we use basic tooth pastes commonly?

5. **Salt, in chemistry**, substance produced by the reaction of an acid with a base. A **salt** consists of the positive ion (cation) of a base and the negative ion (anion) of an acid. The different type of salts are

Type of Salt	**Type of Acid**	**Type of Base**	**Example**
Neutral pH = 7	Strong Acids Examples: HCl H_2SO_4	Strong Bases Examples: NaOH KOH	NaCl K_2SO_4

Type of Salt	Type of Acid	Type of Base	Example
Acidic pH < 7	Strong Acids Examples: HCl HNO_3	weak Bases Examples: NH_4OH $Mg(OH)_2$	NH_4Cl $Mg(NO_3)_2$
Basic pH > 7	Weak Acids Examples: H_2CO_3 CH_3COOH	Strong Bases Examples: NaOH KOH	Na_2CO_3 CH_3COOK

i) What will be the nature of magnesium sulphate ?

ii) Give the formula of salt formed by weak acid and weak base?

iii) From which acid and base is potassium hydrogen carbonate is formed?

6. Here are some ways neutralisation is used:

- Farmers use lime (calcium oxide) to neutralise acid soils.
- Your stomach contains hydrochloric acid, and too much of this causes indigestion. Antacid tablets contain bases such as magnesium hydroxide and magnesium carbonate to neutralise the extra acid.

- Bee stings are acidic. They can be neutralised using baking powder, which contains sodium hydrogen carbonate

    i) Define neutralisation reaction

    ii) How does tooth paste helps in neutralisation

    iii) Name the plant whose leaves can be used to relieve thepainful stings of leaves of nettle

7. When dry crystals of green ferrous sulphate is heated in a dry test tube water can be seen on the cooler sides of test tube. Why?
8. Zinc granules were taken in a bottle and dil HCl was added into it .A balloon covered the mouth of the bottle to collect the gas. When the end was tied the balloon started floating up in air. Why? Write the reaction occurring during the formation of gas. How can we test this gas?
9. Can plaster of Paris be converted to Gypsum and vice versa? Explain how
10. You are provided with lime water in which few drops of phenolphthalein is added (forms pink solution) and a straw. Using this how can you change the solution back to colourless?