

CHEMISTRY STUDY MATERIALS FOR CLASS 10

(NCERT Based notes of Chapter -02)

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ACIDS, BASES AND SALTS

IMPORTANCE OF pH IN EVERYDAY LIFE

1. pH in human body

- Using pH factor the healthiness of our body is predicted. At pH level 6.9, the body becomes prone to viral infections like colds, cough and flu. Cancer cells thrive inside the body at a pH of 5.5.
- The pH of a normal, healthy human skin is 4.5 to 6. Proper skin pH is essential for a healthy complexion.
- pH of stomach fluid is approximately 2.0. This fluid is essential for the digestion of food.
- Human blood pH range is 7.35 to 7.45. Any increase or decrease in this value, leads to diseases. The ideal pH for blood is 7.4.
- pH of normal saliva ranges between 6.5 to 7.5.
- White enamel coating in our teeth is calcium phosphate, hardest substance in our body. It does not dissolve in water. If pH of mouth falls below 5.5, the enamel gets corroded. Toothpastes are generally basic, and is used for cleaning the teeth, can neutralize the excess acid and prevent tooth decay.

2. pH in soil

- In agriculture, the pH of soil is very important. Citrus fruits require slightly alkaline soil, while rice requires acidic soil and sugar cane requires neutral soil.

3. pH in rain water

- pH of rain water is approximately 7 showing high level of its purity and neutrality. If rain water is polluted by SO_2 and NO_2 , acid rain occurs, bringing the pH value less than 7.

INDICATOR:

Substances which show the acidic or basic behavior of other substance by change in colour are known as indicator.

Type of Indicator: There are many types of indicators. Some common types of indicators are

- Natural
- Olfactory Indicator
- Synthetic Indicator
- Universal Indicator

NATURAL INDICATOR

Indicators obtained from natural sources are called natural indicators. Litmus, turmeric, red cabbage, China rose, etc. are some common natural indicators used widely to show the acidic or basic character of substances.

LITMUS

Litmus is obtained from lichens. The solution of litmus is purple in colour. Litmus paper comes in two colour – blue and red.

- An acid turns blue litmus paper red.
- A base turns red litmus paper blue.

TURMERIC

Turmeric is another natural indicator. Turmeric is yellow in colour. Turmeric solution or paper turns reddish brown with base. Turmeric does not change colour with acid.

RED CABBAGE

The juice of red cabbage is originally purple in colour. Juice of red cabbage turns reddish with acid and turns greenish with base.

OLFACTORY INDICATORS

Substances which change their smell when mixed with acid or base are known as olfactory indicators. For example onion, vanilla, clove, etc.

ONION

Paste or juice of onion loses its smell when added with base. It does not change its smell with acid.

VANILLA

The smell of vanilla vanishes with base, but its smell does not vanish with an acid. Olfactory indicators are used to ensure the participation of visually impaired students in laboratory.

SYNTHETIC INDICATOR

Indicators that are synthesized in laboratory are known as synthetic indicators. For example; phenolphthalein, methyl orange, etc

Phenolphthalein is a colourless liquid. It remains colourless with acid but turns into pink with a base.

Methyl orange is originally orange in colour. It turns into red with acid and turns into yellow with base.

Indicator	Original colour	Acid	Base
Red litmus	Red	No change	Blue
Blue litmus	Blue	Red	No change
Turmeric	Yellow	No change	Reddish brown
Red cabbage juice	Purple	Reddish	Greenish yellow
Phenolphthalein	Colourless	Colourless	Pink
Methyl orange	Orange	Red	Yellow
Onion	n/a	No change	Smell vanishes
Vanilla	n/a	No change	Smell vanishes

UNIVERSAL INDICATOR:

Using a litmus paper, phenolphthalein, methyl orange, etc. only the acidic or basic character of a solution can be determined, but use of these indicators does not give the idea about the strength of acid or base. So, to get the strength as well as acidic and basic nature of a given solution universal indicator is used.

Universal indicator shows different colour over the range of pH value from 1 to 14 for a given solution. Universal indicator is available both in the form of strips and solution. Universal indicator is the combination of many indicators, such as water, propanol, phenolphthalein, sodium salt, sodium hydroxide, methyl red, bromothymol blue monosodium salt, and thymol blue monosodium salt. The colour matching chart is supplied with universal indicator which shows the different colours for different values of pH.


