NCERT Solution

Acids, Bases and Salts

Exercise

1. State differences between acids and bases.

Answer:

Acid	Bases
Acids are sour in taste	Bases are bitter in taste and soapy to touch.
The chemical nature of such substances is acidic.	The nature of such substances is said to be basic.
Acid turns blue litmus red	Bases turn red litmus blue
Acids are generally found in Vinegar, Curd,Spinach, Amla, Citrus fruits, Tamarind, grapes, unripe mangoes, Citrus fruits such as oranges, lemons, etc	Bases are generally found in lime water, soap, window cleaner, Milk of Magnesia

2. Ammonia is found in many household products, such as window cleaners. It turns red litmus blue. What is its nature?

Answer :

If a solution turns red litmus to blue thus, solution is basic in nature. So ammonia is a basic in nature because it turns red litmus to blue.

3. Name the source from which litmus solution is obtained. What is the use of this solution?

Answer:

Litmus is extracted from lichens. It is most commonly used as an indicator to determine the chemical nature of substance. It has a mauve (purple) colour in distilled water. When added to an acidic solution, it turns red and when added to a basic solution, it turns blue. It is available in the form of a solution, or in the form of strips of paper, known as litmus paper. Generally, it is available as red and blue litmus paper. To test a substance whether a solution is an Acid or a base or neutral, litmus test is performed in which the Acid turns blue litmus red, Bases turn red litmus blue and has no effect on neutral solutions.

4. Is the distilled water acidic/basic/neutral? How would you verify it?

Answer:

The Distilled water is neutral.

It can be verified by:

Taste: It is neither sour (Acidic) nor bitter (Basic).

Litmus test: It neither turns blue litmus red nor red litmus blue hence we can say, distilled water is neutral substance.

5. Describe the process of neutralisation with the help of an example.

Answer :

Neutralisation is a process in which an acid solution when mixed with base solution, react with each other to produce a salt and water along with evolution of heat. Salt so produced, may be acidic, basic or neutral in nature. In this process the acidic nature of the acid and the basic nature of the base are destroyed.

Example :

In the following reaction Hydrochloric acid (HCl) when added to Sodium hydroxide (NaOH) will produce Sodium chloride (NaCl) along with Water (H_2O) and heat.

$$HCl + NaOH \rightarrow NaCl + H_2O$$

6. Mark 'T' if the statement is true and 'F' if it is false:

(i) Nitric acid turns red litmus blue.

(ii) Sodium hydroxide turns blue litmus red.

(iii) Sodium hydroxide and hydrochloric acid neutralize each other and form salt and water.

(iv) Indicator is a substance which shows different colours in acidic and basic solutions.

(v) Tooth decay is caused by the presence of a base.

Answer:

(i) Nitric acid turns red litmus blue. (F)

(ii) Sodium hydroxide turns blue litmus red. (F)

(iii) Sodium hydroxide and hydrochloric acid neutralize each other and form salt and water. (T)

(iv) Indicator is a substance which shows different colours in acidic and basic solutions. (T)

(v) Tooth decay is caused by the presence of a base. (F)

7. Dorji has a few bottles of soft drink in his restaurant. But, unfortunately, these are not labelled. He has to serve the drinks on the demand of customers. One customer wants acidic drink, another wants basic and third one wants neutral drink. How will Dorji decide which drink is to be served to whom?

Answer :

An Acidic drink will have a sour taste and will turn blue litmus red. A basic drink will turn red litmus blue. A neutral drink will not change the colour of red or blue litmus. He can also use turmeric solution for checking the drinks.

8. Explain why:

(a) An antacid tablet is taken when you suffer from acidity.

(b) Calamine solution is applied on the skin when an ant bites.

(c) Factory waste is neutralised before disposing it into the water bodies.

Answer:

(a) An antacid tablet is taken when we suffer from acidity, as it neutralize the acidity in the stomach caused by hydrochloric acid.

(b) The sting of an ant contains formic acid. When an ant bites, it injects the acidic liquid into the skin. The effect of the sting can be neutralized by rubbing some moist solution of a basic substance such as baking soda (sodium hydrogen carbonate) or calamine solution, which contains zinc carbonate.

(c) The wastes of many factories contain acids. If they are allowed to flow into the water bodies, the acids will kill fish and other organisms. The factory wastes are, therefore, neutralized by adding basic substances.

9. Three liquids are given to you. One is hydrochloric acid, another is sodium hydroxide and third is a sugar solution. How will you identify them? You have only turmeric indicator.

Answer :

Turmeric which is yellow in colour, when exposed to neutral (Sugar Solution) or acidic substances (Hydrochloric Acid) it will retain its yellow colouration. However, if turmeric is exposed to more alkaline substances (sodium hydroxide) it becomes dark pink/red. So first we detect sodium hydroxide : a basic substance by a colour change from yellow to dark red. Then will test for an acid or neutral substance with indication of no colour change. Now out of these two we will add one with already tested solution for basic substance -sodium hydroxide which gave dark red colour, if on mixing the colour reverses back to yellow, the liquid is an acid and the remaining third liquid is neutral.

10. Blue litmus paper is dipped in a solution. It remains blue. What is the nature of the solution? Explain.

Answer:

Blue litmus paper when dipped in a solution, if it remains blue. The nature of the solution is neutral.

Note: Neutral solution does not change the colour of blue or red litmus.

11. Consider the following statements:

(a) Both acids and bases change colour of all indicators.

(b) If an indicator gives a colour change with an acid, it does not give a change with a base.

(c) If an indicator changes colour with a base, it does not change colour with an acid.

(d) Change of colour in an acid and a base depends on the type of the indicator.

Which of these statements are correct?

(i) All four (ii) a and d (iii) b and c (iv) only d

Answer :

(iv) Only:- Change of colour in an acid and a base depends on the type of the indicator