

Prepare 250 ml of 5N HCl from the given 12N HCl

To prepare 250 ml of 5N HCl from 12N HCl, the volume of concentrated acid required can be calculated by using the normality equation :

$$N_1V_1 = N_2V_2$$

where, N_1 = Normality of concentrated acid = 12 N

V_1 = Volume of concentrated acid required = ?

N_2 = Normality of dilute acid to be prepared = 5 N

V_2 = Volume of dilute acid to be prepared = 250 ml.

$$12 \times V_1 = 5 \times 250$$

$$V_1 = \frac{5 \times 250}{12} = 104.2 \text{ ml}$$

Therefore 104.2 ml of concentrated acid should be taken and diluted with water to make the volume 250 ml. The resulting solution will be 5N HCl.

Apparatus

Measuring cylinder, 250 ml measuring flask, beakers and glass rod.

Procedure

1. Calculate the volume of 12N HCl required for preparing 250 ml of 5N HCl.
2. With the help of a measuring cylinder, take about 100 ml of distilled water in a 400 ml beaker. (This volume of water is slightly less than the volume of water which will be required).
3. Take 104.2 ml of given concentrated HCl in a measuring cylinder. Add it slowly and carefully, with stirring with a glass rod, to the water taken in the beaker. Cool the beaker under tap water from time to time.
4. After all the acid has been added, transfer the solution from the beaker to a 250 ml measuring flask. Add more of water so that the total volume becomes 250 ml.
5. Stopper the measuring flask and shake the solution well to make it uniform. Label it as 5N HCl.

Precautions

1. While diluting acid with water, always **add acid to water and not the water to acid**.
2. Pour the concentrated acid into water very slowly.
3. When sulphuric acid is diluted, dilution is done in instalments and the mixture is cooled under tap water after each addition. This is done because dilution of sulphuric acid is exothermic and a large amount of heat is liberated during its dilution.
4. Concentrated acids are highly corrosive and therefore, should be handled with great care.
5. Measure the concentrated acid in a small measuring cylinder. If pipette is to be used, make use of a pipette filler. **Do not suck it.**
6. Go on stirring the solution with a glass rod when you are adding the concentrated acid to water. This ensures uniform rise of temperature throughout the solution. This avoids local heating which may otherwise break the glass vessel.
7. If any acid falls on any part of the body, wash it with water thoroughly. Then apply some ointment.