EXPERIMENT

Aim

Prepare 250 ml of M/10 solution of oxalic acid from crystalline oxalic acid.

Theory

Molecular mass of crystalline oxalic acid $\begin{pmatrix} COOH.2H_2O \\ | \\ COOH \end{pmatrix} = 126$

Hence, for preparing 1000 ml of 1M oxalic acid, weight of oxalic acid crystals required = 126 g.

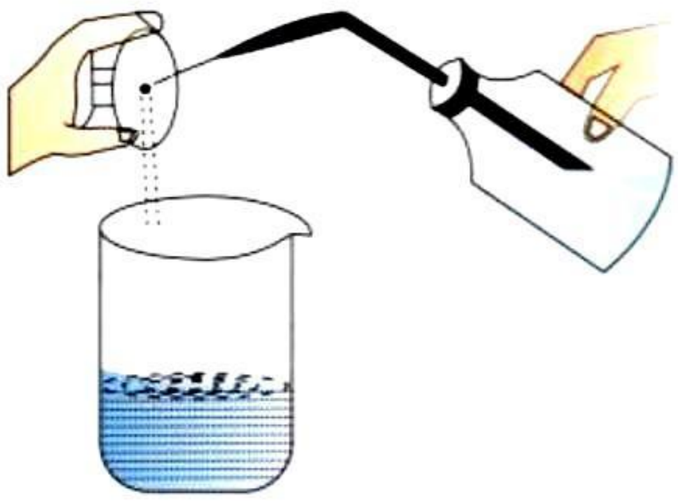
∴ For preparing 250ml of 0.1M solution, oxalic acid crystals required $= \frac{126}{1000} \times 250 \times 0.1 = 3.150$ g.

Material Required

Watch glass, analytical balance, weight box, fractional weight box, 250 ml beaker, glass rod, 250 ml measuring flask, wash bottle, Oxalic acid crystals and distilled water.

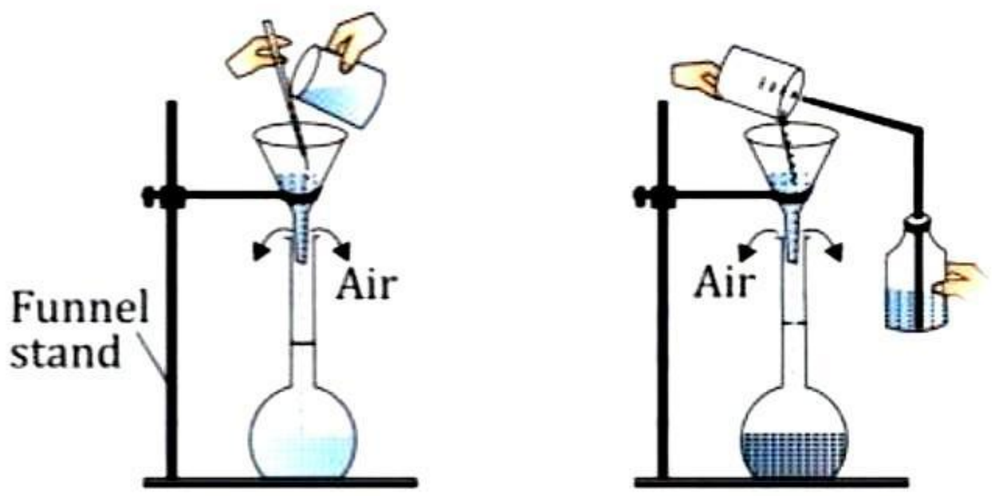
Procedure

1. Take a watch glass, wash it with distilled water and then dry it.
2. Weigh the clean and dried watch glass accurately and record its weight in the notebook.
3. Weigh 3.150 g oxalic acid on the watch glass accurately and record this weight in the notebook.
4. Transfer gently and carefully the oxalic acid from the watch glass into a clean 250 ml beaker. Wash the watch glass with distilled water with the help of a wash bottle to transfer the particles sticking to it into the beaker Fig.13.
5. The volume of distilled water for this purpose should not be more than 50 ml.
6. Dissolve oxalic acid crystals in the beaker by gentle stirring with a clean glass rod.
7. When the oxalic acid in the beaker is completely dissolved, transfer carefully the entire solution from the beaker into a 250 ml measuring flask (volumetric flask) with the help of a funnel Fig.14.



Washing of watch glass to transfer sticking particles to the beaker

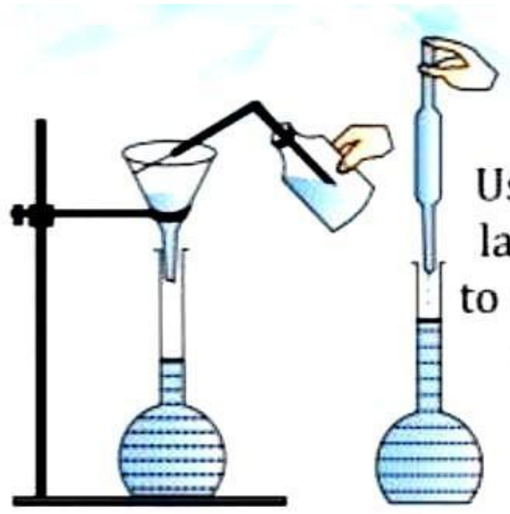
Fig.13



Transferring solution to measuring flask **Transferring last traces of solution to measuring flask**

Fig.14

8. Wash the beaker with distilled water. Transfer the washings into the measuring flask Fig.15.
9. Finally wash the funnel well with distilled water with the help of a wash bottle to transfer the solution sticking to the funnel into the measuring flask.
10. Add enough distilled water to the measuring flask carefully, up to just below the etched mark on it, with the help of a wash bottle.
11. Add the last few drops of distilled water with a pipette until the lower level of the meniscus just touches the mark on the measuring flask Fig.15.
12. Stopper the measuring flask and shake gently to make the solution uniform through-out. Label it as oxalic acid solution.



Use pipette to add last drop of water to make the volume up to the mark

Washing last traces of solution from funnel to the measuring flask **Using pipette to add last drop of water to make the volume upto the mark**

Fig. 15

Precautions

As discussed under handling of balance and use of measuring flask.

While preparing standard solution, about 5 mL of freshly prepared dil. H_2SO_4 is added before adding water. This is done to prevent hydrolysis.

Note:

- Similarly a solution of desired normality can also be prepared.
- To prepare a Solution of Mohr's salt.

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Q 1. What is the molecular formula of oxalic acid?

Ans. The molecular formula of oxalic acid is $C_2H_2O_4$.

Q 2. What is the molarity of a solution?

Ans. Molarity (M) is a measure of the concentration of a solute in a solution, expressed as the number of moles of solute per liter of solution.

Q 3. What does "$\frac{M}{10}$ solution" mean?

Ans. $\frac{M}{10}$ denotes a solution that has a concentration (one-tenth) $\frac{1}{10}$ of the molar concentration (M) of the solute.

Q 4. Why is it important to use distilled water for preparing the solution?

Ans. Distilled water is free from impurities that could affect the accuracy of the solution's concentration or react with the solute.

Q 5. How would you ensure that the solution is accurately prepared?

Ans. Ensure that the weighing of oxalic acid is precise using an analytical balance, and accurately measure the final volume using a volumetric flask or graduated cylinder.

Q 6. What safety precautions should be taken while handling oxalic acid?

Ans. Safety goggles, gloves, and a lab coat should be worn to protect against contact with oxalic acid, which can cause irritation to the skin, eyes, and respiratory system.