Chemistry Practical Class 11 Determination of strength of a given solution of sodium hydroxide by titrating it against a standard solution of oxalic acid Viva Questions with Answers

Q1. What is the principle of volumetric analysis?

Answer. The concentration of a solution is determined in volumetric analysis by allowing a known volume of it to quantitatively react with another solution of known concentration.

Q2. What is titration?

Answer. Titration is the process of adding one solution from the burette to another in the titration flask in order to complete the chemical reaction.

Q3. What is an indicator?

Answer. A chemical substance that changes colour at the endpoint is known as an indicator.

Q4. What is the endpoint?

Answer. The endpoint of the titration is the point during titration when the reaction is nearly complete.

Q5. Why are the burette and the pipette rinsed with the solution with which these are filled?

Answer. If you rinse the burette with the solution to be used, any tiny amounts of liquid remaining are the same as the solution used to fill the burette, and they will not affect the solution's concentration in any way.

Q6. Which indicator is used in the titration of oxalic acid vs sodium hydroxide? Can the titration be performed by using some other indicator?

Answer. In the titration of oxalic acid and sodium hydroxide, phenolphthalein is used as an indicator because it changes colour in the titration pH range (8.3 – 10).
Any indicator with a pH range of 3.5 to 10 will detect the equivalence point. As a result, either phenolphthalein or methyl orange could be used as an indicator.

Q7. Why should one read the lower meniscus in the case of colourless and transparent solutions and the upper meniscus for solutions of dark colour?

Answer. When measuring the volume of colourless or transparent liquids, the lower meniscus must be read, but the upper meniscus must be read when measuring the volume of coloured liquids because the phase boundary in the colourless liquid is clearly visible and easy to read.

Q8. Which indicator is used in this titration?

Answer. In this titration phenolphthalein (HPh) is used as an indicator.

Q9. What do you mean by a 1.0 M solution?
Answer. A 1.0 M solution contains one mole of solute per litre of solution.

Q10. Why should the last drop of the solution not be blown out of a pipette?

Answer. This is due to the fact that the drops remaining in the jet end exceed the volume measured by the pipette.

Q11. Explain the term basicity of acid and acidity of a base?

Answer. The basicity of an acid is defined as the number of hydrogen ions produced by one molecule of the acid upon complete dissociation, whereas the acidity of a base is defined as the number of hydroxyl ions produced by one molecule of the base upon complete dissociation.

Q12. For titrating NaOH vs HCl, phenolphthalein and methyl orange, both are suitable indicators. Why?

Answer. Methyl orange is used as an indicator in the titration of a strong acid and a weak base. When performing a titration between a strong base and a weak acid, phenolphthalein is an excellent indicator. In this case, alkali is poured from the burette, and acid is poured into the titration flask. The colour of the solution in the titration flask shifts from colourless to pink. The human eye can easily detect this change in colour. If we put alkali in the titration flask, the colour will change from pink to colourless, and the accuracy in noting the colour change will be reduced. Any of the above indicators can be used in the titration of strong acid versus strong base.

Q13. What is meant by the term, 'concordant readings'?

Answer. Concordant readings are volumetric analysis readings that differ by less than 0.05 mL.

Q14. Can one take oxalic acid solution in the burette and sodium hydroxide solution in the titration flask? Point out the limitations of doing so if any.

Answer. No, because when a sodium hydroxide solution is added to the titration flask, the endpoint colour changes from pink to colourless. The precision in noting this change may be reduced as the compound changes from colourless to pink.

Q15. How can the molarity of the solution be calculated?

Answer. The molarity of the solution can be calculated by using the formula-
$a_1 M_1 V_1 = a_2 M_2 V_2$
where a_1, M_1, V_1 are respectively basicity, molarity and volume of acid used and a_2, M_2 and V_2 are acidity, molarity and volume respectively of base used in the titration.

Q16. What is a standard solution?

Answer. Any solution whose strength is known is called a standard solution.

Q17. What is a molar solution?

Answer. A molar solution is one that contains 1 mole of solute in one litre of solution.

Q18. What is acidimetry?

Answer. The method used to determine the strength of acid by titrating it against a standard alkali solution using a suitable indicator is known as acidimetry.

Q19. What type of reaction is an acid-alkali titration?

Answer. Neutralization titration.

Q20. What precautions need to be taken while performing the experiment?

Answer. Precautions that should be taken while performing the experiment are as follows-

- Weighing of oxalic acid crystals need weights of 2g + 1g + 100mg + 50mg.
- While weighing do not spill the substance on the balance pan.
- Rotate the knob of balance gently.
- Keep the weights in the weights box at the proper places after weighing
- Wash the watch glass carefully so that even a single crystal is not left on the watch glass.
- Bring the watch glass close to the funnel while transferring weighed substance and transfer it gently. Wash it repeatedly with distilled water.
- Wash the burette with water after titration is over.
- The last few drops should be added using a pipette to avoid the extra addition of distilled water above the mark on the neck of the measuring cylinder.