BRIEF PROCEDURE WRITING

Part A: Preparation of standard solution

Weigh the given FAS in to a 250 cm^3 of volumetric flask. Add 10 cm^3 of dillute H_2SO_4. Dissolve the crystals in dematerialized water. Make up to the mark and shake well

$$\text{Normality of FAS solution} = \frac{\text{Weight of FAS} \times 4}{\text{Equivalent wt of FAS (392)}}$$

Part B: Determination of COD of waste water

Burette: Standard solution of FAS.

Conical flask: 25cm^3 of waste water sample + 25 cm^3 of standard $K_2Cr_2O_7$ using pipette + 10 cm^3 of 1:1 sulphuric acid containing (1g Ag_2SO_4+ 1g $HgSO_4$) + 3 drops of Indicator.

Indicator: Ferroin indicator

End point: Bluesh green to reddish brown.

Conduct a blank experiment under similar conditions but without the waste water sample.

From the difference in the titre values (Blank-Back), to determine the COD of the waste water sample.

VIVA-VOCE QUESTIONS AND ANSWERS

1. **What is meant by industrial sewage?**
   The waste water coming out from the industrial establishments such as chemical plants, fertilizer industries, leather tanneries, sugar and paper industries, bewereries, textiles mills, oil refineries, pharmaceutical units is called as industrial sewage.
2. **What is the full form of COD?**
   COD stands for chemical oxygen demand.
3. **What is chemical oxygen demand?**
   It is the amount of oxygen required for oxidation of biologically and non-biologically oxidisable organic compound present in 1dm^3 of waste water by a strong oxidizing agent such as acidified potassium dichromate.
4. **What is full form of BOD?**
   BOD stands for biological oxygen demand.
5. **What is biological oxygen demand?**
   It is the amount of oxygen requires for the biological oxidation of organic compounds present in 1dm^3 of wastewater over a 5 days period at 20 °C.
6. **What is back titration?**
   Back titration is generally performed when the sample doesn't react with the standard solution. It is performed by taking excess of reagent which can react with the sample and the standard solution.
7. **What is blank titration?**
   Since the blank titration gives the amount of reagent left in excess and not the amount of reagent used up by the sample, blank titration is performed in the same way as the back but without using the sample. Difference between back and blank titre values gives the amount of reagent used up.
8. **What is the role of silver sulphate in the determination of COD?**
   Silver sulphate acts as catalyst in the oxidation of straight chain aliphatic hydrocarbons and acetic acid. Oxidation is effective in presences of silver ions.
9. **What is the role of mercuric sulphate in the determination of COD?**
   Chloride ions normally present in high concentration in waste water undergo oxidation in COD test and cause erroneous high results. Mercuric ions of mercuric sulphate bind the halide ions present in water to form poorly ionized mercuric chloride and prevent the formation of AgCl precipitate by making halide ions unavailable.
10. **What are the oxidisable impurities present in waste water?**
    Wastewater contains organic impurities such as straight chain aliphatic compounds, straight chain alcohols, aromatic compounds etc.
11. **What is the indicator used in COD experiment?**
    Ferroin indicator (Ferrous 1, 10 phenanthroline sulphate)

12. What is the colour at the end point?

Blue green to reddish brown.

13. Why the sulphuric acid is added during the preparation of standard FAS solution?

Sulphuric acid is added to prevent the hydrolysis of ferrous sulphate into ferric hydroxide.

14. What is the role of $K_2Cr_2O_7$ in COD analysis?

Potassium dichromate oxidizes the organic matter present in waste water.

15. What are the products formed on oxidation of organic matter?

$K_2Cr_2O_7$ oxidizes organic matter to CO_2 and H_2O

16. Which organic compounds are not oxidized in COD analysis?

Aromatic hydrocarbons and pyridine are not oxidized in COD test.

17. Mention a few application of COD analysis?

The COD test is used in analysis of industrial waste water.

The COD test gives the pollution level of industrial waste water.

18. Among COD and BOD, which is higher in value?

COD is higher in value

19. What is the unit in which COD is expressed?

COD is expressed in mg of oxygen per dm^3 of waste water.