

3 Hours

(Total marks: 80)

- N.B. 1. All questions are compulsory  
 2. Figures to right indicate full marks.  
 3. Draw neat labelled diagrams wherever necessary.  
 4. Attempt answer of each main question on new page.

Q.1 A. Explain the terms: (8)

- i. Cerimetry
- ii. Permanganometry
- iii. Overvoltage
- iv. Electrogravimetry
- v. Ostwald's ripening
- vi. Sequestering agent
- vii. Molality
- viii. Primary standard

B. Answer the following questions: (12)

- i. Balance following reaction -  

$$\text{MnO}_4^- + \text{Fe}^{2+} \rightarrow \text{Mn}^{2+} + \text{Fe}^{3+}$$
- ii. How will you prepare 350ml solution of 0.95 N HCl from given one litre of 1.47N solution.
- iii. Give reasons:
  - a. Mohr' determination is carried out within a pH range of 6.5 to 9.
  - b. Mohr's method is not suitable for determination of iodides (I<sup>-</sup>) and thiocyanates (SCN<sup>-</sup>)
- iv. Calculate how much quantity of substance will remain in aqueous phase, if a single extraction of 1g solute having partition coefficient K=7 between chloroform and water is carried out with equal volumes (20ml) of each solvents.
- v. Name indicator and titrant used in – i. Assay of dried ferrous sulphate  
 ii. Assay of ascorbic acid API
- vi. State Faraday's laws of electrolysis.

Q. 2 A. What is Aquametry? Write principle and reactions involved in Karl Fischer Titration. (4)

OR

Discuss in detail method used for determining organically bound halogens.

B. i. Explain differentiating and levelling effects exerted by solvents in non aqueous titration. (4)

ii. Complete the following table:

Compound	Titrant used in its assay	Indicator
Sodium benzoate		
Acetazolamide		

C. What is fractional precipitation? Discuss the estimation of halides using adsorption indicators. (4)

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- Q. 3 A. Write a note on normal pulse polarography and differential pulse polarography. (4)
- B. What is the difference between iodometric and iodimetric titration? Give the equations involved in the assay of potassium iodide. (4)
- C. Write principle, chemical reactions and end point determination involved in the assay of calcium gluconate injection **or** assay of aspirin API. (4)

- Q. 4 A. Explain the neutralisation curve for titration of strong acid with strong base by taking suitable example. (4)
- B. What is gravimetry? Explain organic and inorganic precipitants with suitable examples and reactions. (4)
- C. Give the role of: (4)
- Sulphuric acid in permanganometry
  - Ferrous in cerimetry
  - Starch in iodimetry
  - Sodium thiosulphate in iodometry

- Q. 5 A. A series of extract assays yielded the following values in terms of mg of total alkaloid per 100mL. (4)

33.40 mg	32.99 mg	33mg	31.95mg	32.35mg
33.5 mg	33.33mg	32mg	31mg	

Calculate mean, median, R.S.D and variance for the recorded values.

- B. Explain how pH is an important factor in complexometric titrations. Write structure and properties of EDTA as a complexing agent. (4)
- C. What is separability factor? Write a note on counter current extraction. (4)
- Q. 6 A. i. What volume of 1N H<sub>2</sub>SO<sub>4</sub> would be required to neutralize 60 ml of 1.256 N NaOH. (2)
- ii. How will you prepare 200 ml 0.25 N KMnO<sub>4</sub> solution. (mol.wt.158) (2)
- B. i. In Kjeldahl's estimation of an unknown compound, ammonia obtained from 0.99 g of an organic compound was received in 98 mL M/20 HCl, the residual acid in flask required 49 mL of M/20 NaOH for complete neutralization in back titration. What is the percentage of nitrogen in the compound? (2)
- ii. Explain end point determination using external indicator in assay of Sulphacetamide sodium. (2)
- C. i. Give reactions involved in assay of Nickel by dimethylglyoxime. (2)
- ii. Calculate gravimetric factor involved in gravimetric determination of sulphates as barium sulphate. (2)
- [Atomic weights: C:12, H:1, O:16, N:14, Ba: 137.33 , S:32]
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**QP CODE : 26212**