

(3 Hours)

[Total Marks : 70

- N.B. : (1) All questions are compulsory
(2) **Figures to right** indicate full marks
(3) **Draw neat labelled diagram**, write chemical reactions and give examples wherever **necessary**
(4) Attempt each **main** question on **new** page.

1. (a) Explain the terms 5
(i) Molar solution
(ii) Sequestering Agents
(iii) Standard Reduction Potential
(iv) Iodometry
(v) Common ion effect
- (b) Answer the following 10
(i) Differentiate between 1M & 1N solution with respect to KMnO_4
(ii) Balance the following equations of redox reactions
(a) $\text{Cr}_2\text{O}_7^{2-} + \text{I}^- \rightarrow \text{Cr}^{3+} + \text{IO}_3^-$
(aq) (aq) (aq) (aq)
(b) $\text{Mn}^{2+} + \text{ClO}_3^- \rightarrow \text{MnO}_2 + \text{ClO}_2$
(aq) (aq) (aq) (aq)
(iii) What are the potentiostatic and amperostic conductometric methods
(iv) Explain the terms
(a) Constant current electrolysis
(b) Over voltage
(v) A Partition coefficient of a solute between water and diethyl ether is 5. If 12 ml of an aqueous solution of the compound is extracted with 18 ml of organic solvent, what percentage of original solute will be found in organic layer after equilibrium ?
2. (a) Explain Mohr's method and Volhard's method of Argentometric titrations 4
(b) What is Aquametry. Give composition, preparation and stability of KFR 4
OR
(b) Explain Amperometric titrations with DME 4
(c) Explain levelling and differentiating effect of solvents for non aqueous titrations 3
3. (a) What is pharmacopoeial Monograph. Give dose, Therapeutic category and principle for Assay of Aspirin 4
(b) Give construction and working of DME. Give its advantages 4

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- (c) Give Indicator and titrant for 3
- (i) Assay of KMnO_4 by Iodometry
 - (ii) Assay of Hydrogen peroxide solution
 - (iii) Assay of Ascorbic acid

4. (a) Explain color change exhibited by phenolphthalein in strong acid and strong base titrations with the help Ostwald's theory 4

OR

- (a) Explain Neutralization Curve for HCl and NaOH titration 4
 - (b) Enlist unit operations in gravimetry. Explain precipitation in detail 4
 - (c) Explain permanganometry and cerimetry with suitable example 3
5. (a) Define and differentiate with suitable example "direct and back EDTA titrations" 4
- (b) Explain factors influencing solvent extraction. 4
- (c) Calculate : Mean, SD and CV for following data 3

% content of KI in lugol's sol	9.51	9.32	9.30	9.41	9.11
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6. (a) When 50 cm^3 of 0.1 M HCl is titrated with 0.1 M NaOH . Calculate the pH values at the start of the titration and after addition of $10, 50, 60 \text{ cm}^3$ of titrant 4

OR

- (a) (i) A sample has hydrogen ion concentration of $2.9 \times 10^{-4} \text{ M}$. What is the pH? Is the solution acidic? 2
- (ii) How will you prepare 750 ml of 0.05 M KIO_3 solution using 1 M stock solution of KIO_3 2
- (b) (i) A 0.45 g of an organic substance was evolved and absorbed in 60 ml of 0.1 N HCl solution. The unreacted HCl was titrated with 0.1 N NaOH . The Burette reading for back titration was 33.2 ml . Determine percentage of Nitrogen in substance 2
- (ii) Explain in brief "nitrite titrations" 2

OR

- (ii) Give Absorbing liquids used in oxygen combustion flask method for determination of organically bound F, Cl, Br, I 2
- (c) Calculate gravimetric factor for 3

Substance sought	Substance weighed
SO_4	BaSO_4
P	Ag_3PO_4

At. Wt S=32.06, O=15.99, P=38.97, Ba=137.33, Ag=107.87