22CH4D5:SEPARATION TECHNIQUES AND ELECTRO ANALYTICAL TECHNIQUES

Course Code	22CH4D6	I A Marks	30
No. of Lecture Hours / Week	4	End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Seminar	-	Exam Hours	03

S.No	COURSE OUTCOMES	PO`s
	The student will be able to	
1	Memorize the theory and principles of separation techniques in chemical analysis	2,7
2	Understand the significance of chromatography in separation of components and quantitative determination	1,2,7
3	Exercise theconceptual knowledge of chromatography in chemical analysis	1,6
4	Analyze the roleof the analytical techniquesin quantitative and qualitative analysis	1,7
5	Assess the data obtained in the instrumental analysis of chemical compounds.	1,7

CO-PO MATRIX								
COURSE CODE 22CH4D6	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1		M					M
	CO2	H	M					M
	CO3	H					H	
	CO4	H						M
	CO5	H						M

UNIT-I

SEPARATION TECHNIQUES IN CHEMICAL ANALYSIS: SOLVENT EXTRACTION :Introduction,principle,techniques,factors affecting solvent extraction, quantitative treatment of solvent extraction equilibria-chelate and ion association systems-synergism., ION EXCHANGE : Introduction,action of ion exchange resins, separation of inorganic mixtures, applications.,

UNIT - II

CHROMATOGRAPHY: Introduction-Column, paper chromatography-Thin layer chromatography and HPLC and Gas chromatography: Introduction, equipment. Gas liquid chromatography. Exclusion chromatography.-Applications

UNIT III

Electrogravimetry: - Theory of electro analysis–Polarisation–Over voltage–Principles involved in electrogravimetric analysis–current – voltage curves – separation of metals by electrolysis – constant current – controlled potential electrolysis.

Unit IV

Coulometry: - Coulometry at controlled potential – separation of Nickel and Cobalt – coulometres – types of coulometric analysis – constant current coulometry of coulometric titrations.

UNIT –V

Voltametry, Polarography and Amperometric titrations: - Voltametry – Principle of Polarography – dropping mercury electrode; working; factors effecting the limiting current; residual current, migration current – diffusion current – kinetic current – polarographic maximum – Half wave potential – Organic Polarography, Rapid Scan polarography – cyclic voltametry – qualitative and quantitative polarographic analysis – Amperometric titrations – its advantages and disadvantages – Bi Amperometric titrations – Chrono potentiometry

SUGGESTED BOOKS:,

1. B.K.Sharma -- Instrumental methods of chemical analysis,Goel Publishers,
2 .G.Chatwal and S.Anand --Instrumental methods of chemical analysis,,
3. J.J.Lingane- Electroanalytical Chemistry- Inter Science,
4. A.I.Vogel -- A text Book of Quantitative Inorganic Analysis-ELBS,
5 .H.H.Willard,LL Merrit and JA Dean -- Instrumental Methods of Analysis.,
6. Peace-Instrumental Methods of Analysis,
7. J.W.Robbinson- Under graduate Instrumental Analysis,
8. R.A.Day and A.L.Underwood- Quantitative Analysis,
9. G.W Eving- Instrumental Methods of Chemical Analysis.,
10.D.A.Skoog,D.M.West and F.J.Holler--Fundamentals of Analytical Chemistry ,
11. H.Kaur-- Instrumental methods of chemical analysis,PragathiPrakasan,
12 .D.A.Skoog,F.J.Holler and Neman-- Instrumental Methods of Analysis.,
13.G.H.Morrison and H.Frieser- Solvent extraction in Analytical Chemistry,
14. Chemical Separation methods- JA Dean, D.Vannostrand Company, New York
15. Physical and Chemical Methods of Separation by E.W.Berg, MC Graw Hill Book Company, New York

M.Sc. DEGREE EXAMINATION
FOURTH SEMESTER

22CH4D6:: Analytical Chemistry

Time: 3 hours **Maximum Marks: 70**

SECTION – A **5X4=20M**

Answer all the questions

1) (a) What is toxicology and explain with a suitable example. (CO-3,L-3)

(OR)

(b) Discuss any one method of quantitative analysis. (CO-3,L-3)

2) (a) Explain equilibria between strong and weak acids. (CO-2,L-2)

(OR)

(b) Discuss salt hydrolysis in detail. (CO-2,L-2)

3) (a) Explain Beers law in detail. (CO-2,L-2)

(OR)

(b) Discuss chromophores in detail. (CO-2,L-2)

4) (a) Compare the importance of oxidizing and reducing agents. (CO-4,L-4)

(OR)

(b) Discuss the importance of IR drop in electrochemical cells. (CO-4,L-4)

5) (a) Explain thermo gravimetric analysis with an example. (CO-3,L-3)

(OR)

(b)Discuss differencial thermal analysis with an example. (CO-3,L-3)

SECTION – B (5x10=50M)

UNIT – I

6) (a) Explain flow diagrams in detail. (CO-2,L-2)

(OR)

(b) Explain (i) Micro analytical balance (ii) Filtration techniques. (CO-2,L-2)

UNIT – II

7) (a) Elaborate the importance of various types of equilibria on basis of chemical analysis. (CO-4,L-4)

(OR)

(b) Discuss in detail (i) Titration curves (ii) Common ion effect. Explain their importance. (CO-4,L-4)

UNIT – III

8) (a) Explain d – d, f – f transitions and its applications in detail. (CO-3,L-3)

(OR)

(b)Discuss chromophoric reagents by applying Beers law to mixtures. (CO-3,L-3)

UNIT – IV

9) (a) Discuss the (i) differential scanning calorimetry (ii) TG – plot. (CO-2,L-2)

(OR)

(b) Discuss (i) Gravimetric estimation (ii) Furnaces and crucibles. (CO-2,L-2)

UNIT – V

10) (a) Evaluate the importance of potentiometric titrations over normal titrations. (CO-5,L-5)

(OR)

(b) Explain the importance of controlled potential coulometry with a neat labeled diagram. How this method advantageous over other analytical methods? (CO-5,L-5)

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