

UNIVERSITY OF MADRAS
U.G. DEGREE COURSES
SYLLABUS WITH EFFECT FROM 2020-2021

BCY-CSA2A

ALLIED CHEMISTRY - II
(For Maths and Physics Students)
(60 Hours) 4 Credits

Learning outcome

1. To understand the fundamentals of coordination chemistry and its applications
2. To learn the structural aspects of biologically important compounds
3. To know the applications of phase rule and freezing mixtures
4. To explain the basics of electrochemistry
5. To understand the basics of Analytical chemistry

Unit I: COORDINATION CHEMISTRY (15 Hours)

Definition of terms - Classification of Ligands - Nomenclature - Chelation - EDTA and its application - Werner's Theory - Effective Atomic Number - Pauling's theory - Postulates - Hybridisation, Geometry and magnetic properties of $[\text{Ni}(\text{CN})_4]^{2-}$, $[\text{NiCl}_4]^{2-}$, $[\text{Fe}(\text{CN})_6]^{4-}$, $[\text{Co}(\text{NH}_3)_6]^{+3}$ and $[\text{CoF}_6]^{-3}$ - Biological Role of haemoglobin and Chlorophyll (elementary idea only) - Identification of metal ions like Cu, Fe and Ni.

Unit II: BIOMOLECULES (10 Hours)

Classification, preparation and reactions of glucose and fructose. Interconversion of glucose to fructose and vice versa - Preparation and properties of sucrose. Diabetes - causes and control: measures RNA and DNA (elementary idea only) - Amino acids: classification, preparation and properties of alanine.

Unit III: PHASE DIAGRAM (15 Hours)

Phase rule: Definition of terms, application of phase rule to water system - reduced phase rule and its application to Pb-Ag system. Freezing mixture - Completely miscible and partially miscible liquid systems - upper and lower critical solution temperatures

Unit IV: ELECTROCHEMISTRY (10 Hours)

Electrolytic conductance in metals and in electrolytic solution – specific conductance and equivalent conductance – Arrhenius theory of electrolytic dissociation and its limitations - weak and strong electrolytes according to Arrhenius theory – Ostwald's dilution law – applications and limitations – Conductometric titrations – strong acid vs strong base only.

Unit V: ANALYTICAL CHEMISTRY (10 Hours)

Introduction to Qualitative and Quantitative Analysis - Separation techniques - extraction – crystallization - Chromatographic separations - Principles and applications of column, paper, thin layer, gas-liquid and ion-exchange.

BOOKS FOR REFERENCE

1. Gopalan R. and Sundaram S., Allied Chemistry, Sultan Chand & Sons Publishers, New Delhi 2nded.
2. Soni P.L. and Mohan Katyal, Text Book of Inorganic Chemistry, Sultan Chand and Company Pvt. Ltd, New Delhi, 20thed.
3. Bahl B.S. and Arun Bahl, A text book of Organic Chemistry 21st ed., S. Chand and Co. Pvt. Ltd.