

TRENDS IN CHEMISTRY

(Common paper)

UNIT I

Resonance Spectroscopy-I

^1H NMR: Long-range coupling – Homotopic, enantiotopic and diastereotopic systems - Conformationally mobile, open-chain systems, Virtual coupling – Coupling of proton to fluorine, phosphorus - Nuclear Overhauser effect. ^{13}C NMR: Off resonance decoupling – Coupling of carbon to deuterium, fluorine, phosphorus – DEPT – Application of proton and carbon data in identifying small organic compounds. 2D NMR: Principles of 2D NMR spectroscopy - ^1H - ^1H COSY – ^1H - ^{13}C COSY – HMBC and HSQC. Basic principles of solid state NMR.

UNIT II

Resonance Spectroscopy-II

Basic concepts of ESR spectroscopy – Factors affecting the magnitude of g and A tensors in metal complexes – Anisotropy in g and A values - Zero-field splitting and Kramers degeneracy - Applications of EPR to some simple inorganic systems like methyl radical, p-benzoquinone and naphthalene anion, Cu(II), Fe(II), Mn(II) and Ni(II) complexes – Spin-trapping.

UNIT III

Good laboratory Practices and safety

Introduction: History, definition, principles, Good laboratory practices (GLP) and its application. GLP training: Resources, Rules, Characterization, Documentation, quality assurance, Resources, Facilities: building and equipment, Personnel, GLP and FDA, European Union, non-member countries. Stepwise implementation of GLP and compliance monitoring.

Safe working procedure and protective environment, protective apparel, emergency procedure and first aid, laboratory ventilation, Safe storage and use of hazardous chemicals, procedure for working with substances that pose hazards, flammable or explosive hazards, procedures for working with gases at pressures above or below atmospheric – safe storage and disposal of waste chemicals, recovery, recycling and reuse of laboratory chemicals, procedure for laboratory disposal of explosives, identification, verification and segregation of laboratory waste, disposal of chemicals in the sanitary sewer system, in incineration and transportation of hazardous chemicals

UNIT IV

Patents and patenting

Definitions and interpretation, criteria for patenting, types of inventions not patentable, patent application procedure, types of patent documents: provisional and complete specifications, publication and examination of patents, opposition proceeding to grant of patent, grant of patent, patent office and its establishment, patent agents, international arrangements while patenting. Exclusive Marketing Right (EMR) – Paris convention and its advantages – Patent Cooperation Treaty (PCT) and its applications.

Unit V

Environmental management: Environmental Management Systems - Life Cycle Assessment, Elements of waste minimization, clean technology, Environmental Impact Assessment, Environmental Acts and Regulations.

UNIT –V(a)

Plagiarism – Definition – History of Plagiarism – Key to avoid Plagiarism – Different forms of Plagiarism – Intentional – Unintentional – Non – Attribution – accidental – Common Plagiarism Problems – Six ways to avoid plagiarism in Research Report – Paraphrase – cite – Quoting – Citing Quotes – Citing one's own material – Referencing – Plagiarism checker services – Softwares – write check – VAILL Tutor Tool – Plagiarism Test – Pen and Paper plagiarism Knowledge Test – etc. UGC Public notice dated 01.09.2017

References:

NMR

1. P.M. Silverstein, F.X. Wester, Spectroscopic Identification of Organic Compounds, 6th Ed., Wiley 1998.
2. J. Mohan, Organic Spectroscopy Principles and Applications, CRC; 2nd Ed., 2004.
3. W. Kemp, Organic Spectroscopy, 3rd Ed., MacMillon, 1994.
4. D.L. Pavia, G.M. Lampman and G.S. Kriz, Introduction to Spectroscopy, Brooks Cole, 3rd Ed., 2000.
5. H. Gunther, NMR spectroscopy, basic principles, concepts and application in chemistry, John Wiley & Sons, 2nd Ed., 1995.

EPR

1. R. S. Drago, Physical Methods in Chemistry, Saunders, 1977.
2. R. S. Drago, Physical Methods in Inorganic Chemistry, Third Edition, Wiley Eastern,
3. J. A. Weil, J. R. Bolton and J. E. Wertz, Electron Paramagnetic Resonance: Elementary Theory and Practical Applications, John Wiley and sons, 1994.

UNIT III

1. Handbook Good Laboratory Practice (GLP) Quality Practices for Regulated Non-Clinical Research and Development
2. Good Laboratory Practice Standards: Applications for Field and Laboratory Studies (ACS Professional Reference Book) by Willa Y. Garner, Maureen S. Barge, and James. P Chemical safety matters-IUPAC –IPCS, Cambridge Univ. Press, 1992.

UNIT V

1. K. Arora, Ed., The Patents act, 1970 as amended by the patents Act 2005, Professional book publishers, 2005.
2. Manual of patent practice and procedure, Patent office, India, 2008; [http: www. Patent office.nic.in/ipr/paten](http://www.Patentoffice.nic.in/ipr/paten)