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	Dr.G.R.Chaudhari, R. B. Dhake, S. L. Vispute, Dr. D. B. Patil, Dr. U. A. Fegade	03. Analytical Techniquies Sem-VI CH-605 T.Y.B.Sc. (CBSC Pattern)					Feb-21	978-93-90483-72-3
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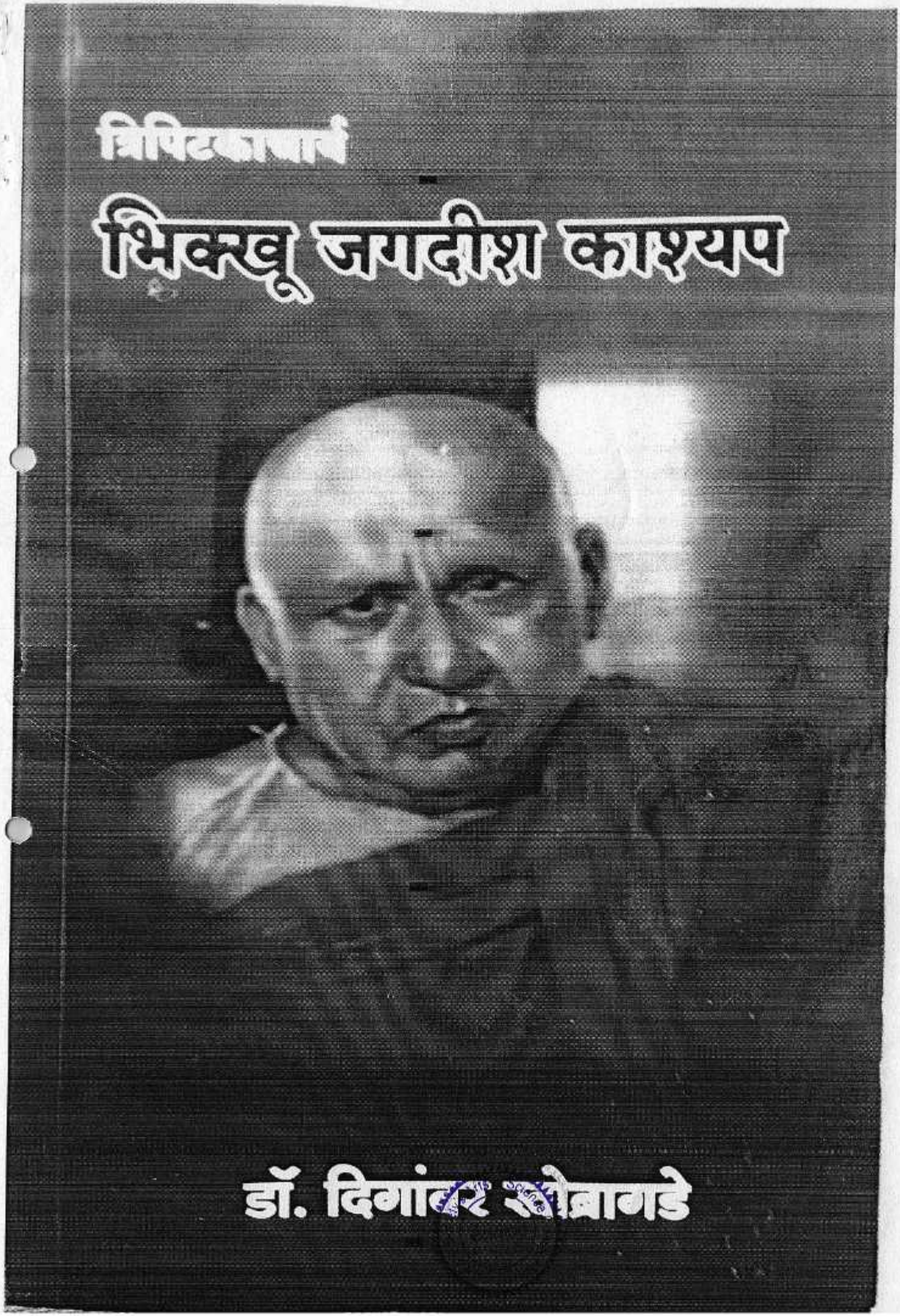

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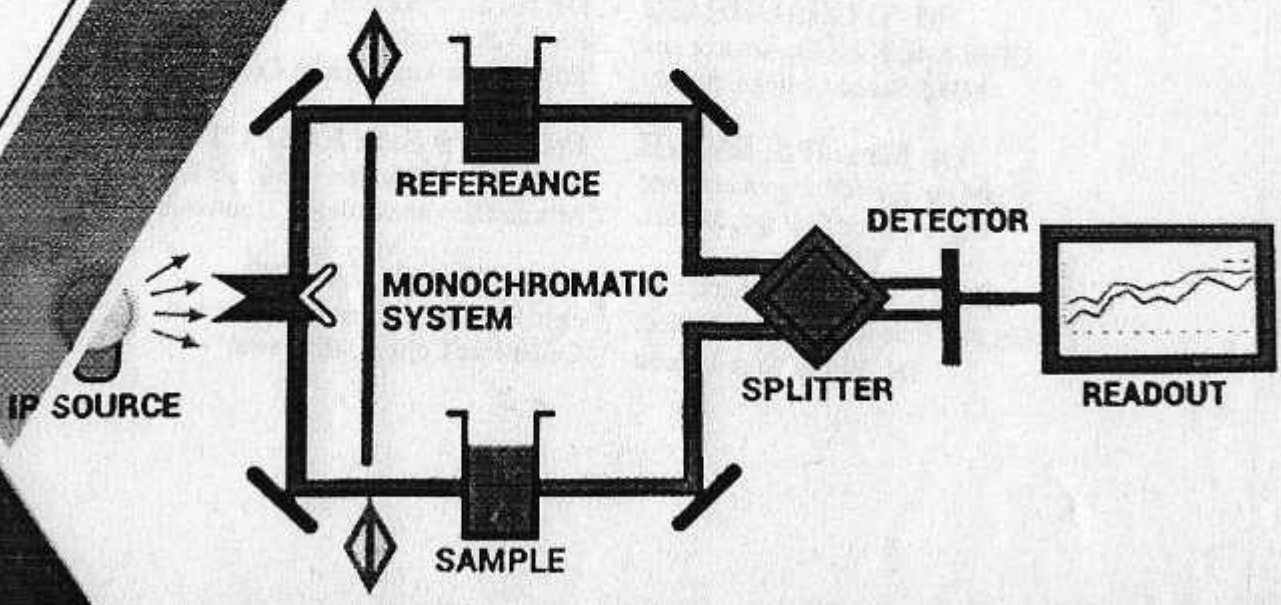

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Semester - VI, CH- 603: Spectroscopic Methods of Structure Determination

UNIT 1. A) Introduction to Spectroscopy **(L-09, M-12)**

Introduction, meaning of spectroscopy, nature of electromagnetic radiation, wave length, frequency, energy, amplitude, wave number, and their relationship, different units of measurement of wavelength and frequency, different regions of electromagnetic radiations. Interaction of radiation with matter. Excitation of molecules with different energy levels, such as rotational, vibrational and electronic level. Types of spectroscopy, advantages of spectroscopic methods.

B) Mass spectroscopy

Basic theory, Nature of mass spectrum, Importance of molecular ion peak, isotopic peaks, base peak, nitrogen rule, rule of 13 for determination of empirical formula and molecular formula

Unit 2 : Ultra Violet Spectroscopy **(L-09, M-12)**

Introduction, nature of UV spectrum, Beer's law, absorption of UV radiation by organic molecule leading to different excitations. Terms used in UV Spectroscopy: Chromophore, Auxochrome, Bathochromic shift (Red shift), hypsochromic shift (Blue shift), hyperchromic and hypochromic effect. Effect of conjugation on position of UV band. Calculation of λ-max by Woodward and Fieser rules: for dienes and enone system, Applications of UV Spectroscopy: Determination of structure, determination of stereo chemistry (cis and trans), problems.

Unit 3 : Infra-red Spectroscopy **(L-09, M-12)**

Introduction, Principle of IR Spectroscopy, fundamental modes of vibrations (3N-6, 3N-5). Types of vibrations (Stretching and bending), Regions of IR Spectrum: functional group region, finger print region and aromatic region, Characteristic IR absorption of functional groups: Alkanes, alkenes, alkynes, alcohol, ethers, alkyl-halides, carbonyl compounds (-CHO, C=O, -COOR, -COOH), amines, amides and Aromatic Compounds and their substitution Patterns. Factors affecting IR absorption: Inductive effect, resonance effect, hydrogen bonding. Applications of IR Spectroscopy: determination of structure, chemical reaction and hydrogen bonding, Problems.

Unit 4 : NMR Spectroscopy **(L-09, M-12)**

Introduction, Principles of NMR Spectroscopy, Magnetic and nonmagnetic nuclei, Precessional motion of nuclei without mathematical details, Nuclear resonance, chemical shift, shielding, & deshielding effect. Measurement of chemical shift, delta and Tau-scales. TMS as reference and its advantages, peak area, integration, spin-spin coupling, coupling constants, J-value (Only first order coupling be discussed), problems.

Unit 5 : Combined Problems Based on UV, IR, NMR & Mass **(L-09, M-12)**

Determination of structure of simple organic compounds on the basis of spectral data such as λ max values, IR frequencies, chemical shift (δ values), coupling constant, peak values provided to the students.

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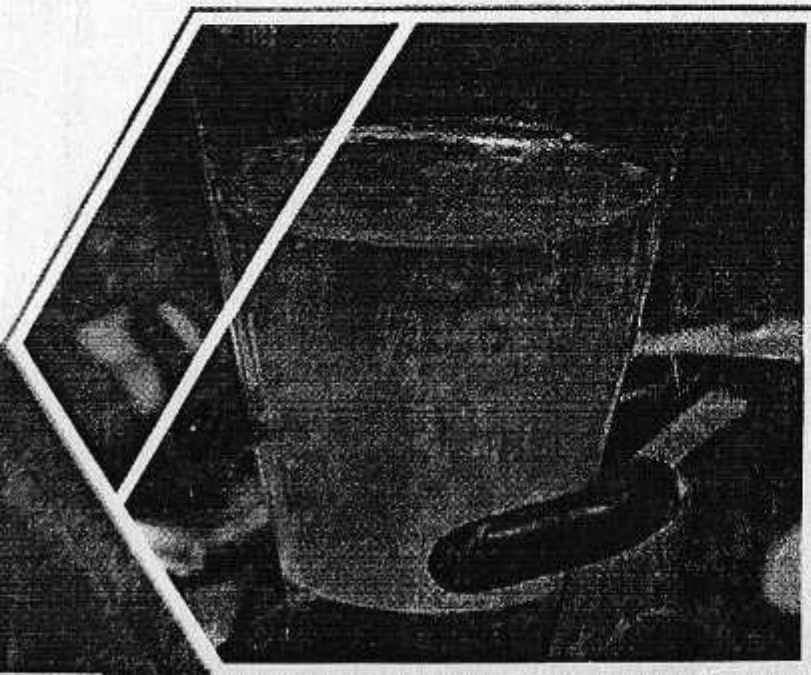

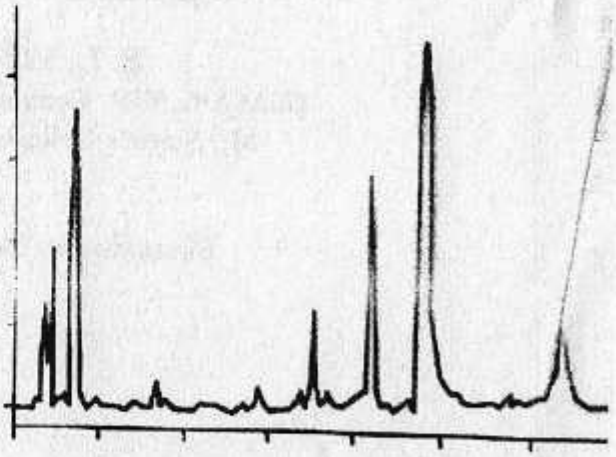

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Semester - VI, CH- 605 : Analytical Techniques

(Theory: Lectures = 45 hrs, Marks 60) **(Credits: 03)**

Unit 1 : Solvent Extraction **(L-09, M-12)**

The Distribution Co-efficient, The Distribution Ratio, Percent Extracted, Solvent Extraction of Metals - Ion Association Complex and Metal Chelates, The Extraction Process, The Separation Efficiency of Metal Chelates, Analytical Separations, Multiple Batch Extractions, Countercurrent Distribution, Simple numerical problems on Percent Extracted and Multiple Extraction, Problems.

Unit 2 : High-Performance Liquid Chromatography **(L-09, M-12)**

Introduction, Principles, Equipment for HPLC, Choice of Column Materials for HPLC, Application.

Unit 3 : Gas Chromatography **(L-09, M-12)**

Introduction, Principles, Gas chromatography Columns, Gas Chromatography Detectors, Column Efficiency in Chromatography- Theoretical Plates, 1) Van Deemter Equation, 2) Capacity Factor and 3) Resolution, Problems

Unit 4 : Ion Exchange Chromatography **(L-09, M-12)**

Introduction, Cation Exchange Resins, Anion Exchange Resins, Cross-linkage, Effect of pH Separation of Amino Acids, Effect of Complexing Agents-Separation of Metal ions on Anion, Exchange Columns, Applications of Ion Exchange Chromatography.

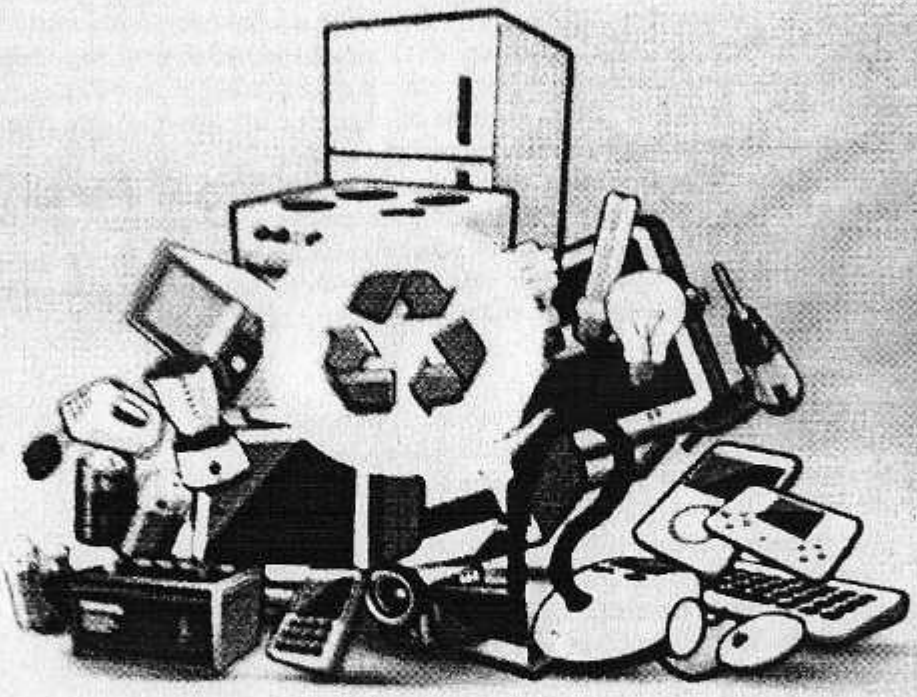
Unit 5 : Thermal Methods **(L-09, M-12)**

General Discussion, Thermogravimetry- Instruments for thermogravimetry, Applications of thermogravimetry, Differential Techniques- Differential Thermal Analysis (DTA) and Differential Scanning Calorimetry (DSC), Instruments for DTA and DSC, Experimental and Instrumental Factors, Applications of DTA and DSC, Problems

E-waste in India

Management, Challenges & Opportunities

Volume I



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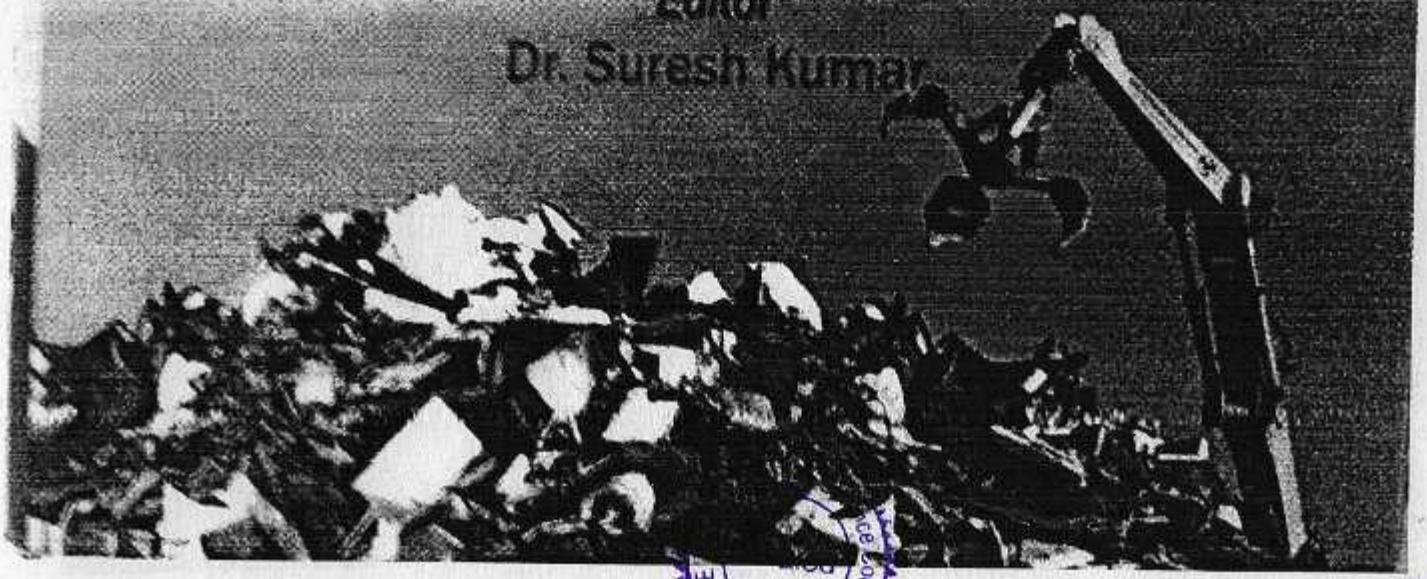

E-waste i.e., electronic waste, arising from the end-of-life electronic products, is one of the rapidly growing waste streams in the world today. E-waste produced annually is worth over $62.5 billion more than the GDP of most countries. According to the UN's Global E-waste Monitor 2020, the annual global production of E-waste is approximately 53.6 million metric tons (Mt) in 2019 which will exceed to 74 Mt till 2030. While, at present only 9.3 Mt (17.4%) of the total generated E-waste was collected and recycled globally. It means that many precious metals (gold, platinum, silver, copper, etc.) and other high-value recoverable critical materials (cobalt, palladium, indium, germanium, etc.) worth US $57 billion, dumped or burned in the E-waste every year. Besides in India, the rapid growing population and increased disposal of electrical and electronic products have instigated serious concerns to the environment and human health. India generated 3rd highest volume of E-waste (3.2 Mt) in 2019, behind China & USA. However, India's per capita (2.4 kg) E-waste generation is 1/3rd the global average (7.3 kg per capita) while it is 3-times the global average in the USA. Moreover, India a country with low recycling capacity (8 lakh tonnes annually) is an indication of big loss in terms of its inability to mine precious and critical materials from the E-waste. In addition, non-collected E-waste is also a serious health and environmental hazard as it contains several toxic substances. With the purpose of discretely collect, effectually treat, and efficiently dispose-of the E-waste, and divert it from conventional landfills and open burning, it is requisite to integrate the informal sector with formal sector. Hence, a proper E-waste management is a great challenge to all the developing countries including India. It is becoming gigantic public health and environmental issue and is exponentially increasing by the day. Several countries have framed rules and regulations, policies and guidelines to manage the E-waste for the producers, consumers and recyclers. This book will be an anthology of scholarly articles devoted to the different issues, challenges, prospects, and opportunities related to E-waste management and practices in context to India and will comprise in two volumes on the basis of following themes.

THEMES/SUB-THEMES:

1. E-waste in India: Current Scenario
2. E-waste in India: Management, Policies & Best Practices
3. E-waste in India: Issues, Implications& Opportunities
4. E-waste in India: Toxicity & Health Hazards
5. E-waste in India: Severe Environmental Threat
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E-waste in India

Management, Challenges & Opportunities

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Contents

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Issues and Opportunities Associated with E-waste in India

Padmakar Arjun Savale*

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Abstract

Progress in the field of information and communication has revolutionised the production and usage of electronic equipment exponentially increasing. These electronic equipments set fastly replaced with newer models due to the rapid technological advancements and production of newer and better electronic equipments. Faster up-gradation of electronic products is forcing the consumers to discard the old electronic products quickly, which in turn adds to the electronic waste (E-waste) to the solid waste stream. Today, E-waste become one of the fastest and biggest growing issues in India. The generation of E-waste, in various types of electronics goods, also a matter of concern because it contains many toxic and hazardous substances present. If these substances are not properly managed, they can have adverse effects on the environment. Consumers are the primary keys to the better management of E-waste and producers are the secondary ones. Initiatives such as extended producer responsibility (EPR), creating environment and awareness for reduce, reuse, recycle, and technology-based platform for linking the market which facilitate a circular economy are in their initial stages. The aim to encourage consumers to correctly dispose of their E-waste, with increased reuse and recycling rates, and adopt sustainable consumer habits must be the top priority to manage the E-waste. Therefore, a strong need to adopt sustainability practices to tackle these growing threats of E-waste is realised. This work is based on secondary data which study the E-waste composition and various hazardous materials found in the E-waste. It also focuses on the issues, implications, and opportunities of E-waste management in India.

Keywords: E-waste Management, Hazardous Substances, Implications, Opportunities

E-waste in India: Management, Challenges and Opportunities
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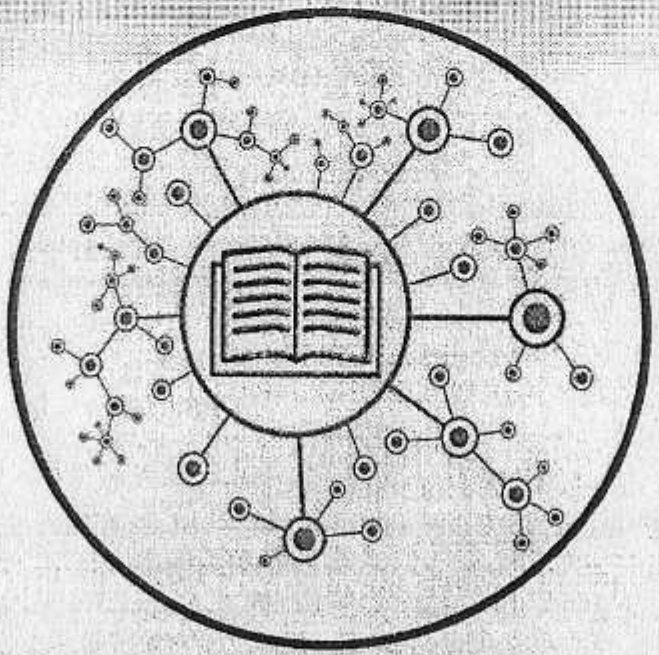

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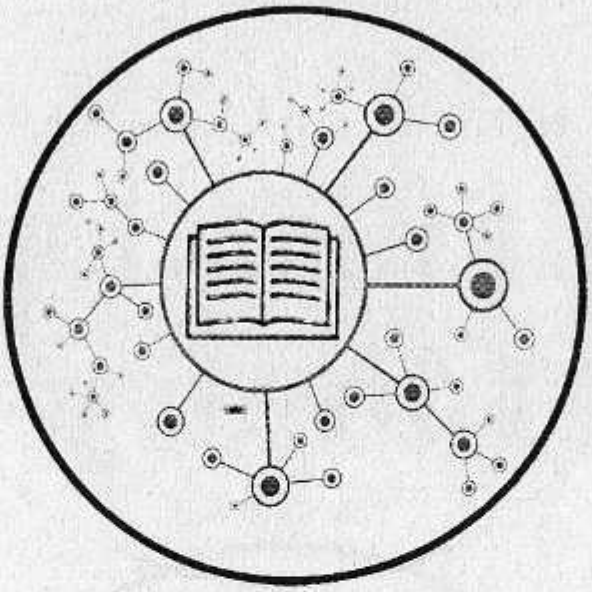

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Abstract :

Swami Ramanand Teerth Marathwada University, Nanded known for its outstanding educational quality and facilities at all levels in almost all the major disciplines of study. From the Maharashtra, twenty universities are imparting regular Economics education and two Universities are distance education, one of them is SRTMUN.The paper study covered 129 doctoral theses in Economics from Swami Ramanand Teerth Marathwada University, Nanded during 1997-2020. It has been used to analyse the research programs offered by Economics.This paper clearly project with relevant statistical tables the output of Department of Economics in SRTMUN for the past 24 Years.

Keywords:*Maharashtra,Swami Ramanand Teerth Marathwada University, Nanded, Economics, Ph. D. theses, Digital repository.*

1. Introduction:

Maharashtra is the third largest state in India, known for its outstanding educational quality and facilities at all levels in almost all the major disciplines of study. There are 36 districts in the state with best colleges and higher education institutions. We are moving ahead in all areas of developments and making massive investments in education to convert our younger population into globally competent human resources. From the Maharashtra, 53 universities out of these twenty universities are imparting regular Economics education and two Universities are distance education, one of them is Swami Ramanand Teerth Marathwada University, Nanded. It was established on September 17, 1994 by the Government of Maharashtra. The University caters to the southern part of the Marathwada region of Maharashtra covering four districts namely, Nanded, Latur, Parbhani and Hingoli. This university obtained 2(f) and 12(B) recognition of UGC and achieved recognition, name and fame at the state, national and international level in the area of academic, research and innovation and extension activities. NAAC accorded grade 'A' to University.The University has 14 Schools on campus, 4 schools at sub-campus, Latur and a sub-campus at Parbhani. The university attracts many foreign students due to its excellent facilities. It offers good accommodation facility. There is a provision of hostel for the students. University received financial assistance from RUSA, DST, UGC, etc. for development of academic infrastructure amenities, research and extension activities. Teachers have invented, patented and commercialized many ideas. Teachers have got research projects worth Rs. 12.5 crores, whose academic and social value is remarkable. Teachers and students

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