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Water testing Chemical Lab Manual

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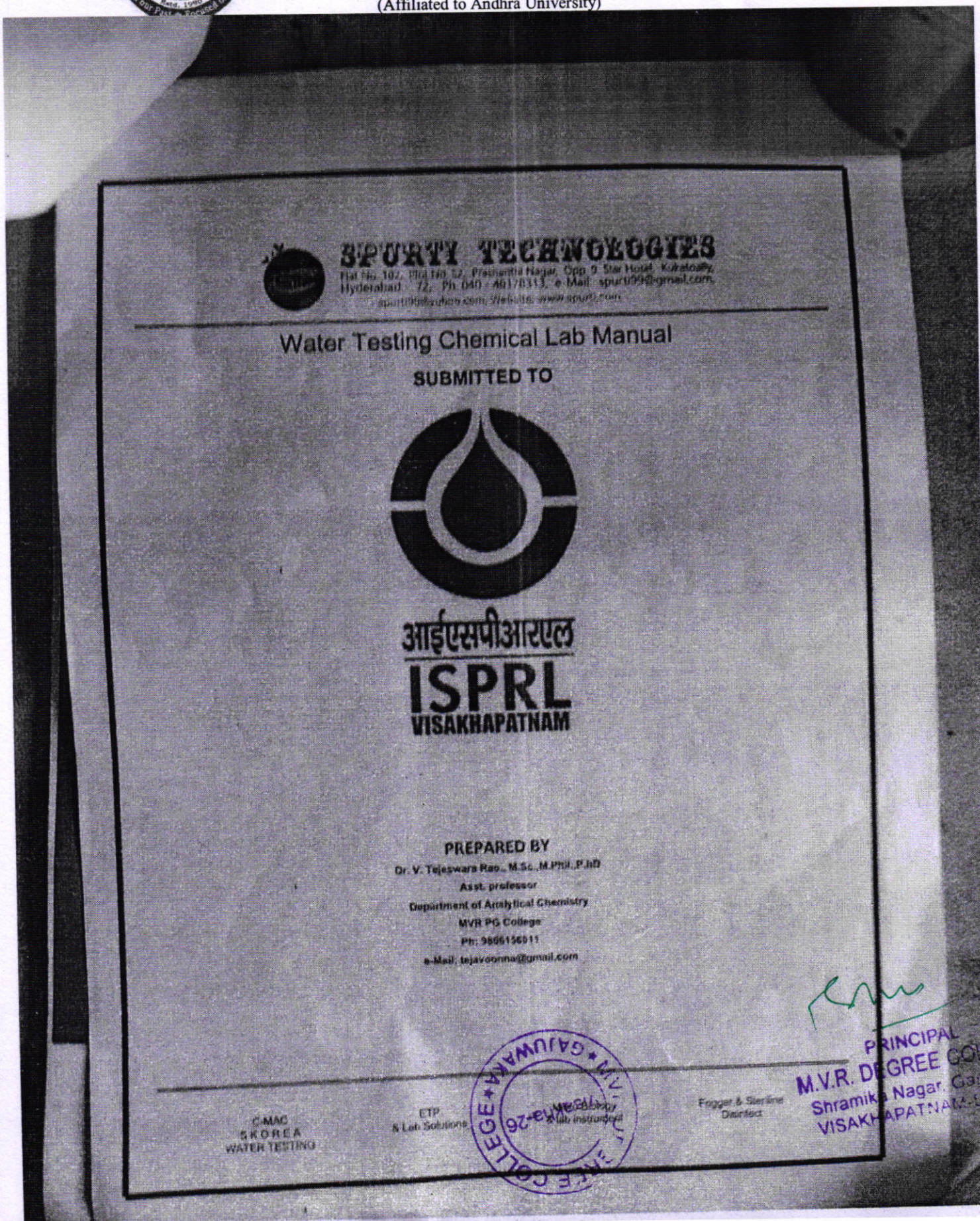

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Water Testing Chemical Lab Manual

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VISAKHAPATNAM

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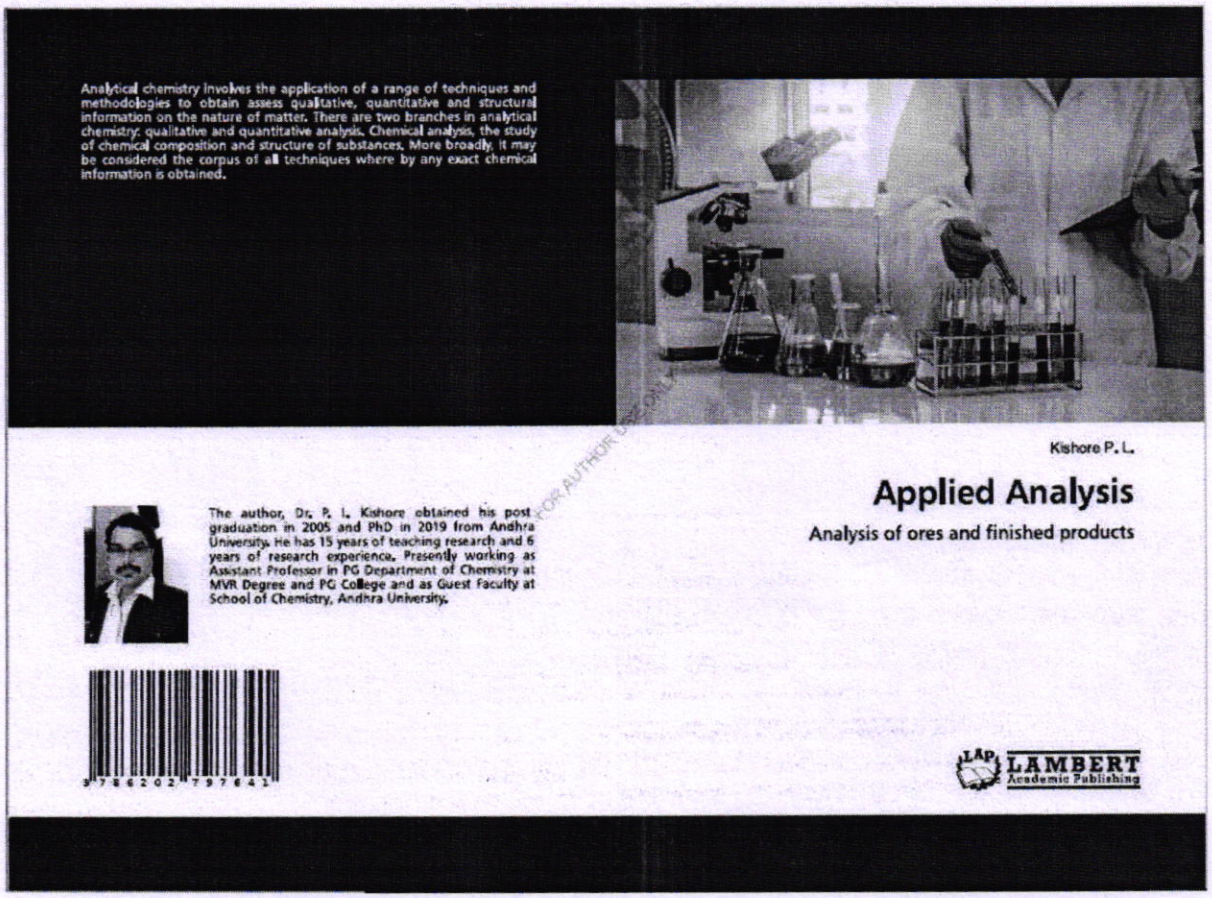

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An e-Book on

"Chemical Speciation",

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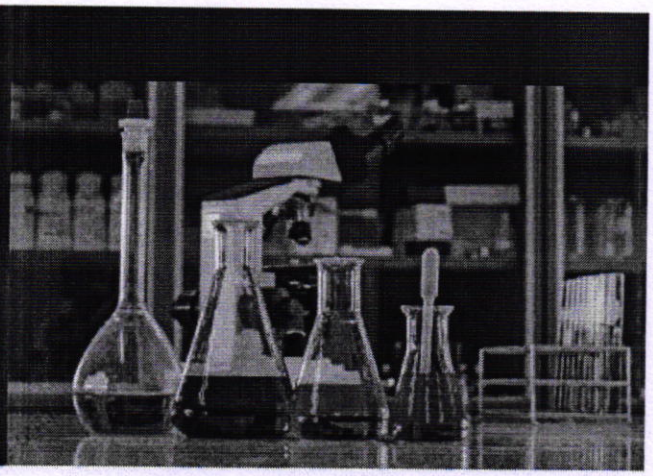
Stability constants or equilibrium constants for metal complex formation have long been employed as an effective measure of the affinity of a ligand for a metal ion in solution. The role of trace metals in biological systems is well recognized in recent years. Some of the trace metal ions like Co(II), Ni(II) and Cu(II) are essential and any variation in their biological concentrations leads to metabolic disorders. So in the present study 2-meracptosuccinic acid (MSA) and 1,10-Phenanthroline (Phen) are chosen as a model compounds to investigate the binding effect of biomolecules with the trace metal ions Co(II), Ni(II) and Cu(II) in DMF- and AN-water mixtures under conditions comparable to those of biological systems. The aim of the present study is to probe into the nature of interactions and speciation of the complexes of Co(II), Ni(II) and Cu(II) with MSA and Phen in DMF- and AN-water mixtures of varying compositions at an ionic strength of 0.16 mol dm-3 by monitoring the change in the free hydrogen ion concentration by glass electrode.



Tejeswara Rao Voonna

Chemical Speciation

Chemical Speciation of Co(II), Ni(II) and Cu(II) Complexes with MSA & PHEN in DMF and Acetonitrile Media

Dr. V. TEJESWARARAO, PhD, Chemistry from Andhra University in 2020; M.Phil. Chemistry From Acharya Nagarjuna University, Guntur in 2012, M.Sc., Analytical Chemistry From Andhra University, in the year 2005. Published 11 international publications and Working as an Assistant Professor in P.G. Chemistry in MVR PG College, Visakhpatnam.

978-620-2-51468-2

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Published Paper on e-Conference Proceedings entitled

"Carbon nanotubes in environmental protection and green engineering perspective"

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PP-34

Carbon nanotubes in environmental protection and green engineering perspective

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[3]*School of Chemistry, Andhra University, Visakhapatnam, India*

ABSTRACT

Carbon nanotubes (CNTs) have been acknowledged as the material of the 21st century. They possess unique combination of extraordinary electronic, transport, electrical and optical properties. Nanoscale sizes make them suitable for a variety of applications. They are cylinder-shaped macromolecules with a radius as small as a few nanometres, and up to several micrometres in length. The walls of these tubes are constructed of hexagonal lattice of carbon atoms and capped by fullerene-like structures. The unique structure of CNTs can be divided mainly into multi-walled carbon nanotubes (MWCNTs) and single-walled carbon nanotubes (SWCNTs).

CNTs play a major role in waste water treatment and air pollution monitoring. In waste water treatment, CNTs serve as sorbents, nano filters and antimicrobial agents to remove organic and inorganic contaminants, as well as pathogens like protozoa, bacteria and viruses. CNTs are used to remove the contaminants in waste water due to their surface active site to volume ratio and controlled pore size distribution. The electrical, electrochemical and optical properties of CNTs aroused the interest of researchers to explore the potential applications of CNTs as sensing elements to detect and monitor the concentrations of toxic gases released in the environment. The detection is based on the change of resistance or conductance in CNTs as a result of direct contact with gas. CNT-based gas sensors have been used for detection of nitrogen oxides (NO_x), ammonia (NH_3) and sulphur oxides (SO_x). CNTs could also act as nano-reinforcements for the biodegradable polymers in order to provide a suite of composite materials with improvement in mechanical properties, extended durability and better thermal stability.

Keywords: *Carbon nanotube, microorganisms, toxic gases, nano filters*

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Published Paper on e-Conference Proceedings entitled

"Impact of non-pesticide toxins on Humans"

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PP-36

Impact of non-pesticide toxins on Humans

K. Padmavathi[1], V. Tejeswara Rao[2], P.L. Kishore[2] and G. Nageswara Rao[3,*]

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ABSTRACT

Dioxins, Polychlorinated Biphenyls (PCBs) and Polynuclear Aromatic Hydrocarbons (PAHs) are some of the hazardous by-products from pesticide manufacture and other anthropogenic sources. Paper industry is a good source of dioxins. Fires and incinerators using PVC are the largest anthropogenic sources of dioxins in the environment. They persist in the environment. They are toxic and disrupt reproductive systems. Their toxicity is related to shape and fitting into a specific biological receptor; the complex of the receptor and molecule can pass through cell membranes and initiate toxic action.

Some dioxin derivatives were used in the Vietnamese war as a defoliant. In 1976 there was a chemical accident in Serveso, Italy in a plant that produced 2,4,5-trichlorophenol. Excessive heat leads to an explosion producing dioxin, which led to wildlife deaths and higher incidence of cancer. Dioxins accumulate in fatty tissue. Studies indicated that long term exposure to dioxins may cause cancer.

PCBs are bioaccumulated in the aquatic food chain in water bodies. Production of PCBs by Monsanto, USA were halted in 1977 due dioxin impurities in them. Dioxins are the major toxins and contaminants in the PCBs. Women who ate fish from Lake Michigan had higher PCB levels in their bodies. Babies born to these women had lower birth weights, smaller head circumference, more premature babies – all proportional to PCB exposure. Such babies had lower scores of mental tests. Larger PAHs tend to bioaccumulate. PAHs are airborne pollutants and are carcinogens. They target lung and kidney.

Estrogens (female sex hormones) bind to certain environmental estrogens (EE) like PCBs, dioxins which interfere with endocrine system and can mimic or block estrogen. Transfer of EE from mother to fetus can lead to abnormalities in the child and cancer in later years.

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THREE DAY INTERNATIONAL VIRTUAL CONFERENCE ON IMPACT OF CHEMICAL DISASTERS ON BIOTA

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PP – 42

BASIC SAFETY MEASURES IN CHEMICAL LABORATORY

V. Tejeswara Rao[1], P. Lakshmi Kishore[1], G. Pushparaju[2] and G. Nageswara Rao[3]

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ABSTRACT

While working in Chemical laboratory one has to follow the basic safety measures: a) To wear protective clothing like lab coat and gloves, b) to avoid spillage and aerosol formation, c) to wash hands immediately and thoroughly if contaminated with blood or other body fluids, d) to remove gloves before handling a telephone, computer keyboard, etc. or prior to leaving the lab, e) to wash hands after completing laboratory activities and before leaving the area, f) to discard all biohazardous material in a biohazard bag to be autoclaved, and g) to disinfect all the counter and table tops with a proper disinfecting solution.

Chemical and Gas Safety: To provide a safe working environment, all the personnel should be aware of potentially hazardous materials and the proper way of handling them. One should avoid unnecessary exposure to chemicals. Occupational Safety and Health Administration (OSHA) requires any necessary information in the form of MATERIAL SAFETY DATASHEETS (MSDS) concerning the handling of hazardous materials to be available to all laboratory personnel, so that they may achieve and maintain safe working conditions: Flammable (Red), Instability (Yellow), Health (Blue), Special Notice (White), and NFPA Chemical Hazard Sign.

Fire Safety: 1) For burning combustible materials (wood, paper, clothing, trash). GREEN TRIANGLE WITH THE LETTER 'A', uses water or an all-purpose dry chemical. 2) For burning liquids: RED SQUARE WITH THE LETTER 'B', uses foam, a dry chemical or carbon dioxide. 3) For electrical fires: BLUE CIRCLE WITH THE LETTER 'C' uses non-conducting extinguishing agents (carbon dioxide or a dry chemical).

R A C E (Rescue those in danger, Alarm-Activate the fire pull station, notify switchboard operator of

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Published Paper on e-Conference Proceedings entitled

Spectrophotometric Determination of Chemical Speciation of Complexes of L-Dopa with Co(II),Ni(II) and Cu(II)

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Spectrophotometric Determination of Chemical Speciation of Complexes of L-Dopa with Co(II), Ni(II) and Cu(II)

S. Raju[1], V. Tejeswara Rao[2] and G. Nageswara Rao[3]

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ABSTRACT

Chemical speciation of complexes of Co(II), Ni(II) and Cu(II) with L-Dopa (dopa) has been studied spectrophotometrically. The complexations were carried out at different pH ranges at the wavelengths of respective complexes. The stoichiometries of the complexes were determined using Job's continuous variation method and the value was found to be 1:2 metals to ligand ratio. Stability constants values were calculated using the continuous variation method. The complexes were found to be stable over the pH range used as there was slight change in the color intensity and absorbance values.

Although the above said metals are biologically essential, they become toxic beyond certain concentrations. Biological system has homeostasis to keep the concentration of these metals. For example, copper exhibits acute copper toxicosis. Acute copper toxicosis, manifested by hemolysis, headache, febrile reactions, prostration, and GI symptoms, was observed in one child after a solution containing copper sulfate was applied to burned skin during a debridement procedure and in numerous patients after inadvertent introduction of copper into the circulating blood during hemodialysis. Following acute ingestion of copper salts in amounts that exceed approximately 1 g, systemic effects are generally observed. The effects include GI mucosal ulcerations and bleeding, acute hemolysis and hemoglobinuria, hepatic necrosis with jaundice, nephropathy with azotemia and oliguria, cardiotoxicity with hypotension, tachycardia and tachypnea, and central-nervous-system (CNS) manifestations, including dizziness, headache, convulsions, lethargy, stupor, and coma. Similar are the cases with cobalt and nickel.

Key words: Cobalt(II), Nickel(II), Copper(II), Spectrophotometry, Stability constants, Toxicity.

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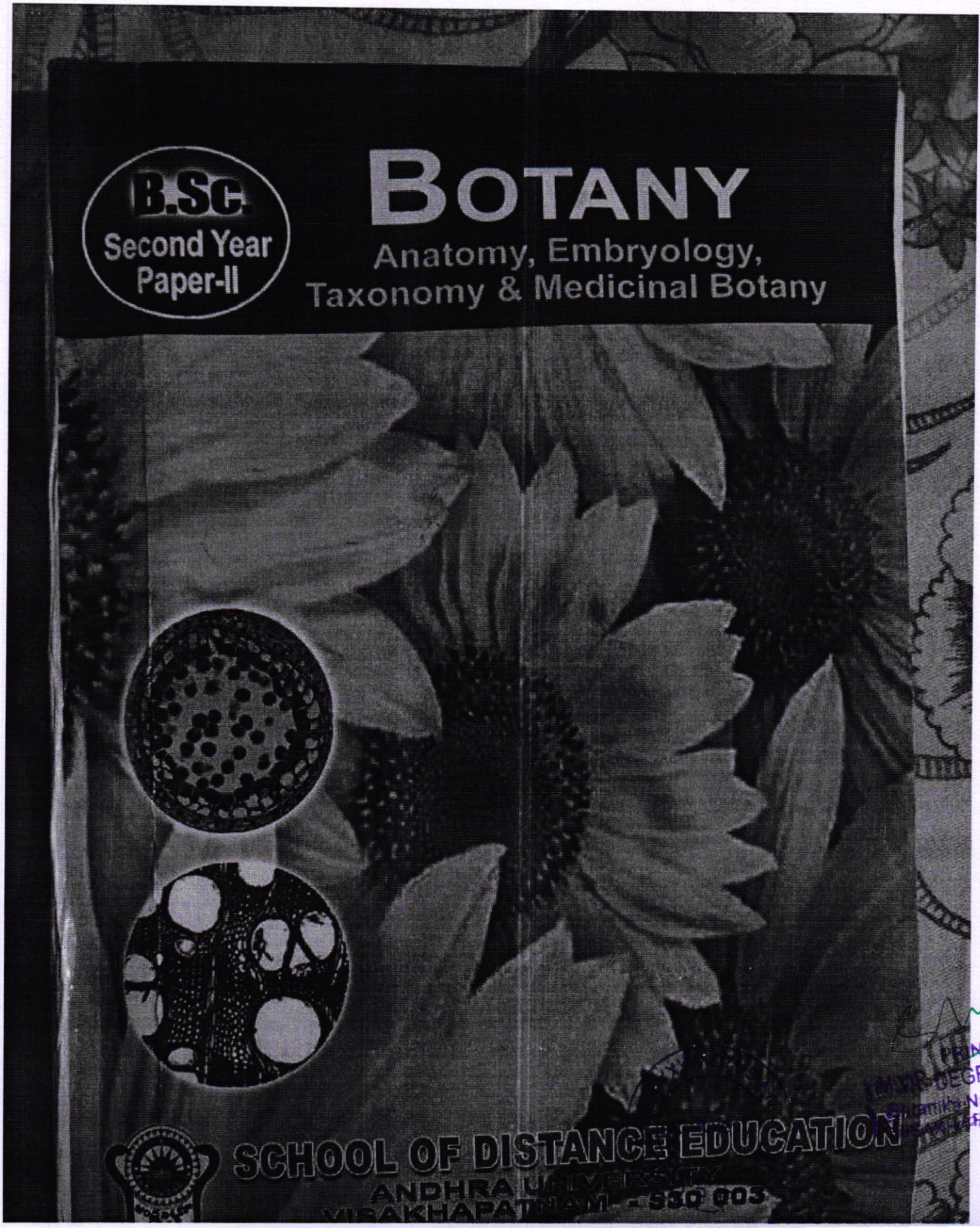

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PAPER - I
Microbial Diversity, Cryptogams and Gymnosperms

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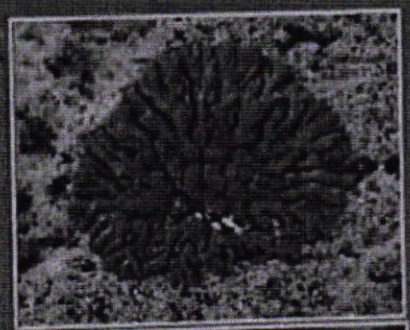

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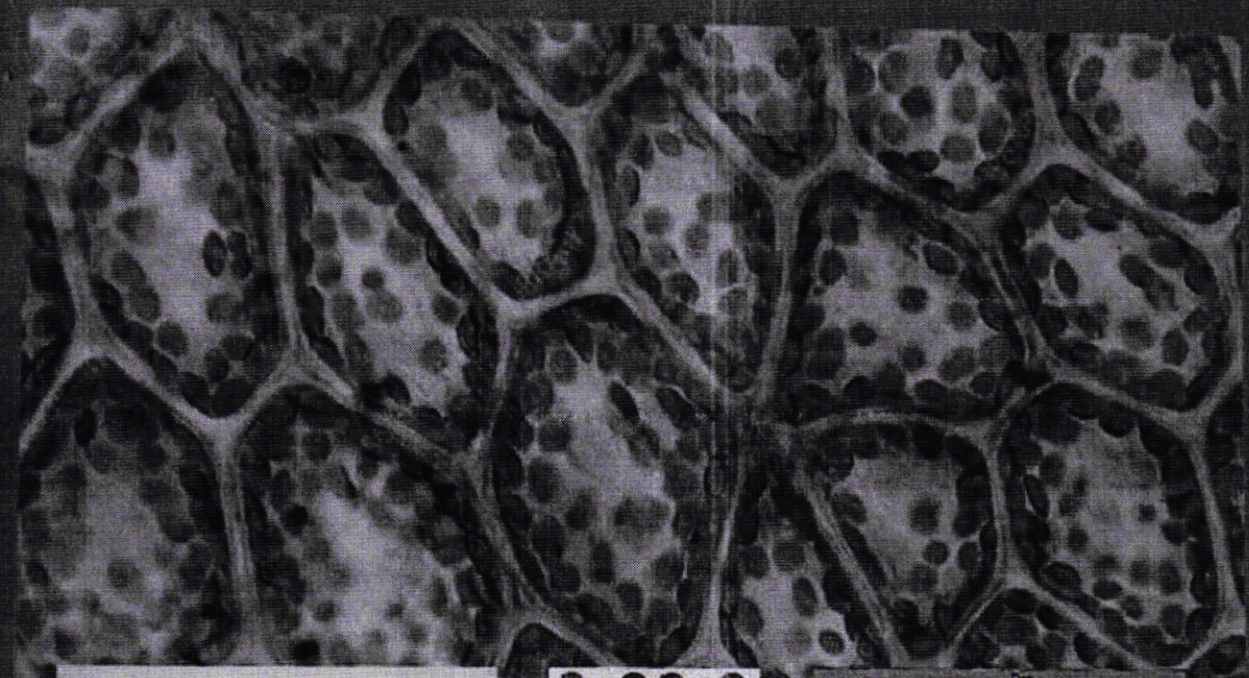

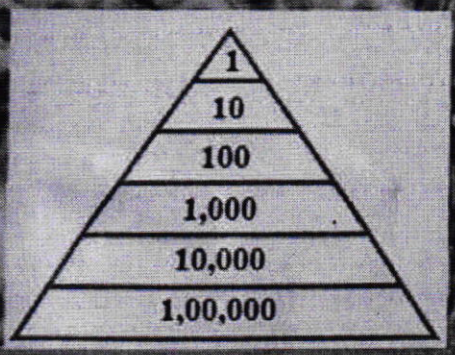

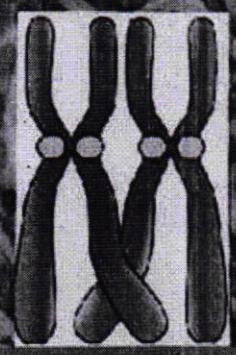

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Paper - IV

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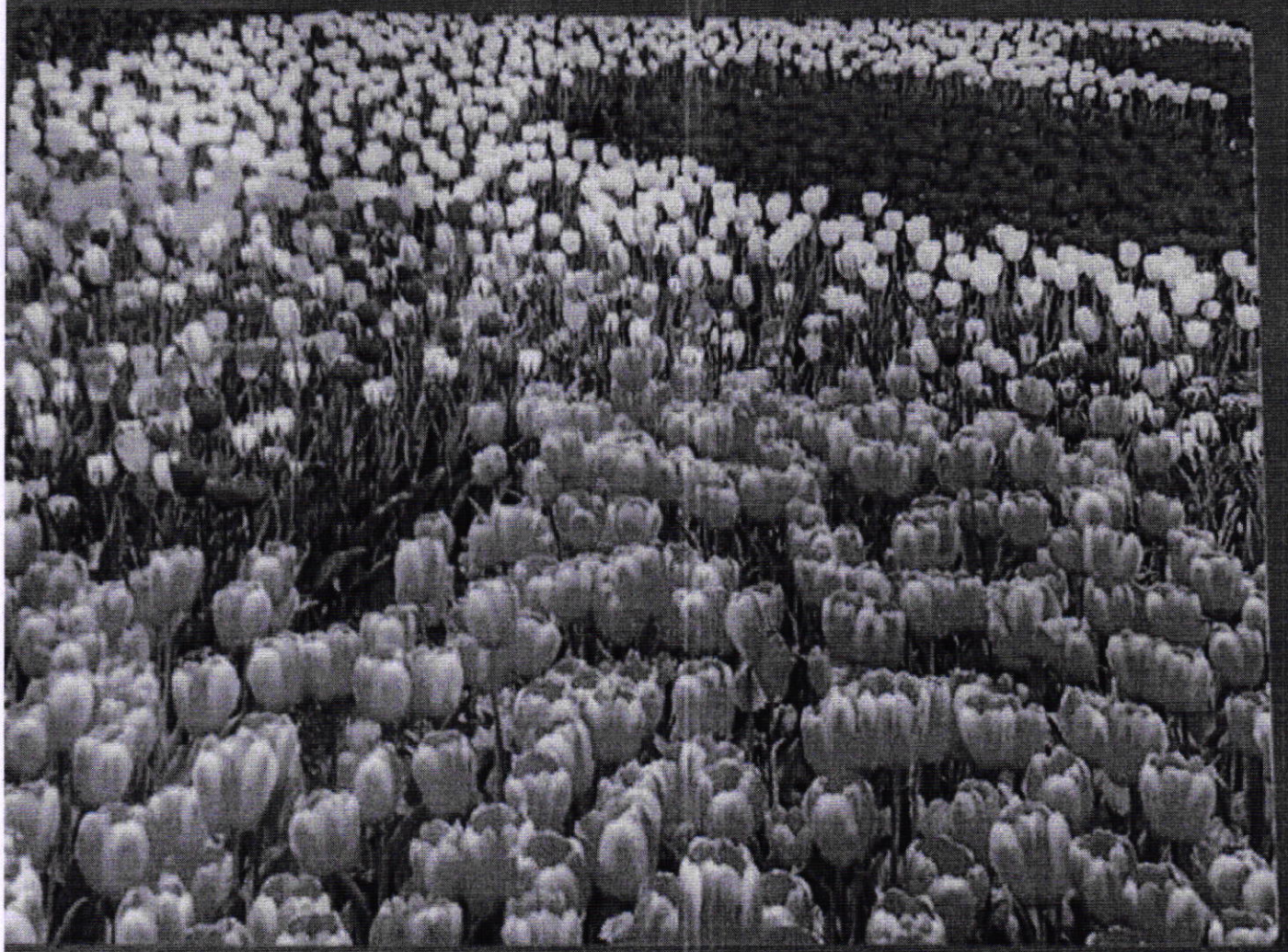

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Contributed a book chapter entitled

"A Discussion of Hausdorff property on Fs-Cartesian product Topological spaces" in Recent studies in Mathematics and computer science"

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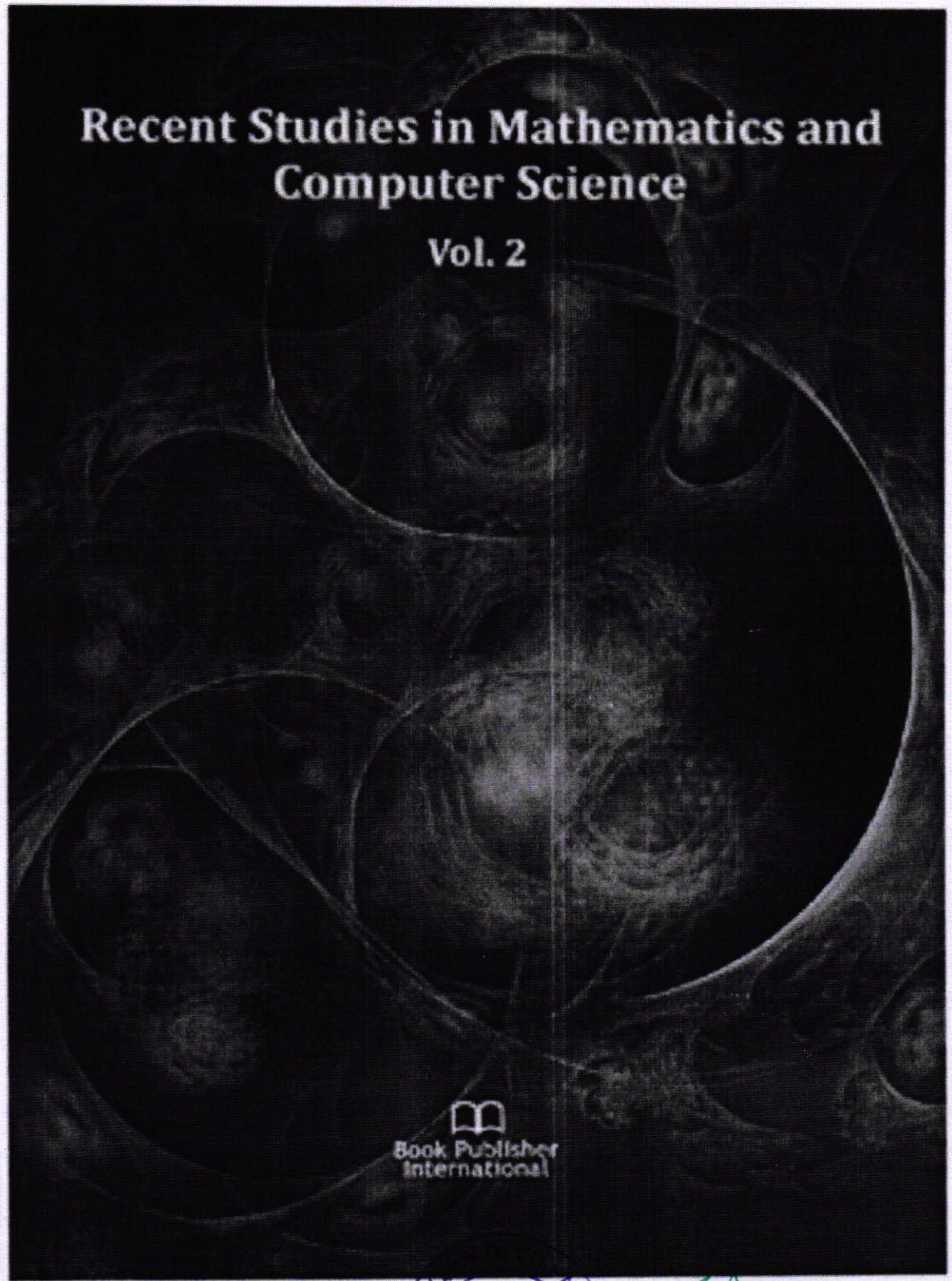

Book Publisher International

A Discussion of Hausdorff Property on Fs-Cartesian Product Topological Spaces

Vaddiparthi Yogeswara[1*], K. V. Umakameswari[2], D. Raghu Ram[2], Ch. Ramasanyasi Rao[3] and K. Aruna Kumari[1]

DOI: 10.9734/bpi/rsmes/v2

Abstract

For anynonempty family $\{(\mathcal{B}_i, \mathfrak{T}_i)\}$ of FsB-Hausdorff Spaces. The Fs- Cartesianproduct topological space is also an FsB-Hausdorff Space.

Keywords: Fs-Set; Fs-Subset; (b,β) object; Fs-Point; FsB-Toplogical Space and FsB-Hausdorff Space.

1 Introduction

Ever since Zadeh [1] introduced the notion of fuzzy sets in his pioneering work, several mathematicians studied numerous aspects of fuzzy sets [2]. Nistla V.E.S. Murthy [3] introduced f-set in order to prove Axiom of choice for fuzzy sets which is not true for L-fuzzy sets [4]. Nistala V.E.S. Murthy [5] introduced the f-complement of an f-subset in [5]. We can easily see that the collection all f-subsets of a given f-set with this definition of f-complement could not form a Boolean algebra. Vaddiparthi Yogeswara, G. Srinivas and Biswajit Rath introduced the concept of Fs-sets and developed the theory of Fs-sets in order to prove collection of all Fs-subsets of given Fs-set is a complete Boolean algebra under Fs-union, Fs- intersection and Fs-complements [6]. The Fs-sets they introduced contain Boolean valued membership functions .They are successful in their efforts in proving that result with some conditions [7]. Also Vaddiparthi Yogeswara, Biswajit Rath , Ch. RamaSanyaasi Rao, K. V. UmaKameswari, D. Raghu Ram introduced the concept of FsB-topological Space [8] on a given Fs –subset of an Fs-set and also they introduced FsB-subspace in the same paper .Fs-points and Fs-point set FSP($\mathcal{A}$) are introduced by Vaddiparthi Yogeswara etc…[9] and based on Fs-set theory they defined a pair of relations between collection of all crisp subsets of Fs-points set FSP($\mathcal{A}$)of the same Fs-set $\mathcal{A}$ [10] and collection of all Fs –subsets of $\mathcal{A}$ and proved one of the relations is a meet complete homomorphism and the other is a join complete homomorphism and searched properties of relations between Fs-complemented sets and complemented constructed crisp sets via these homomorphisms and ultimately they proved a representation theorem connecting Fs-subsets of $\mathcal{A}$ to crisp subsets of FSP($\mathcal{A}$) via homomorphisms. In this paper we introduce the concepts of T_1- Space and Haudorff Space on an Fs-B topological Space via these representation theorems and we give an example. In first four sections of this paper, we introduce Fs-sets, Fs-set functions etc … in brief for smooth reading of the paper . We denote the largest element of a complete Boolean algebra L_A by M_A or 1_A. We denote Fs-union and crisp set union by the same symbol ∪ and similarly Fs-intersection and crispset intersection by the same symbol ∩ etc... For all lattice theoretic properties and Boolean algebraic properties one can refer Szasz [11], Garret Birkhoff [12], StevenGivant • Paul Halmos [13] and Thomas Jech [14]. For results in topology one can refer [15].

2 Basic Definitions, Definitions and Theorems

2.1 Fs-set

Let U be a universal set, $A_1 \subseteq U$ and let $A \subseteq U$ be non-empty. A four tuple $\mathcal{A} = (A_1, A, \overline{A}(\mu_{1A_1}, \mu_{2A}), L_A)$ is said be an Fs-set if, and only if

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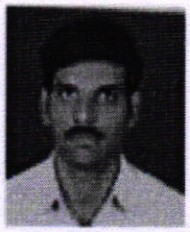

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This chapter is an extended version of the article published by the same author(s) in the following journal.
International Journal of Recent Technology and Engineering (IJRTE), 8(1S3), 2019.

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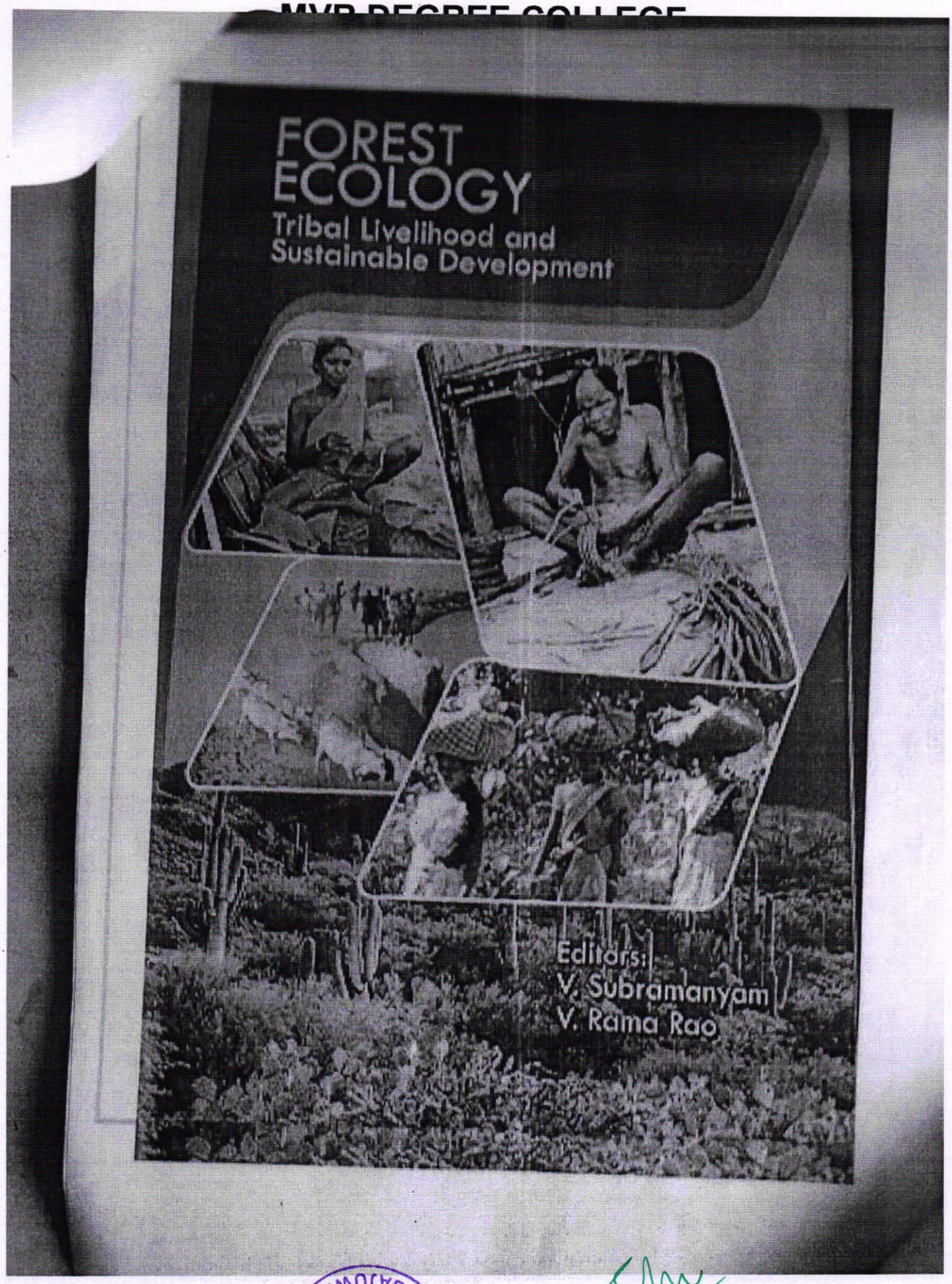

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POPULATION ECOLOGY POVERTY AND SUSTAINABLE LIVELIHOODS OF TRIBES IN EASTERN GHATS OF ANDHRA PRADESH

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