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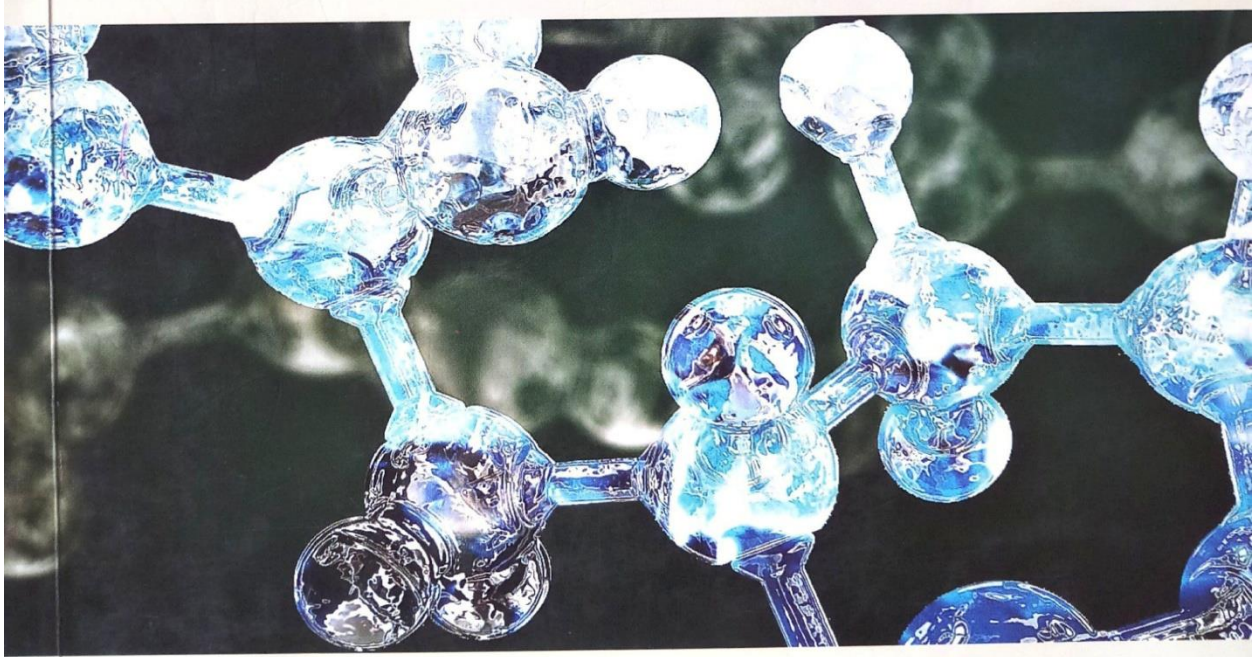

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M. : 08600353712, 09503237806

Price : ₹ 145/-

Printed at Shri Gurudeo Printers, Amravati.
Mahatma Fule Sankul, Shegaon Naka, V.M.V. Road, Amravati - 444603 (Maharashtra)

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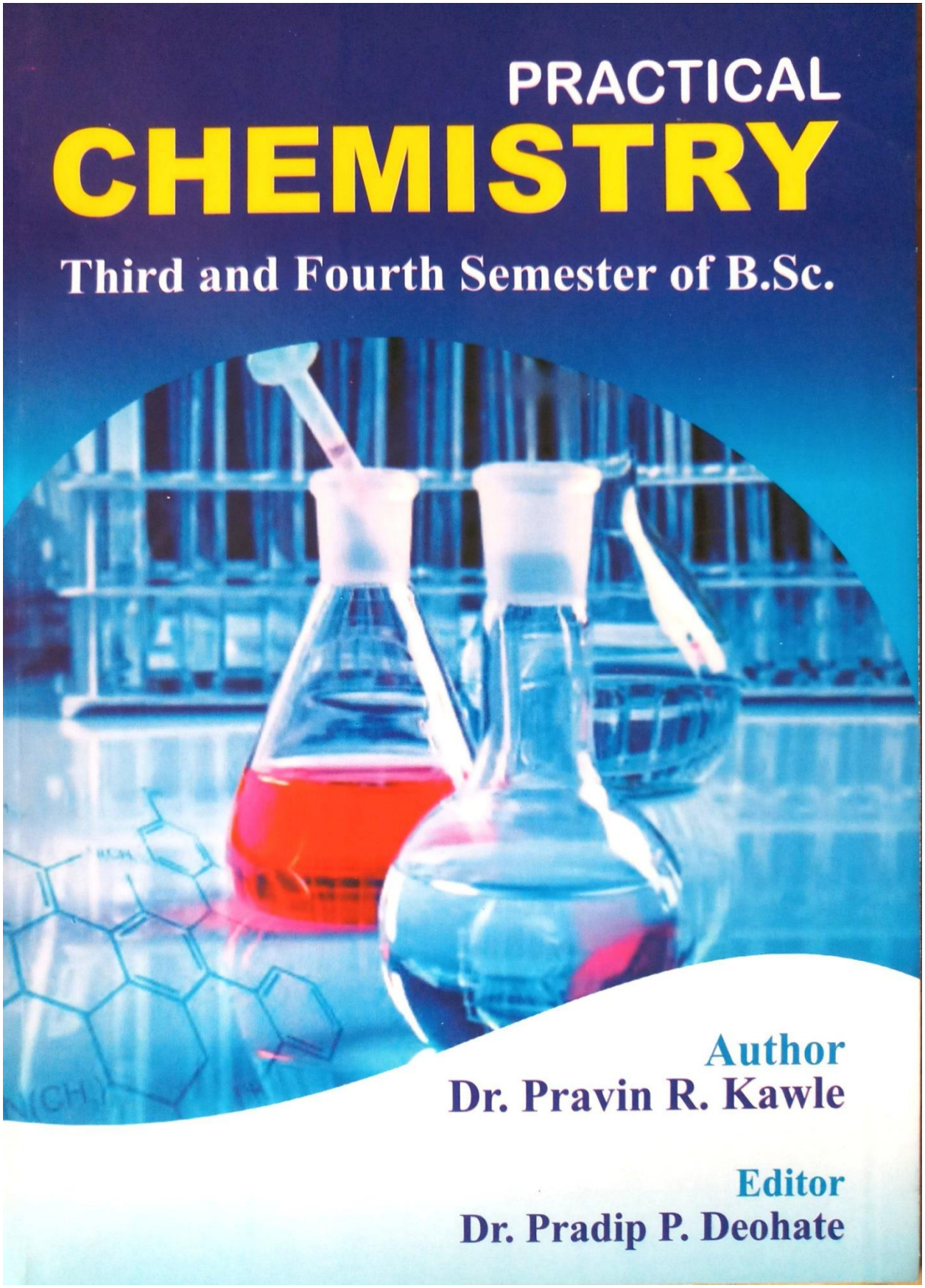
PRACTICAL
CHEMISTRY
Third and Fourth Semester of B.Sc.
Author
Dr. Pravin R. Kawle
Editor
Dr. Pradip P. Deohate

A Text Book of
PRACTICAL CHEMISTRY
B.Sc.- II (Third and Fourth Semester)

ISBN- 978-81-905776-54-7
Edition: First 2017-18

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Publisher
Milind Dahake
Nabh Prakashan
Shyam Nagar, Amravati-444 606.
Ph: +917798204500

Printer
Nabh Offset Printer
Shyam Nagar, Amravati-444 606.

Price: Rs. 80/-

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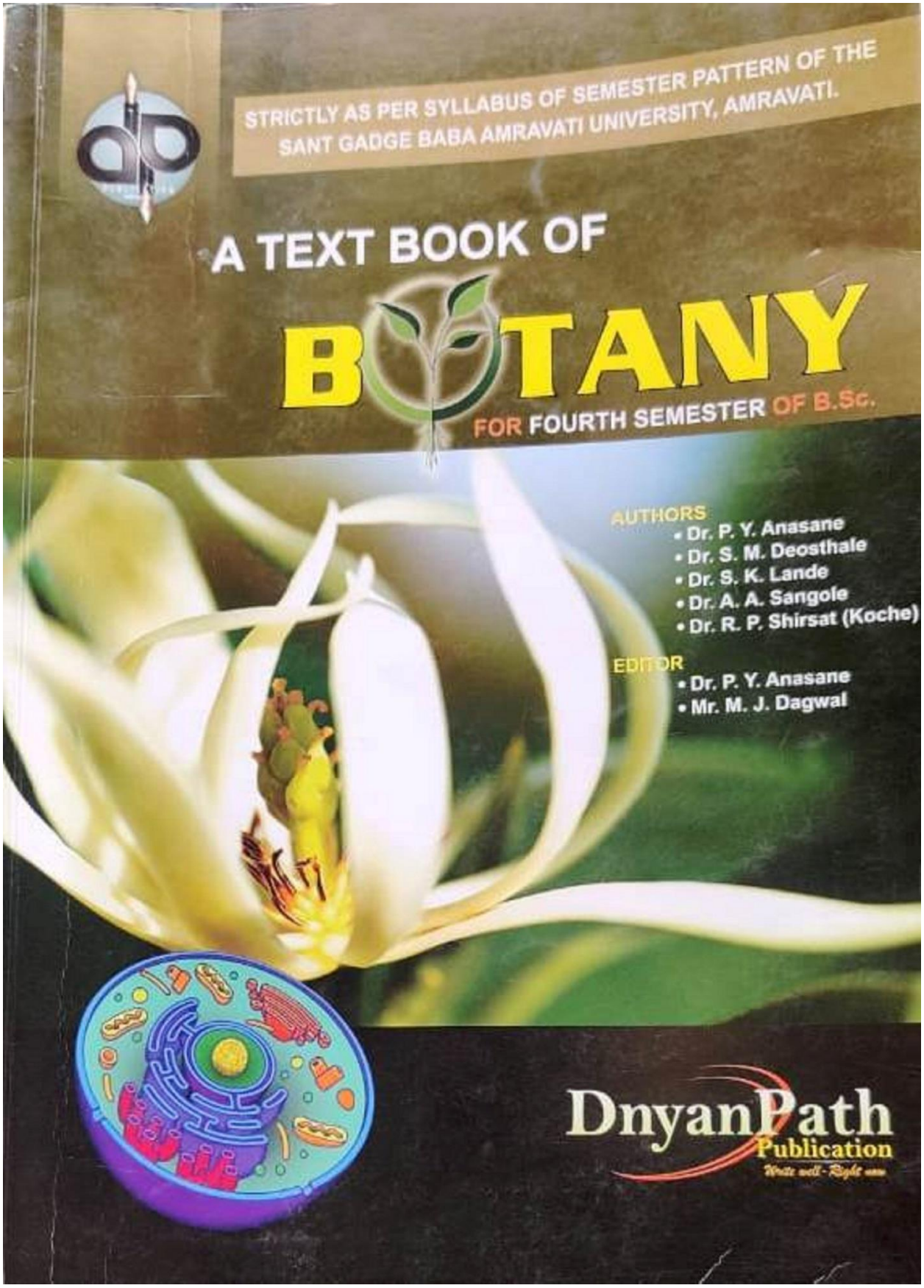
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FOR FOURTH SEMESTER OF B.Sc.
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DnyanPath
Publication

A TEXT BOOK OF BOTANY : SEMESTER - IV

ISBN 13 : 978-93-87278-04-2
Edition : First, January 2018

DnyanPath Publication

Published by the **DnyanPath Publication**
Mahatma Fule Sankul, Infront of Abhiyanta Bhavan,
Shegaon Naka, V.M.V. Road, Amravati - 444603 (Maharashtra)
Visit us : www.dnyanpath.com
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M. : 08600353712, 09503237806

Price : ₹ 110/-

Printed at Shri Gurudeo Printers, Amravati.
Mahatma Fule Sankul, Shegaon Naka, V.M.V. Road, Amravati - 444603 (Maharashtra)

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B.Sc. Part-I (Semester - IV)

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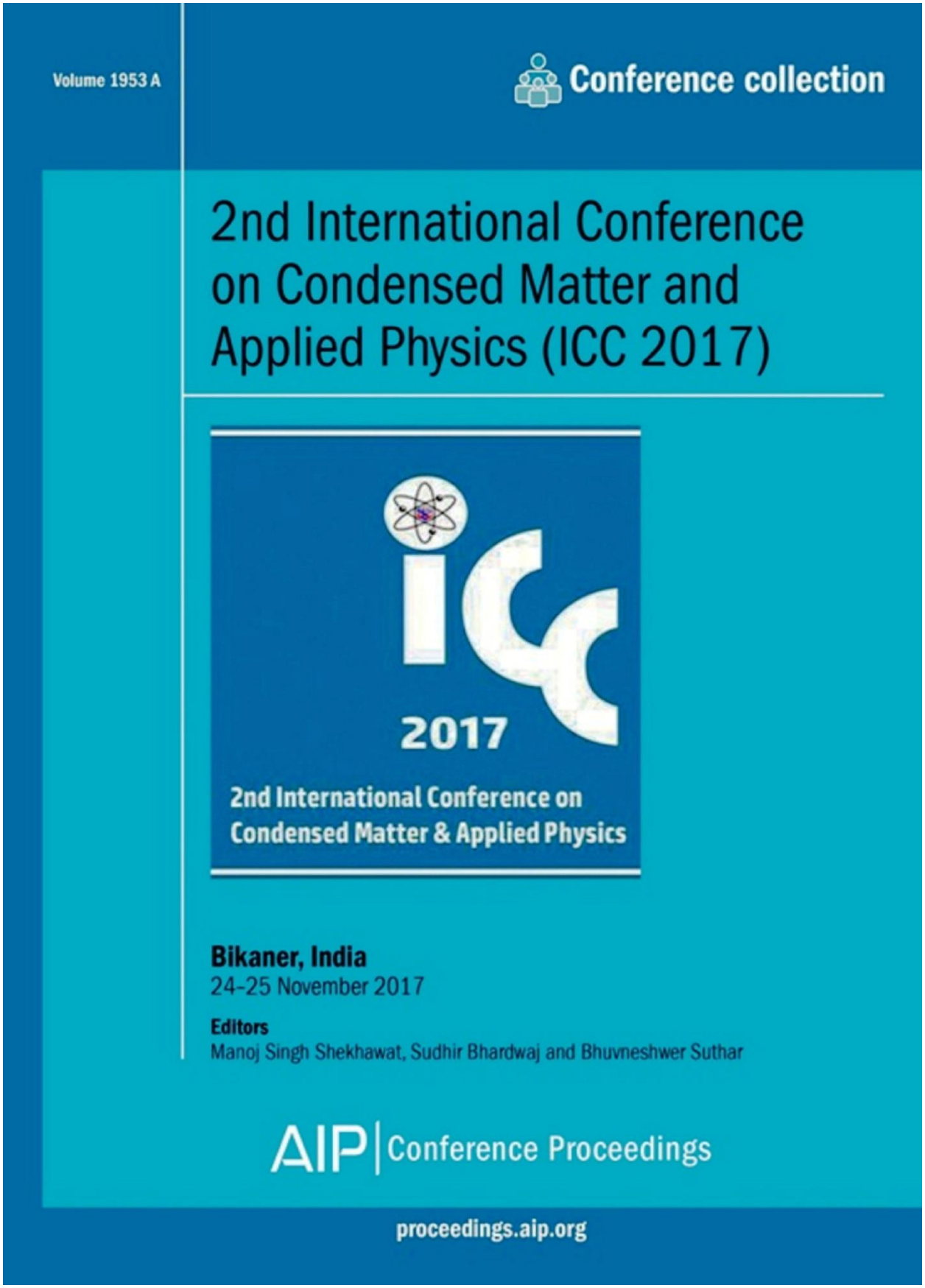
Volume 1953 A
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2nd International Conference on Condensed Matter and Applied Physics (ICC 2017)
2017
2nd International Conference on Condensed Matter & Applied Physics
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Conference date: 24-25 November 2017
Location: Bikaner, India
ISBN: 978-0-7354-1648-2
Editors: **Manoj Singh Shekhawat**, **Sudhir Bhardwaj** and **Bhuvneshwer Suthar**
Volume number: 1953
Published: May 8, 2018

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AIP Conference Proceedings **1953**, 030003 (2018); https://doi.org/10.1063/1.5032338

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Optical Limiting in Gelatin Stabilized Cu-PVP Nanocomposite Colloidal Suspension

Y. S. Tamgadge[1,a)], P. P. Gedam[2], N. B. Thakare[3], S. S. Talwatkar[4], A. L. Sunatkari[5], G. G. Muley[6]

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Abstract. This article illustrates investigations on optical limiting properties of Cu-PVP nanocomposite colloidal suspension. Gelatin stabilized Cu nanoparticles have been synthesized using chemical reduction method and thin films in PVP matrix have been obtained using spin coating technique. Thin films have been characterized by X-ray diffraction (XRD), Ultraviolet-visible (UV-vis) spectroscopy, etc. for structural and linear optical studies. Optical limiting properties of Colloidal Cu-PVP nanocomposites have been investigated at 808 nm diode CW laser. Minimum optical limiting threshold was found for GCu3-PVP nanocomposites sample. The strong optical limiting is thermal in origin as CW laser is used and effects are attributed to thermal lensing effect.

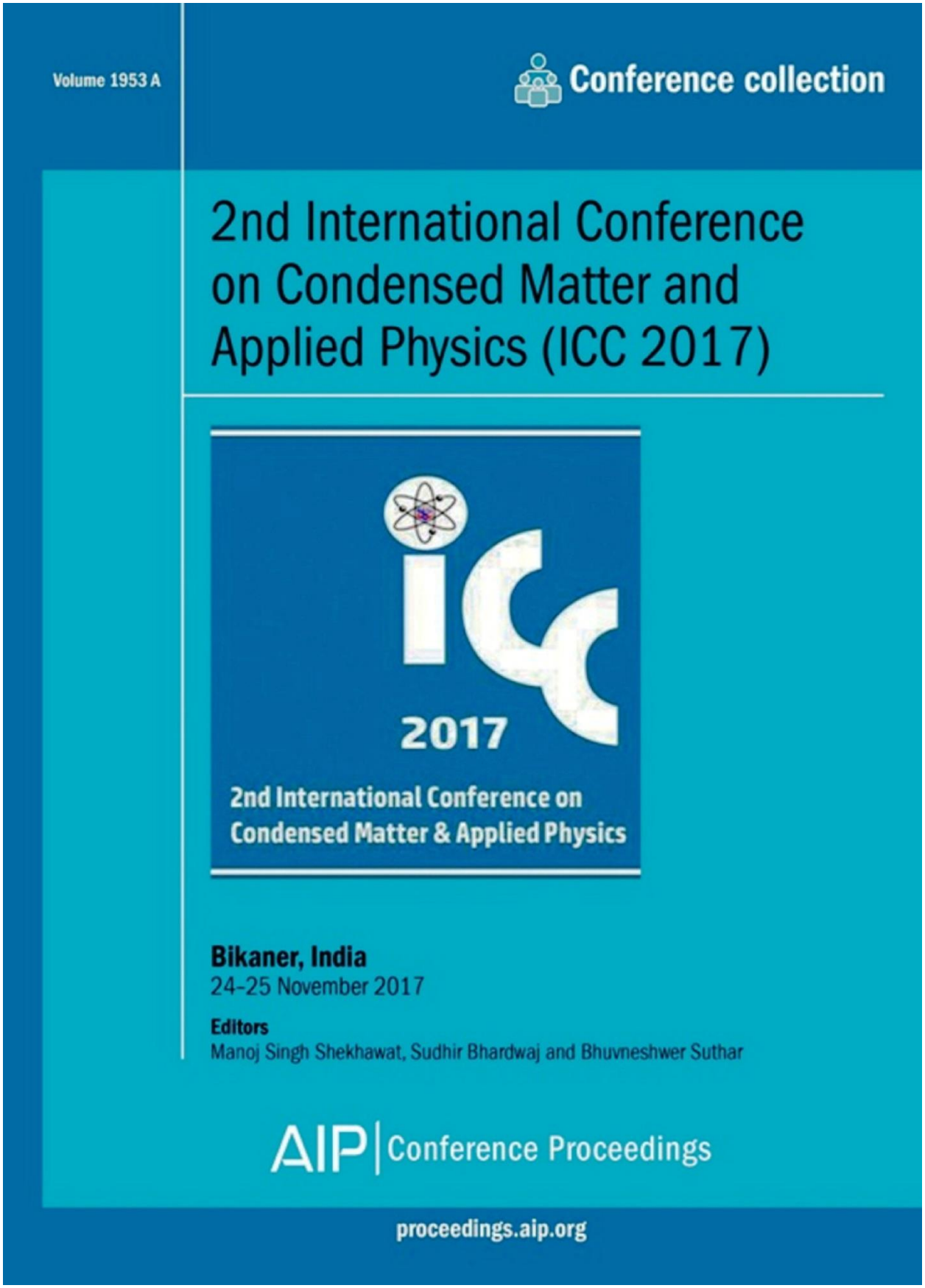
Keywords: Cu nanoparticles, Cu-PVP nanocomposite, optical limiting.

INTRODUCTION

Metal nanoparticles have obtained tremendous interests because of the ease with which they can be synthesized and modified chemically [1]. Colloidal metal nanoparticles have been known since the end of the middle ages. Interest in copper nanoparticles (Cu NPs) arises from the useful properties of this metal such as the good thermal and electrical conductivity at a cost much less than silver and gold. This leads to potential application in cooling fluids for electronic systems and conductive inks [2]. Cu NPs are also widely used as catalysts for various reactions including water-gas shift and gas detoxification reactions, and as electrocatalysts in solid oxide fuel cells [3, 4]. On the other hand, due to their good biocompatibility and surface-enhanced Raman scattering (SERS) properties, Cu NPs may have potential applications as nanoprobes in medical diagnosis and biological analysis [5]. Due to surface plasmon resonance (SPR), Cu NPs exhibit enhanced nonlinear optical properties (NLO), which could result in many applications in optical devices and NLO materials, such as optical switches or photochromic glasses [6].

In this study, we have synthesized Cu NPs in colloidal form stabilized by gelatin. Copper colloids stabilized by gelatin having a stability upto six months were mixed with polyvinyl pyrrolidone (PVP) and thin film nanocomposites were obtained by the spin coating technique. Cu NPs and Cu-PVP thin films were characterized by various techniques for structural, optical and morphological studies. Optical limiting properties of Cu-PVP nano colloids have also been investigated using diode laser at 808 nm. The results and discussions have been presented here.

2nd International Conference on Condensed Matter and Applied Physics (ICC 2017)
AIP Conf. Proc. 1953, 030002-1–030002-4; https://doi.org/10.1063/1.5032337
Published by AIP Publishing. 978-0-7354-1648-2/$30.00


Volume 1953 A
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AIP Conference Proceedings **1953**, 030003 (2018); https://doi.org/10.1063/1.5032338

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Synthesis and Characterization of Ni doped ZnO Nanoparticles

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Abstract. In this paper, we present synthesis of L-valine assisted surface modification of Ni doped ZnO nanoparticles (NPs) using chemical precipitation method. Samples were calcined at 500°C for 2h. Uncalcined and calcined samples were characterized by powder X-ray diffraction (XRD), transmission electron microscopy (TEM) and ultraviolet-visible (UV-vis) spectroscopy. Ni doped ZnO NPs with average particle size of 8 nm have been successfully obtained using L-valine as surface modifying agent. Increase in the particle size was observed after the calcination. XRD and TEM studies confirmed the purity, surface morphology and hexagonal wurtzite crystal structure of ZnO NPs. UV-vis spectroscopy indicated the blue shift of excitons absorption wavelength and surface modification by L-valine.

Keywords: ZnO nanoparticles, L-valine, XRD, TEM, UV-vis.

INTRODUCTION

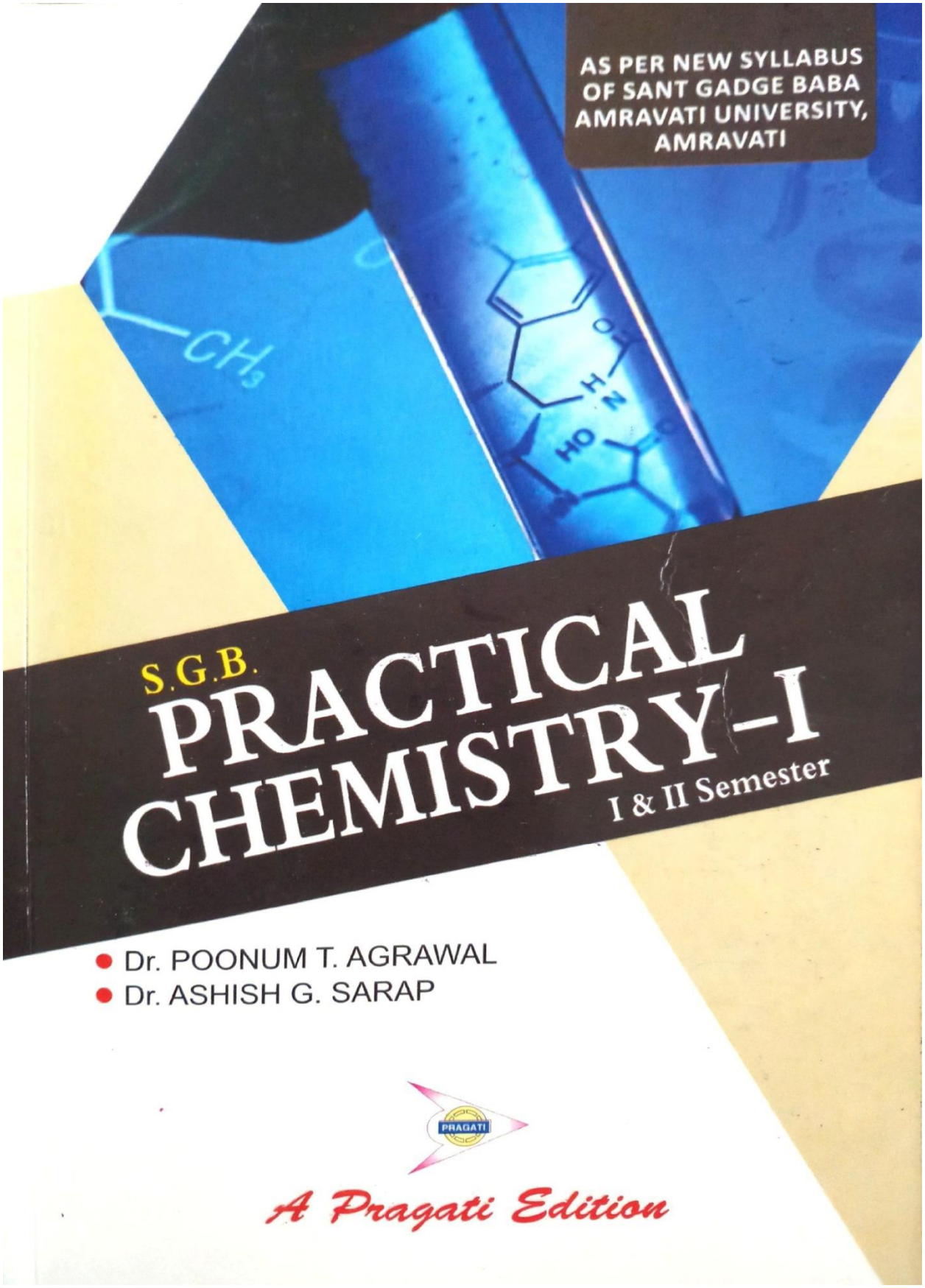
Nanostructured materials offer great advantages over bulk materials owing to enhanced properties due to high surface to volume ratio and quantum size effects. Semiconducting nanomaterials are known to have peculiar shape and size dependent physical, chemical, electrical and optical properties which can be engineered as per application requirements [1]. ZnO is an interesting wide band gap semiconducting material having room temperature band gap of 3.3 eV and high exciton binding energy of 60 meV. It has got technological importance because of its high mechanical and chemical stability, good optical and thermal properties in addition to its natural abundance and non-toxicity [2, 3]. Doping in ZnO nanostructures are being studied widely for many practical applications like spintronics devices, light emitting diodes, diode lasers and nonlinear optics [4–9]. Authors have reported physical, chemical as well as nonlinear optical properties of undoped ZnO thin films [10] and ZnO thin films doped with Zr, Ce, Mn, F, Er, Al, Sn, F:In [11-16] deposited using various techniques.

In this study, we have synthesized Ni doped ZnO NPs stabilized by L-valine. Samples were calcined at 500°C for 2h in order to remove organic material. Samples were then characterized by ultraviolet-visible (UV-vis) spectroscopy, X-ray diffraction (XRD) and transmission electron microscopy (TEM). The results are presented here.

EXPERIMENTAL

Chemical co-precipitation technique has been invoked for the synthesis of Ni doped ZnO NPs. All chemicals of analytical reagent grade were used as received without further purification. Zinc chloride ($ZnCl_2$) 99.99% purity, sodium hydroxide pellets (NaOH) 99 %, ethanol AR were procured from SD-fine Chemicals, Mumbai. L-valine and

2nd International Conference on Condensed Matter and Applied Physics (ICC 2017)
AIP Conf. Proc. 1953, 030003-1–030003-4; https://doi.org/10.1063/1.5032338
Published by AIP Publishing. 978-0-7354-1648-2/$30.00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First Edition 2018

ISBN : 978–93–88151–00–9

Price : Rs. 65/=

Published by : A. K. Mittal for Pragati Prakashan, Meerut-250 001, Laser Typesetting : Pragati Prakashan, Meerut and Printed at : Arihant Electric Press, Meerut.

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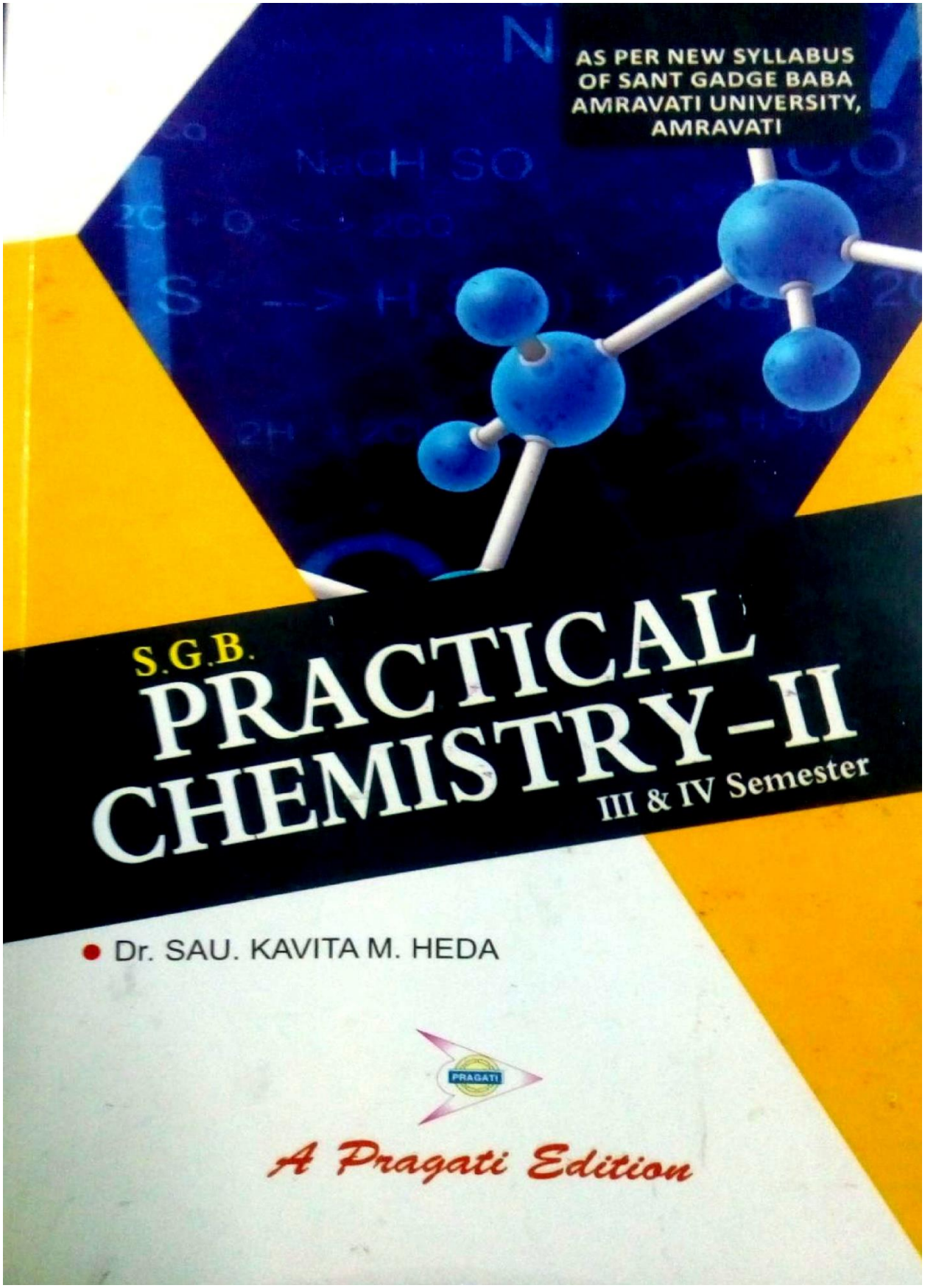
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First Edition 2018

ISBN : 978–93–88151–01–6

Price : Rs. 75/=

Published by : A. K. Mittal for Pragati Prakashan, Meerut-250 001, Laser Typesetting : Pragati Prakashan, Meerut and Printed at : Arihant Electric Press, Meerut.

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3rd National Conference on
Recent Innovations in Science, Engineering & Technology -2018

Spectral Study and Screening of 1-phenyl-3-substituted phenyl benzothiazolyl thiocarbamide for an antimicrobial activity

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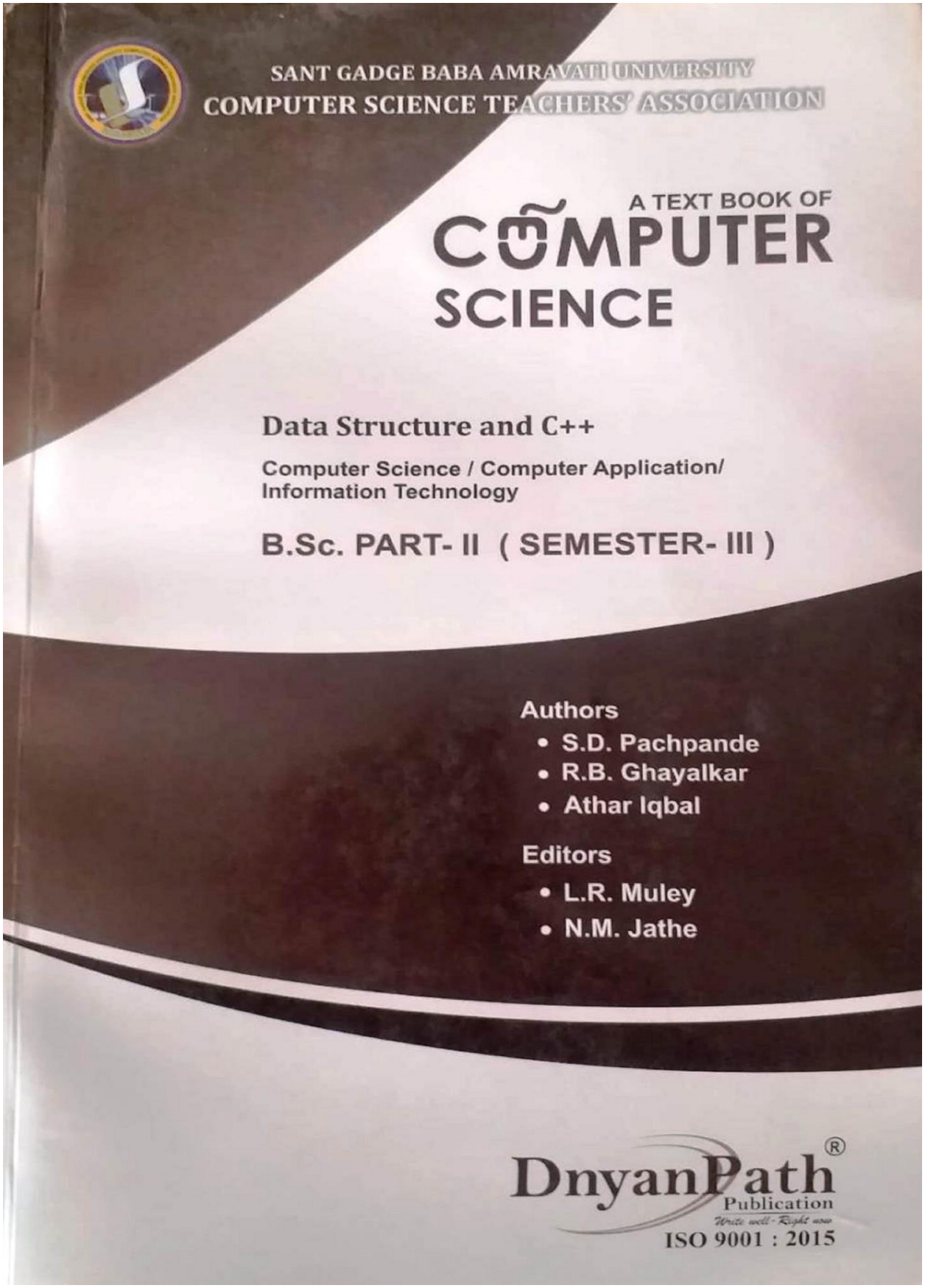
Abstract-. The benzothiazole, and azo moieties are crucial functionalities because of their wide variety of biological activity and have wide range of therapeutic properties. Keeping in view the importance of these organic moieties, some new compounds were synthesized which contains benzothiazole, Benzothiazoles are bicyclic ring system with multiple applications. 2-aminobenzothiazoles, substituted benzothiazoles have found applications in several areas of chemistry. 2-aminobenzothiazoles are broadly found in bioorganic and medicinal chemistry with applications in drug discovery A number of 2-aminobenzothiazoles were intensively studied, as in medicinal chemistry and reported cytotoxic on cancer cells. Several 1-phenyl, 3-substituted phenyl benzothiazolyl thiocarbamide (3a-j) have been synthesized by the interaction of various substituted benzothiazoles (2a-j) with phenyl isothiocynate. These compounds were screened for their antibacterial and antifungal activities against–E. coli, P. vulgaries, S. aureus, S. typhimurium, K. pneumonie, Ps. aeruginosa, A. niger and C. albicance. The newly synthesized compounds have been characterized by analytical and IR, 1HNMR and Mass spectral studies.

Key words- : phenyl isothiocyanate, substituted benzothiazoles, benzothiazolyl thiocarbamides.

P. No.: 6

978-93-5300-458-3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A TEXT BOOK OF COMPUTER SCIENCE SEMESTER - III

ISBN 13 : 978-93-87278-48-6
Edition : First, July 2019

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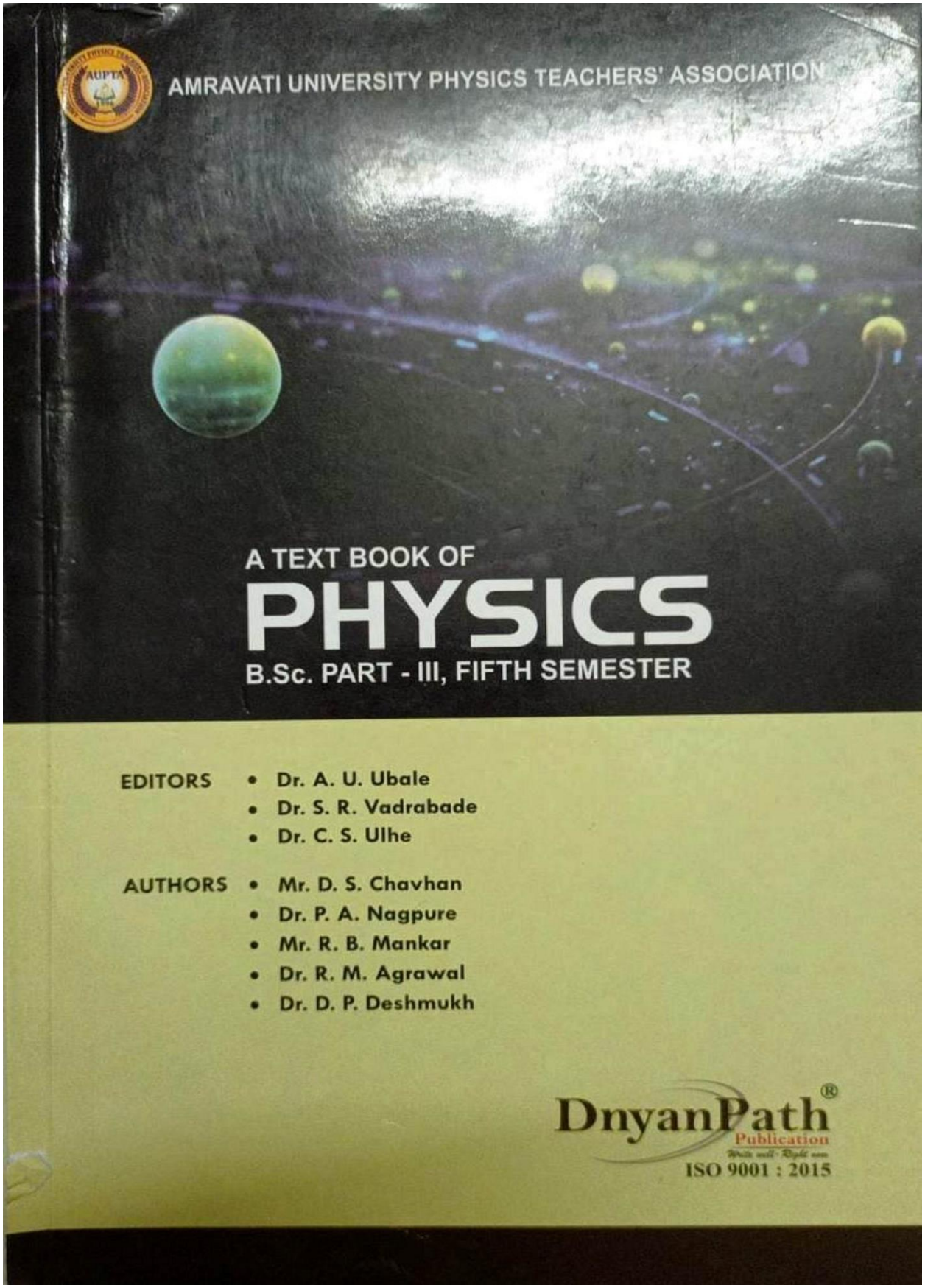
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Edition : First, July 2019

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Printed at Shri Gurudeo Printers, Amravati.
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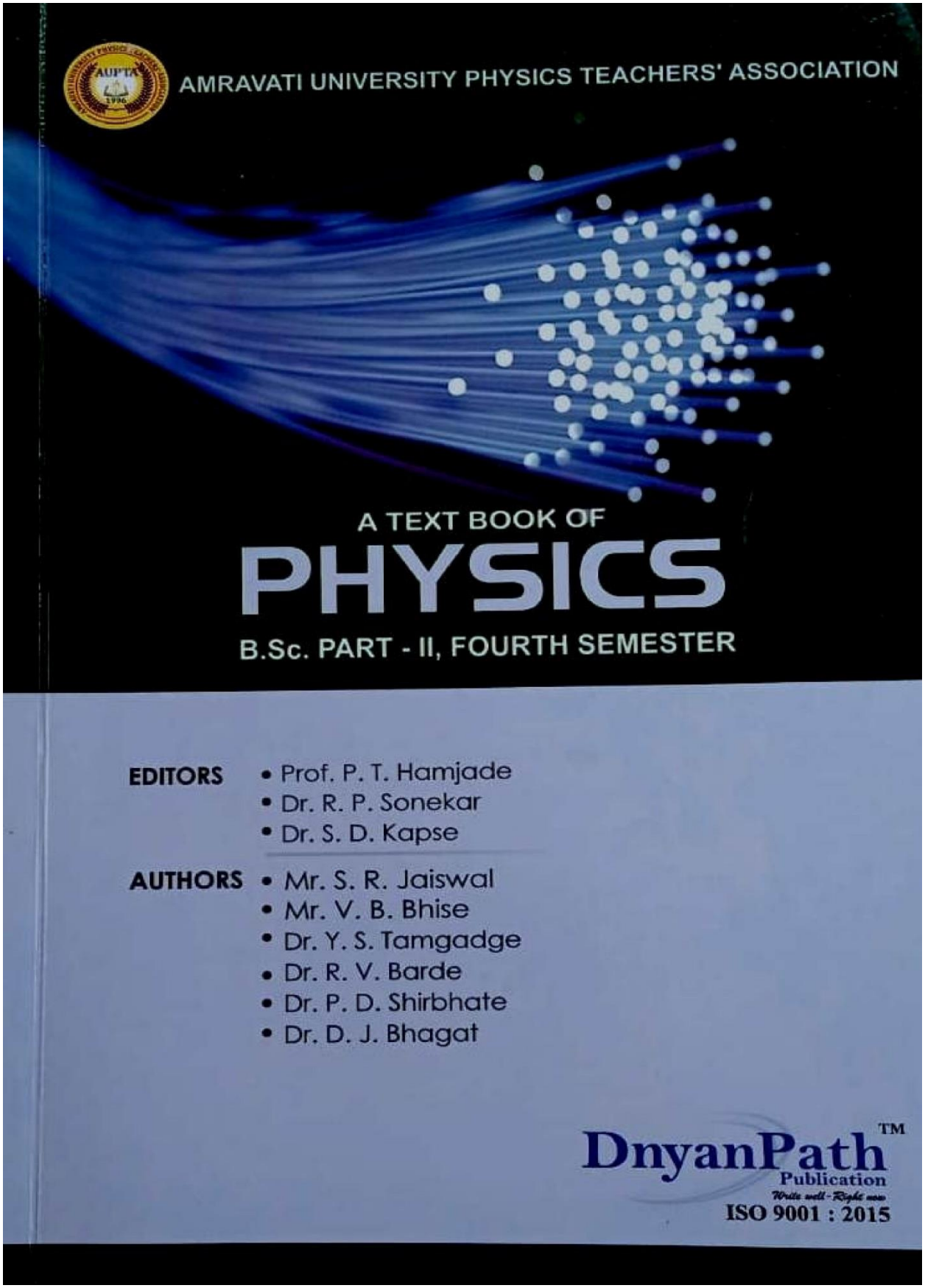
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The edition publish in 2019 by

ISBN 13 : 978-93-87278-29-5

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Printed by:
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Printed from the Camera ready copy provided by the editors.

ISBN: 978-81-923621-82

Published by:
Pandit Jawaharlal Nehru Study Center,
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A MULTIFUNCTIONAL BIOMATERIAL: SPIDER SILK

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ABSTRACT:

Researchers are always looking for new materials that are stronger as well as comfortable than materials currently in use and trying to develop the better one. Spider silk is nature's high performance fiber that outperforms the best man-made materials by displaying extraordinary mechanical properties. Man often takes pride in our ability to create materials that are superior to ones created by nature. Yet some of the materials that nature creates out form everything designed by the human mind. Spider silk is one of them. Due to its superior qualities, spider silk has wide range of opportunities for medical, defense as well as in industrial sector. I reviewed the nature and outstanding properties of spider silk and applications of spider silk in various fields. Successful large scale production of recombinant spider silk protein with inexpensive bioreactors and development of a proper spinning methodology to produce synthetic spider silks will open a new gate in various sectors.

Keywords: Spider silk, Biopolymer, Silk production.

Introduction:

Spider is a wonderful tiny arachnid which adds beauty to nature. Spider communities dominate the world's tropical, subtropical and almost all conceivable habitats surviving. According to World Spider Catalog (2020), 48927 valid spider species from 4189 genera are known from the world. Spiders are the preeminent silk craftsmen among arthropods and are best known for producing webs which is their beautiful and impressive house. Spider shows unique ability to produce silken threads of various kinds throughout their life span. Spiders depends on their silk for variety of life activities and functions, such as- shelter, prey capture, storing food, as a food, dispersal, guideline, safety lines, retreat, reproduction, formation of egg sac,

Stereochemistry

Chemistry in three dimensions

Basics of Stereochemistry for Undergraduate and Postgraduate Studies

With QR Codes of Video Lectures

Dr. Pradip P. Deohate
Associate Professor
Department of Chemistry
Shri R.L.T. College of Science, Akola

ISBN : 978-93-5426-742-0

Stereochemistry

Chemistry in three dimensions

ISBN : 978-93-5426-742-0

Edition : First, 28th February 2021

Author and Publisher

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Shri R.L.T. College of Science,
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Maharashtra, India

E-mail - pradip222091@yahoo.co.in

Printer

Prakash Printers
Civil Lines, Akola-444001,
Maharashtra, India

Price : Rs. 200/-

Note - While all possible care has been taken in the editing, proof reading and printing of this book, but in case of any omission / mistake which might have crept in the book, author / publisher shall not be held responsible for the same. The author / publisher shall feel obliged for suggestions received from the readers for further improvement of the contents of the book.

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Based on Syllabus of Sant Gadge Baba Amravati University, Amravati

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Associate Professor
Department of Chemistry
Shri R.L.T. College of Science, Akola

ISBN : 978-93-5445-764-7

B.Sc.-III
Practical Chemistry

ISBN : 978-93-5445-764-7

Edition : First, 8th March 2021

Author and Publisher
Dr. Pradip P. Deohate
Associate Professor
Department of Chemistry
Shri R.L.T. College of Science, Akola

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Department of Chemistry,
Shri R.L.T. College of Science,
Civil Lines, Akola-444001,
Maharashtra, India
E-mail - pradip222091@yahoo.co.in

Printer
Prakash Printers
Civil Lines, Akola-444001,
Maharashtra, India

Price : Rs. 120/-

Note - While all possible care has been taken in the editing, proof reading and printing of this book, but in case of any omission / mistake which might have crept in the book, author / publisher shall not be held responsible for the same. The author / publisher shall feel obliged for suggestions received from the readers for further improvement of the contents of the book.

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Stereochemistry
Basic Concepts and Applications
Educational
DVD
1st Edition
25th March 2021
ISBN : 978-93-5457-066-7
9 789354 570667
Price - Rs. 150/-
Author and Publisher
Dr. Pradip P. Deohate
Associate Professor
Department of Chemistry
Shri R.L.T. College of Science, Akola
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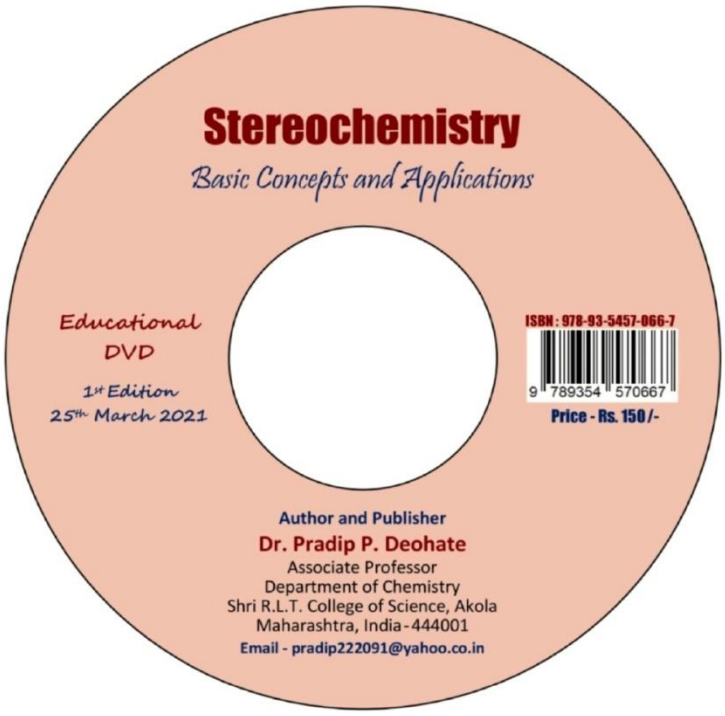
Stereochemistry
Basic Concepts and Applications
Educational
DVD
1st Edition
25th March 2021
ISBN : 978-93-5457-066-7
9 789354 570667
Price - Rs. 150/-
Author and Publisher
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Associate Professor
Department of Chemistry
Shri R.L.T. College of Science, Akola
Maharashtra, India - 444001
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Stereochemistry

Basic Concepts and Applications

ISBN : 978-93-5457-066-7

Edition : First, 25th March 2021

Author and Publisher

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Shri R.L.T. College of Science,
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Printer

Prakash Printers
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Title: A Text Book of Organic Chemistry for B.Sc. -I year (Sem-I)

Author's Name: **Dr. Poonam T. Agrawal**

Published By: Dr. Poonam T. Agrawal

Assistant Professor& Head

Department of Chemistry,

Shri R.L.T.College of Science, Akola

Address: **Department of Chemistry**

Shri R.L.T.College of Science

Civil-lines Akola

Maharashtra, India

Email: poonamagrawal2575@gmail.com

Printer: **Ajay Printer**

Near Shivaji College of Arts, Comm. And Science, Akola

Edition: First, 21st August 2021

ISBN: 978-93-5457-896-0

Price: Rs.150/-

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ISBN - 9788192362182

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Printed by:
Ganraya Graphis,
Mahsul Colony,
Cell: 98221 16819
Emai: ganrayaakl@gmail.com

Printed from the Camera ready copy provided by the editors.

ISBN: 978-81-923621-82

Published by:
Pandit Jawaharlal Nehru Study Center,
Shri Shivaji College of Arts, Commerce and Science, Akola (MS) India
A National Publication

Printed in India

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A NOTE ON BIODIVERSITY OF WEEDS FROM AKOLA DISTRICT (MS)

P. M. Khadse
Department of Botany, Shri R. L. T. College of Science, Akola (MS) India
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ABSTRACT:

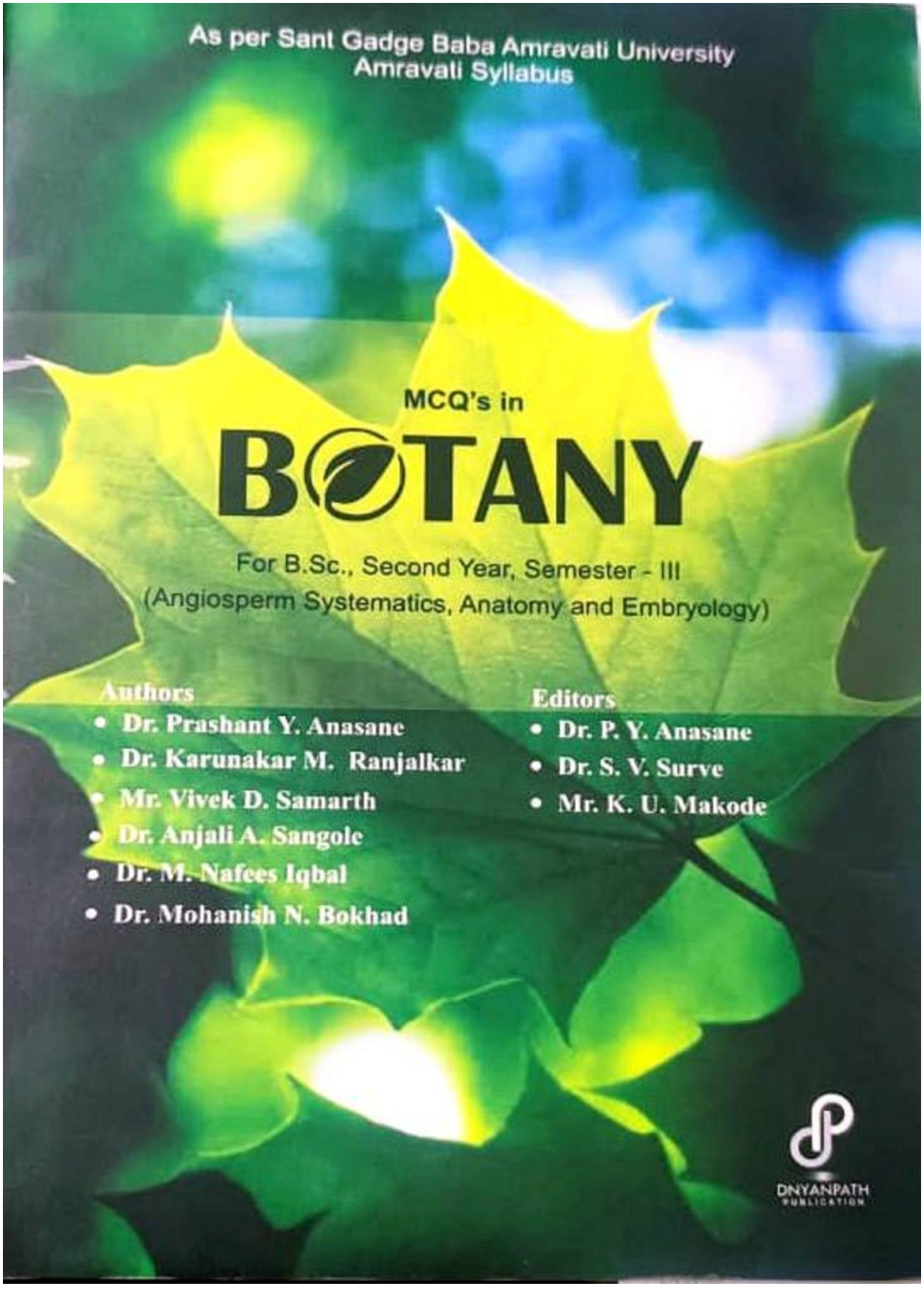
The term biodiversity is the shortform of Biological diversity . It can be defined as " The variability among living organisms from all types of habitats on the earth" and weeds are the plants which grow where they are not wanted. However there are several other definations of weeds as plants out of place (Dayton 1948). The present paper deals with the study of some of the weeds from Akola Disrtict. The present survey shows that there are about 135 prominent weeds belonging to 25 different families of which some are given here. This paper includes Botanical name, common name in Marathi, Family name of some of the weeds authenticated by using various floras like Flora of Marathwada Vol I & II, Flora of presidency of Bombay, Flora of presidency of Madras, Compandium of Indian weed science Research etc.

Key words: Biodiversity, Weed plants, Flora

Introduction:

Akola District is one of the District from Vidarbh region of Maharashtra state. It is bounded on North by Washim District, on the east by Buldana and on west by Amravati District. It is least urbanised district of Maharashtra most of the peoples are self employed in agriculture and forestry as black cotton soil present in most of the area of the District . The major crops are cotton, Wheat, Jawar, groundnut, Soya bean etc .

The current paper deals with the study of weed plants from Akola District. During this survey work in 2018-19 it is noticed that there are lots of weeds growing in and surrounding the fields affecting the quality and quantity of the yield. There are about 135 weeds are commonly present in the District belonging to 25 different families of the monocot and dicot plants of which some are listed here in table no.1. The weed samples were collected identified with the help of Floras and deposited in the departmental herbarium of Dept. of Botany Shri. R. L. T. College of Science, Akola (MS) for ready reference.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DNYANPATH
PUBLICATION

MCQ's in Botany for B.Sc., Second Year, Semester - III
(Angiosperm Systematics, Anatomy and Embryology)

Published by the DnyanPath Publication (INDIA)
The edition published in 1 May, 2021

ISBN 13 : 978-81-952191-8-6

DnyanPath® Publication
ISO 9001 : 2015

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Printed at Shri Gurudeo Printers, Amravati.
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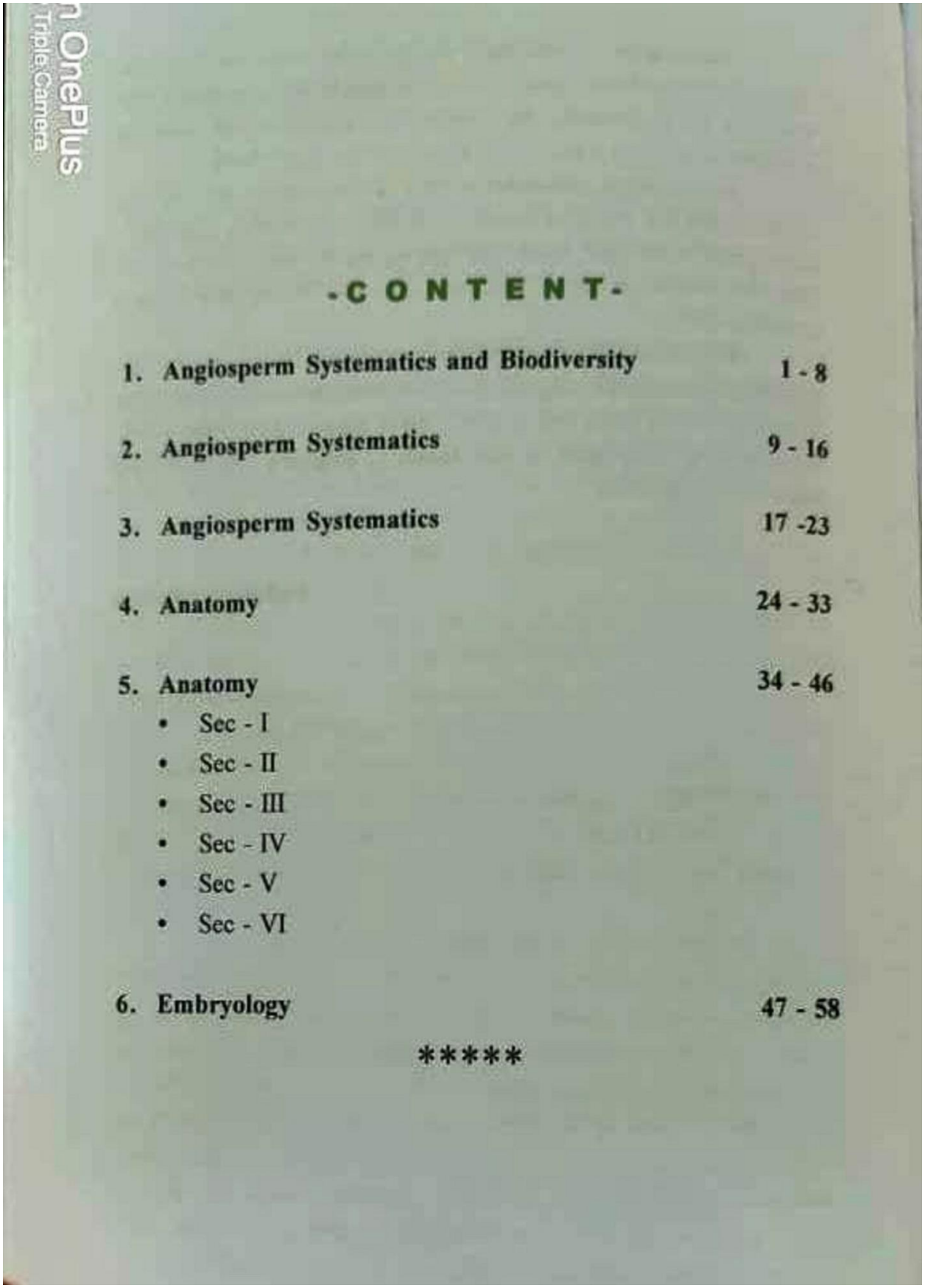

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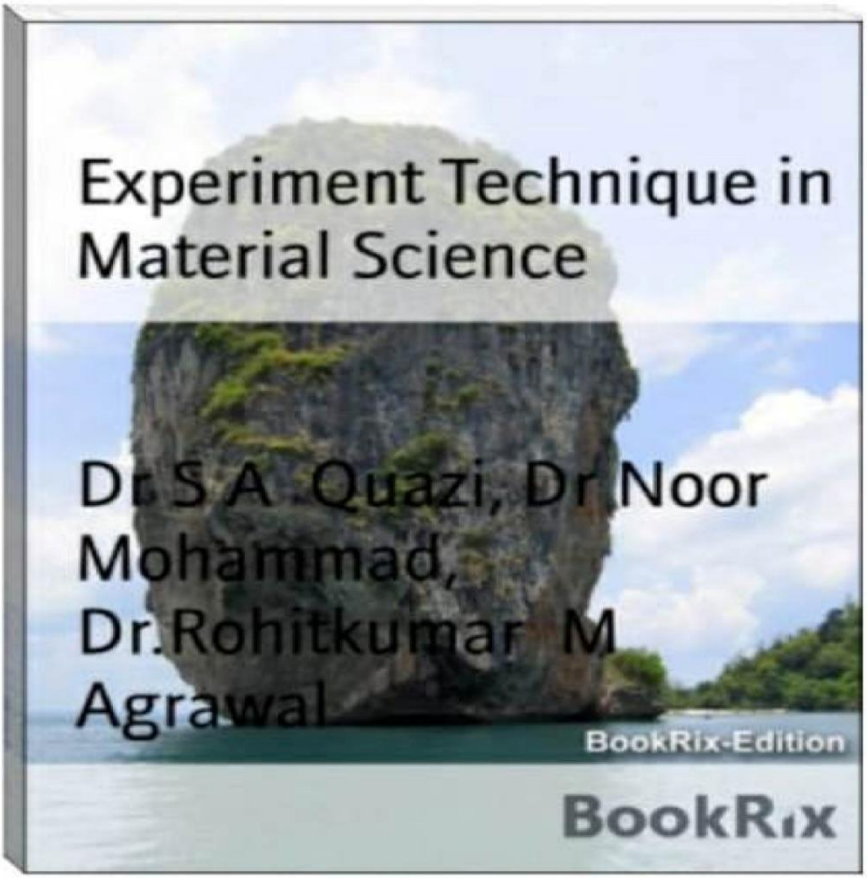

ACKNOWLEDGEMENT

I would like to thanks to the President Adv.Salim Bapumiya Patel for there continues encouragement and providing necessary facilities.

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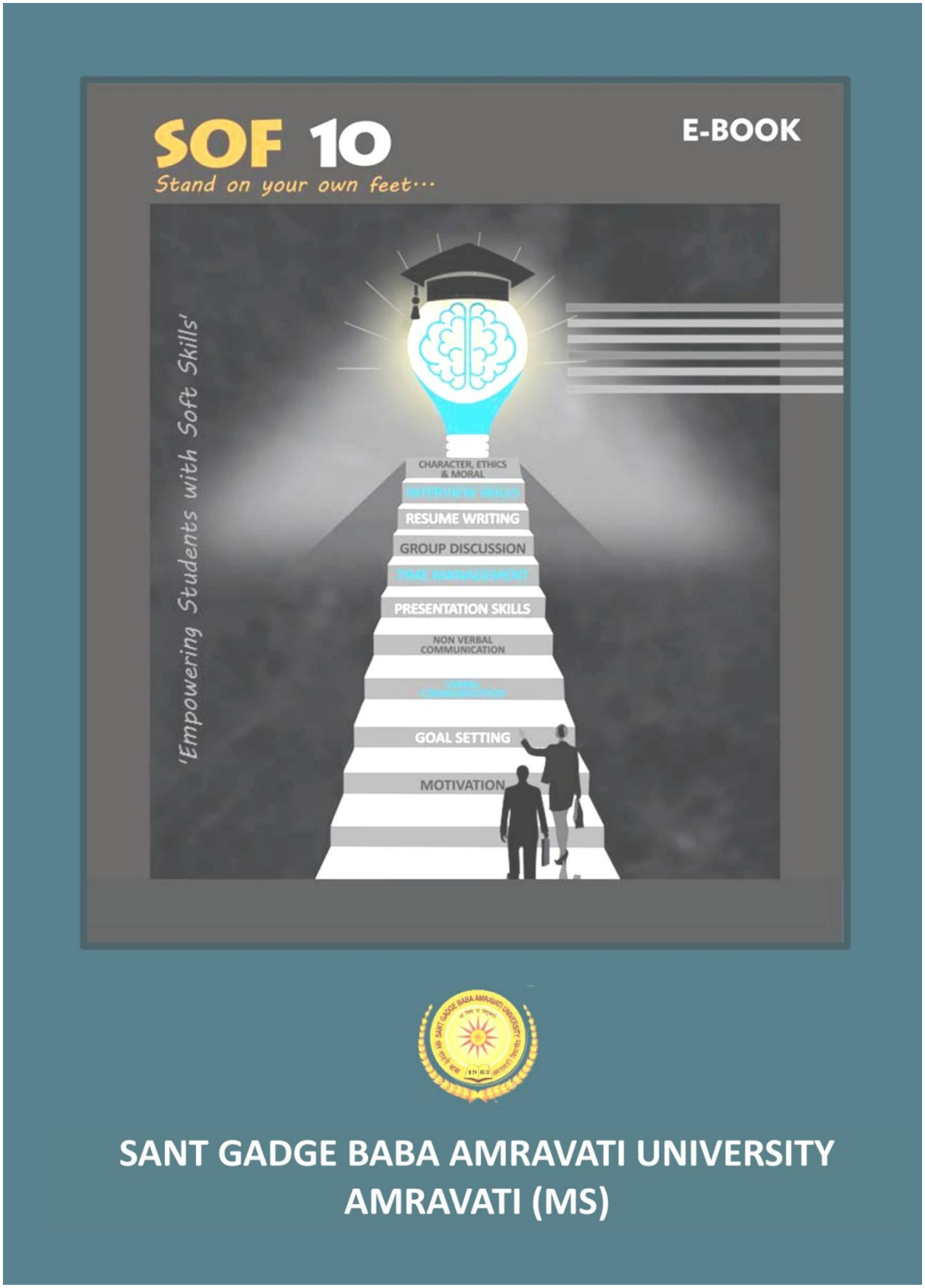
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Author:- **Dr. Dineshkumar Satange**

Edition :- I

Cover and Interior design By:- **Dr. Pavan Deshmukh**. Dean Training & Placement, Prof Ram Meghe College of Engineering & Management, Badnera (MS).

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Chapter 24

TIME AS RESOURSE

The time management is the method or process of proper development of planning and to exercise complete control over the quantity of time spent on various or specific activities, especially to increase effectiveness, efficiency or productivity. It is range of skills, tools, and techniques used to manage time to achieve specific tasks, projects and personal goals complying with a due date. A time management system is a designed for the combination of processes, tools, techniques, and methods. The time management is very important because the available time is limited. Time cannot be stored, goals are usually multiple, sometimes conflict and it cannot be accomplished without any effort, which requires the use of time.

The major aspects on time management include the creating an environment conducive to effectiveness, to set priorities, to carry out activity related to the priorities, the process of reduction of time spent on non-priorities.

Time management has been considered the combination of different concepts such as:

1. To build an effective surroundings

Some of the literature stresses tasks related to create a surrounding favourable to "real" effectiveness. These strategies include principles such as:

a) To get prepared the sorting of paperwork and of tasks.

b) Protecting one's time by insulation, isolation and delegation.

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ISBN: 978-81-954818-7-3

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Publisher Address:
My Rays Book Publication Center, Powered by International Journal of Microbial Science, Sr.no.66, Near Sai Baba Temple, Satav Nagar, Handewadi Road, Hadapsar, Pune-411028, Maharashtra, India.
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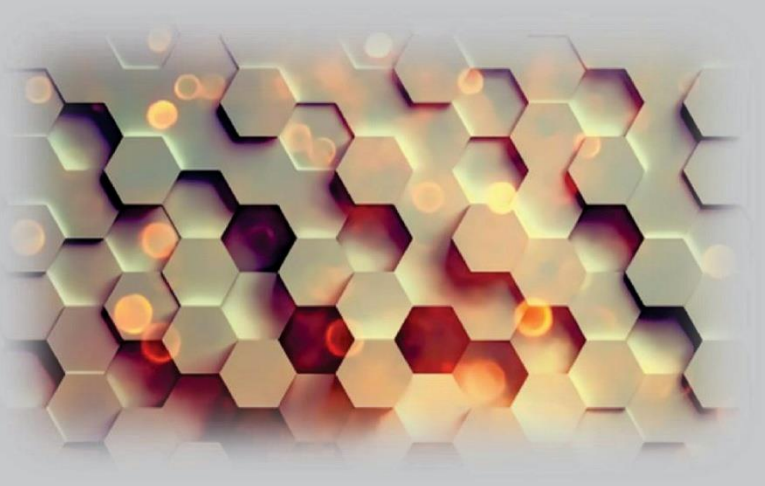

ISBN : 978-93-5627-454-9

Organic Chemistry

An approach to systematic study of selected topics

ISBN : 978-93-5627-454-9

Edition : First, 5th May 2022

Author and Publisher

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E-mail - pradip222091@yahoo.co.in

Printer

Prakash Printers
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Price : Rs. 250/-

9 789356 274549

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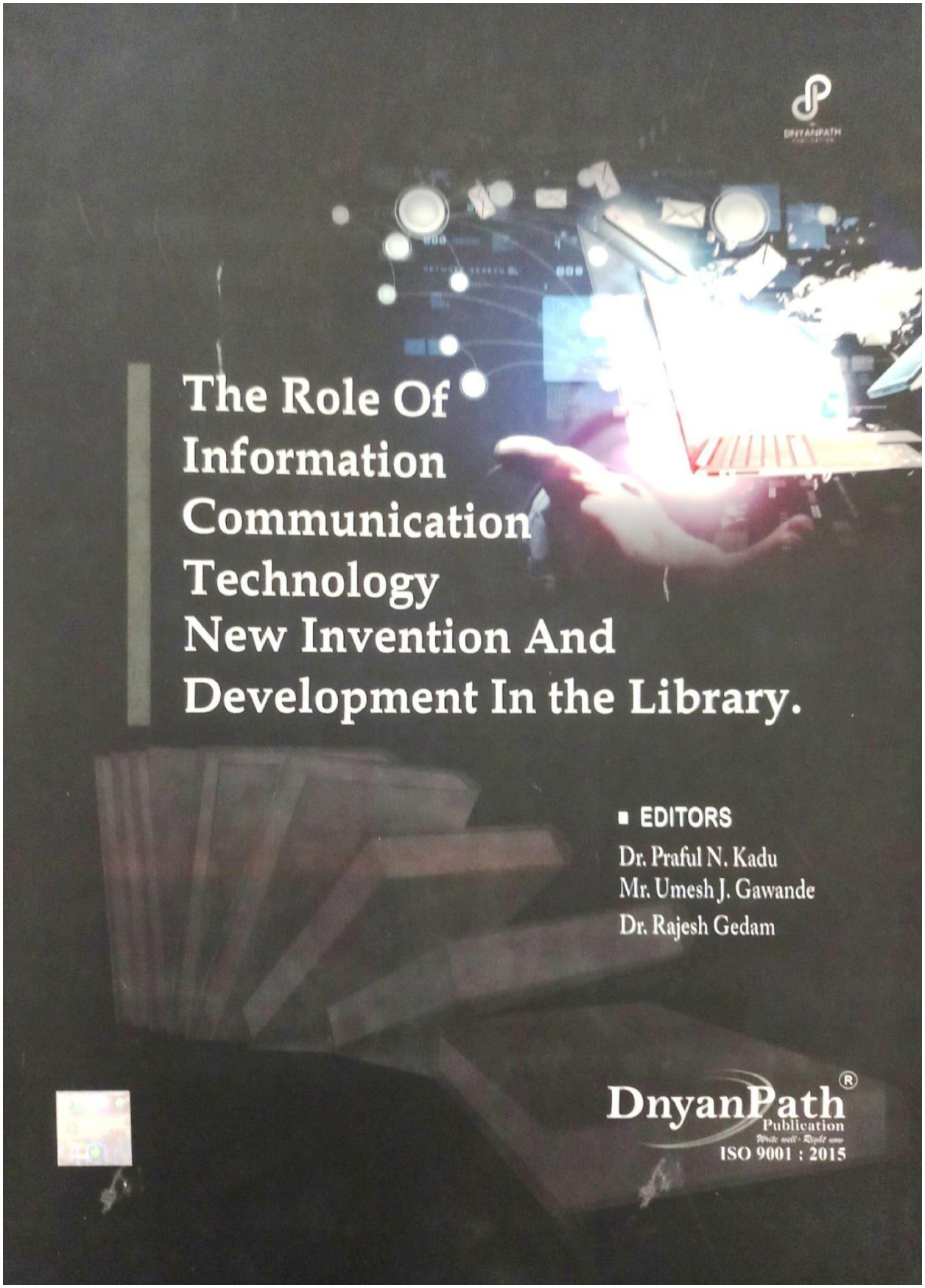
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Part B - Digitization Technology in libraries

Re-Engineering of Library Management and its Services in Digital Era

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Abstract-:

Library is growing organism Library and Information Centers (LIC) is growing its prospects. A traditional operation of Library and information is in a critical position. Prime fact here is the combination of zero growth budget, rapid escalating pricing on Information resources and necessary investments in technology, human resources development and increasing Parterres expectations. Library and information centers during the last decades, operating with more are less stable budget during these years. Another important is up gradation of users in comparison to location bound Libraries.

Higher education institutions libraries are trying to facilities and users access to information resources and applicants through the implementation of web-technology, e-books, and e-journals and create own institutional repositories; Emergence of it has made communication process dynamic and interaction across boundaries is now possible, fast and reliable, libraries and information centers should now adopt these technologies to provide Services to their patrons by using mobile phones cellular network, cable television and internet.

In this paper we would like to write up about the changes took place in library origination management and its services.

Introduction :

Libraries initially originated as document prevention system. However with the changes the diverse aspects of the human society, libraries too change changed their role. The modern libraries exist to provide reading services to the humanity. Libraries have always tried to adopt the best principles and practices of other sciences and disciplines. They have observed and adopt many tactics and strategies of management discipline and commercial world. Customer satisfaction is one of concepts the modern libraries are trying to adapt in to librarianship as 'User Satisfaction'. Libraries desire to fulfill all the expectations of their users. However .at times it becomes difficult. Growing, varied demands are the reason for this.

Re-engineering focused on dramatically changes in quality, speed and smoothness of library functions and to reduce its cost. Mainly change the current process. It is the way to help organization fundamentally rethink how they do won work in order to dramatically improve patrons services, cut operational costs and become user friendly.

Objectives-:

A main objective of this paper is to find out he changes in the library services. This took place after invention of ICT and the trends of new services over the traditional library services.

Re-engineering Library services:

Following the major series developed after reengineering with the help of ICT

a) Cataloguing: cataloguing a very document a very easy and at a time multiple volumes can be catalogues. Bibliographic information can be impaired from the stander MARC format database.
b) Acquisition: Integrated library management software is very compatible with the acquisition of library documents. This takes less time of procure of the documents. Ordering, receiving, billings, accessioning other relevant details can make very easy.
c) Circulation : It help to changing discharging

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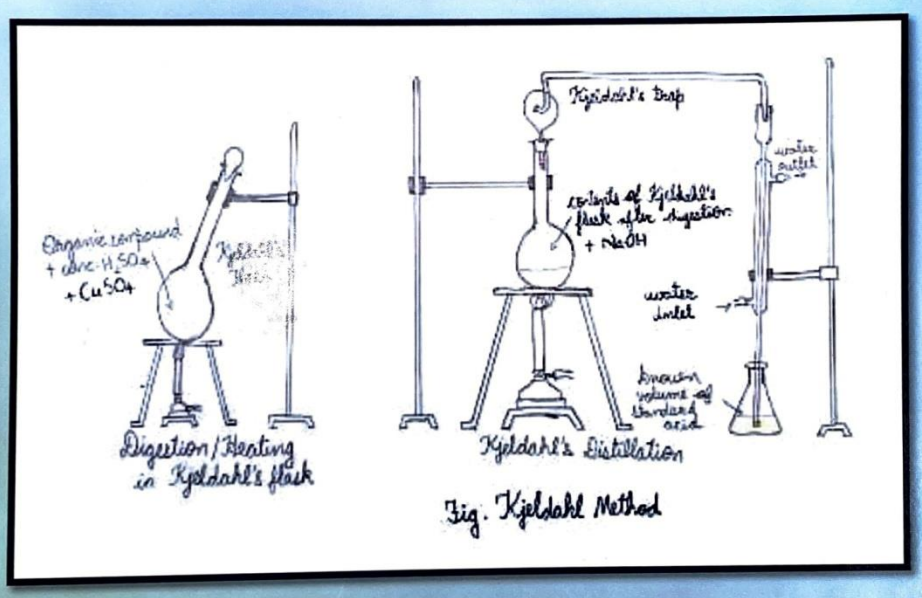

Fig. Kjeldahl Method

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My Rays Book Publication Centre powered by International Journal of Microbial Science (ISSN:2582-967X)

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ISBN: 978-93-5526-076-5

Publisher Address:

My Rays Book Publication Center, Powered by International Journal of Microbial Science, Sr.no.66, Near Sai Baba Temple, Satav Nagar, Handewadi Road, Hadapasar, Pune-411028, Maharashtra, India.

Email: Email:ijmsmcqbooks@gmail.com

Price: Rs.160/-

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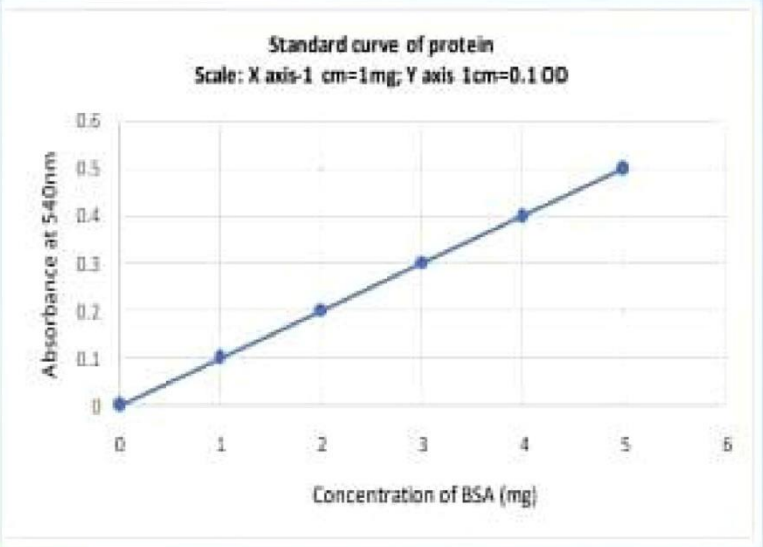

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My Rays Book Publication Centre powered by
International Journal of Microbial Science (ISSN:2582-967X)

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ISBN: 978-93-5526-518-0

Visit us at https://theijms.com/

ISSN (online): 2582-967X

Publisher Address:

My Rays Book Publication Center, Powered by International Journal of Microbial Science, Sr.no.66, Near Sai Baba Temple, Satav Nagar, Handewadi Road, Hadapsar, Pune-411028, Maharashtra, India.

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