Holy Cross College (Autonomous)
Nagercoil – 629 004
Affiliated to Manonmaniam Sundaranar University, Tirunelveli
Nationally Accredited with A+ Grade (CGPA 3.35) by NAAC IV Cycle
An ISO 9001:2015 Certified Institution

SSR
2019-2020
to
2023-2024

3.7.1 Number of functional MoUs/linkages with institutions/ industries in India and abroad for internship, on-the-job training, project work, student / faculty exchange and collaborative research during 2020-2021

DEPARTMENT OF MATHEMATICS AIDED

1. **Research Collaboration - Doctoral Committee Member**
a. Nesamony Memorial Christian College, Marthandam

2. Research Collaboration - Doctoral Committee Member
a. Nesamony Memorial Christian College, Marthandam

3. Research Collaboration - Doctoral Committee Member
b. Nesamony Memorial Christian College , Marthandam

CENTRE FOR RESEARCH MANONMANIAM SUNDARANAR
UNIVERSITY TIRUNELVELI – 627 012 www.msuniv.ac.in

MINUTES OF THE FIRST DOCTORAL COMMITTEE MEETING

The Doctoral Committee Meeting of the Ph.D. Scholar,
Mr./Ms. ANLIN LOUISHA MERLAC · Q (Reg. No. 20113112092021) was held
on 21.08.2020 at 2·30 A.M./P.M. in the Department of Mathematics .

The following members were present

1. Dr. G. Sudhana (Supervisor & Convener)
2. (Joint Supervisor, if applicable)
3. Dr. M.K. Angel Jebitha (Member)
4. Dr. D. Nidha (Member)

Mr./Ms. Q. Anlin Louisha Merlac has presented the overview of the proposed research work. The Doctoral Committee has approved the research topic
as " A Study on Cyclic Decomposition of Graphs

The Committee has recommended the scholar to undertake the following course works

Course Code	Course Title	Core Course / Special Elective
ACWMA11	Combinatorical Theory	Core Course
ACWMAP	Mini Project	Core Course

Number of course works as applicable to the scholars

Dr. D. Nidha M.Sc., M.Phil., Ph.D.
Member
(Signature with Name and seal)
Assistant Professor
Department of Mathematics
Nesamony Memorial Christian College
Marthandam- 629165

Dr. M.K. ANGEL JEBITHA
Member
Assistant Professor
Department of Mathematics
(Signature with Name and seal)
Holy Cross College (Autonomous)
Nagercoil - 629 004

Joint Supervisor
(Signature with Name and seal)
(if applicable)

Supervisor
(Signature with name and seal)
Dr. G. Sudhana, M.Sc., M.Phil., Ph.D.
Assistant Professor
Research Department of Mathematics
Nesamony Memorial Christian College
Marthandam is 629165

Forwarded

Signature of the HOD/Director of the Center/Principal of the institution where the scholar is working
Dr. A. VIJAYAN, Ph.D.,
Head of the Research Centre
Research Department of Mathematics
N.M. Christian College, Marthandam-629 165

4. Research Collaboration - Doctoral Committee Member
a. Nesamony Memorial Christian College , Marthandam

MANONMANIAM SUNDARANAR UNIVERSITY
CENTRE FOR RESEARCH
ABISHEKAPATTI, TIRUNELVELI – 627 012, TAMIL NADU, INDIA

MINUTES OF THE FIRST DOCTORAL COMMITTEE MEETING

The Doctoral Committee Meeting of the Ph.D. Scholar Mr/Ms. BERYL EN BINK - R (Reg. No. 20217112092011) was held on 11-01-2021 at 10.00 A.M./P.M. in the Department of Mathematics

The following members were present:

1. Dr. G. Sudhana (Supervisor & Convener)
2. _____ (Joint Supervisor, if applicable)
3. Dr. S. Asha (Member)
4. Dr. S. Sujitha (Member)

Mr/Ms. R. Beryl En Bink has presented the overview of the proposed research work. The Doctoral Committee has approved the research topic as " A study on Graceful labeling of Graphs

The Committee has recommended the scholar to undertake the following course works.

Course Code	Course Title	Core Course / Special Elective
ACWMA04	Advanced Graph Theory	Core Course
ACWMAP	Mini project	Core Course

Number of course works as applicable to the scholars

Member
(Signature with Name and seal)
Dr. S. SUJITHA, M.Sc.,B.Ed.,M.Phil.,Ph.D.,
Assistant Professor,
Department of Mathematics
Joiuv Cruz College (Autonomous)
Nagercoil - 629 004.
(Signature with Name of Supervisor)
(if applicable)

Forwarded
Signature of the HOD/Director of the Center/Principal of the institution

Member
(Signature with Name and seal)
Dr. S. Asha, M.Sc.,M.Phil.,Ph.D.,
Assistant Professor
Research Department of Mathematics
Nesamony Memorial Christian College
Marthandam- 629195, Kanyakumari District
(Signature with Name)
Dr. G.Sudhana, M.Sc., M.Phil., Ph.D.,
Assistant Professor
Research Department of Mathematics
Nesamony Memorial Christian College
Marthandam
where the supervisor is working

5. Research Collaboration - Doctoral Committee Member
a. Nesamony Memorial Christian College , Marthandam

CENTRE FOR RESEARCH
MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI – 627 012
www.msuniv.ac.in

MINUTES OF THE FIRST DOCTORAL COMMITTEE MEETING

The Doctoral Committee Meeting of the Ph.D. Scholar,
Mr./Ms. SHEEJA C (Reg. No. 20813112092) was held
on 13/01/2021 at 4:00 A.M./P.M. in the Department of Mathematics.

The following members were present

1. Dr. D. Nidha (Supervisor & Convener)
2. – (Joint Supervisor, if applicable)
3. Dr. A. Pramila Inpa Rose (Member)
4. Dr. M.K. Angel Jebitha (Member)
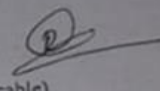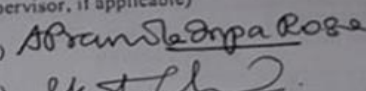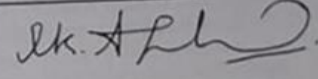
Mr./Ms. SHEEJA C has presented the overview of the proposed research work. The Doctoral Committee has approved the research topic as " Chromatic Polynomials and Domination polynomials of Zero-Divisor Graphs"

The Committee has recommended the scholar to undertake the following course works

Course Code	Course Title	Core Course / Special Elective
ACWMA04	Advanced Graph theory	Core Course
ACWMA11	Combinatorial theory	Core Course

Number of course works as applicable to the scholars

Dr. A. PRAMILA INPA ROSE
(Member)
(Associate Professor & Head)
Department of Mathematics
Nesamony Memorial Christian College
Marthandam, Tamilnadu - 629 165

Dr. M.K. ANGEL JEBITHA,
M.Sc., M.Phil., B.Ed., Ph.D.
(Signature with Name and seal)
Additional Professor,
Department of Mathematics
Holy Cross College (Autonomous)

Dr. D. Nidha M.Sc., M.Phil., Ph.D.
(Signature with Name and seal)
Assistant Professor
Department of Mathematics
Nesamony Memorial Christian College
Marthandam- 629165

Joint Supervisor
(Signature with Name and seal)
(if applicable)

Signature of the HOD/Director of the Center/Principal of the institution where the supervisor is working

Forwarded
NESAMONY MEMORIAL
CHRISTIAN COLLEGE
MARTHANDAM

6. Research Collaboration - Doctoral Committee Member
a. S. T. Hindu College, Nagercoil

From
Dr.B.Uma Devi (Supervisor),
Associate Professor of Mathematics,
S.T.Hindu College, Nagercoil – 629002.

To
The Director,
Centre of Research,
Manonmaniam Sundarnar University,
Abishekapatti, Tirunelveli – 627012.

Through

The Principal
S.T.Hindu College,
Nagercoil – 629 002.

Respected Sir,

Sub: Minutes of Second Doctoral Committee meeting for the PhD Scholar
Reg No : 18223152092019 submission – Reg
Ref : 1. Letter from the Director, Centre for Research, Manonmaniam Sundarnar
University, No. MSU/RES/RI/ July 2018 dated 05.07.2018.

With reference to the above letter, the **Second Doctoral Committee Meeting** was
conducted for Mrs. J.Anusha (Reg. No. 18223152092019) Research Scholar, S. T. Hindu College ,
Nagercoil. Minutes of the meeting is submitted here with for kind persual.

Thanking You

Date : 12-2-2021

Place : Nagercoil

Yours faithfully
Dr. B. Uma Devi

(Supervisor)
UMA DEVI, M.Sc,M.Phil,B.Ed Ph.D
Associate Professor
Dept. of Mathematics,
S.T. HINDU COLLEGE,
Nagercoil

Dr. V. NAGARAJAN,
M.Sc., M.Phil., M.Ed., Ph.D.,
Asst. Professor of Mathematics,
Department of Mathematics,
S.T. Hindu College, Nagercoil

Principal I/c
S.T. Hindu College
Nagercoil

Dr. S. SUJITHA, M.Sc.,B.Ed.,M.Phil.,Ph.D.
Assistant Professor,
Department of Mathematics
Holy Cross College (Autonomous)
Nagercoil - 629 004.

Dr.A. Vijayalekshmi
Associate Professor & Head
Department of Mathematics
S.T. Hindu College, Nagercoil
Tamil Nadu - 629 002.

7. Research Collaboration - Doctoral Committee Member

a. Govindammal Aditanar Women's College, Tiruchedur

You have been invited to the following event.

First DC meeting-R.Santrin Sabibha

When   Tue Jan 12, 2021 11am – 12.30pm India Standard Time - Kolkata

more details »

Joining info   Join with Google Meet

meet.google.com/jvi-krux-nwb

Join by phone

(US) +1 573-833-4162 (PIN: 502687845)

Calendar   sanithazhi@gmail.com

Who
- jeyadaisy@holycrossngl.edu.in - organizer
- jesmalar.l@holycrossngl.edu.in
- sanithazhi@gmail.com
- jeyajeyanthi@rediffmail.com

Going (sanithazhi@gmail.com)?   **Yes** · **Maybe** · **No**   more options »

8. Research Collaboration - Doctoral Committee Member
a.   Nesamony Memorial Christian College , Marthandam
b.   Gobi Arts and Science College, Gobichettipalayam

MINUTES OF THE DOCTORAL COMMITTEE MEETING FOR CONFIRMATION OF PROVISIONAL REGISTRATION

The Doctoral Committee Meeting of the Ph.D. Scholar, Mrs. BRINDHA DEVI .V. I. Reg.No. 18213112092006 (Full- Time) was held on **31-03-2021** at **12.00 p.m** in the Department of Mathematics, Nesamony Memorial Christian College, Marthandam 629 165

The following members were present

1. Dr. S. Kavitha   (Supervisor & Convener)

2. Dr. D. Nidha   (Joint Supervisor)

3. Dr. A. Vijayan   (Member 1)

4. Dr. Angel Jebitha M. K   (Member 2)

Mrs. BRINDHA DEVI V. I. has successfully completed the following course works recommended by the Doctoral Committee. She has obtained the following grades in the course works.

Sl. No	Course Code	Couse title	Credits	Category	Grade / Marks
1	ACWMA04	Advanced Graph Theory	4		O^+
2	ACWMA09	Advanced Calculus	4		B^+
				CGPA	8.00

COE signed result sheet of the course works should be duly attested by the Supervisor with seal.

The scholar had completed the first seminar presentation on 29-03-2021 to the faculty members and research scholars. The attendees list is enclosed herewith. The committee also evaluated the research work carried out by the scholar and satisfied with the performance of the scholar. Hence the Committee recommends the confirmation of Provisional registration of the scholar in the Faculty of Mathematics and permits the scholar to proceed with her research work.

Dr. A. **Member**, Ph.D.
(Signature with name and seal)
Head of the Research Department of Mathematics
M. Christian College, Marthandam-629 165

Member Dr. M.K. ANGEL JEBITHA,
(Signature with name and seal) M.Sc., M.Phil, B.Ed, Ph.D.
Assistant Professor,
Department of Mathematics
Holy Cross College (Autonomous)
Nagercoil - 629 004.

Joint Supervisor
(Signature with name and seal)
Dr. D. Nidha M.Sc., M.Phil, Ph.D.
Assistant Professor
Department of Mathematics
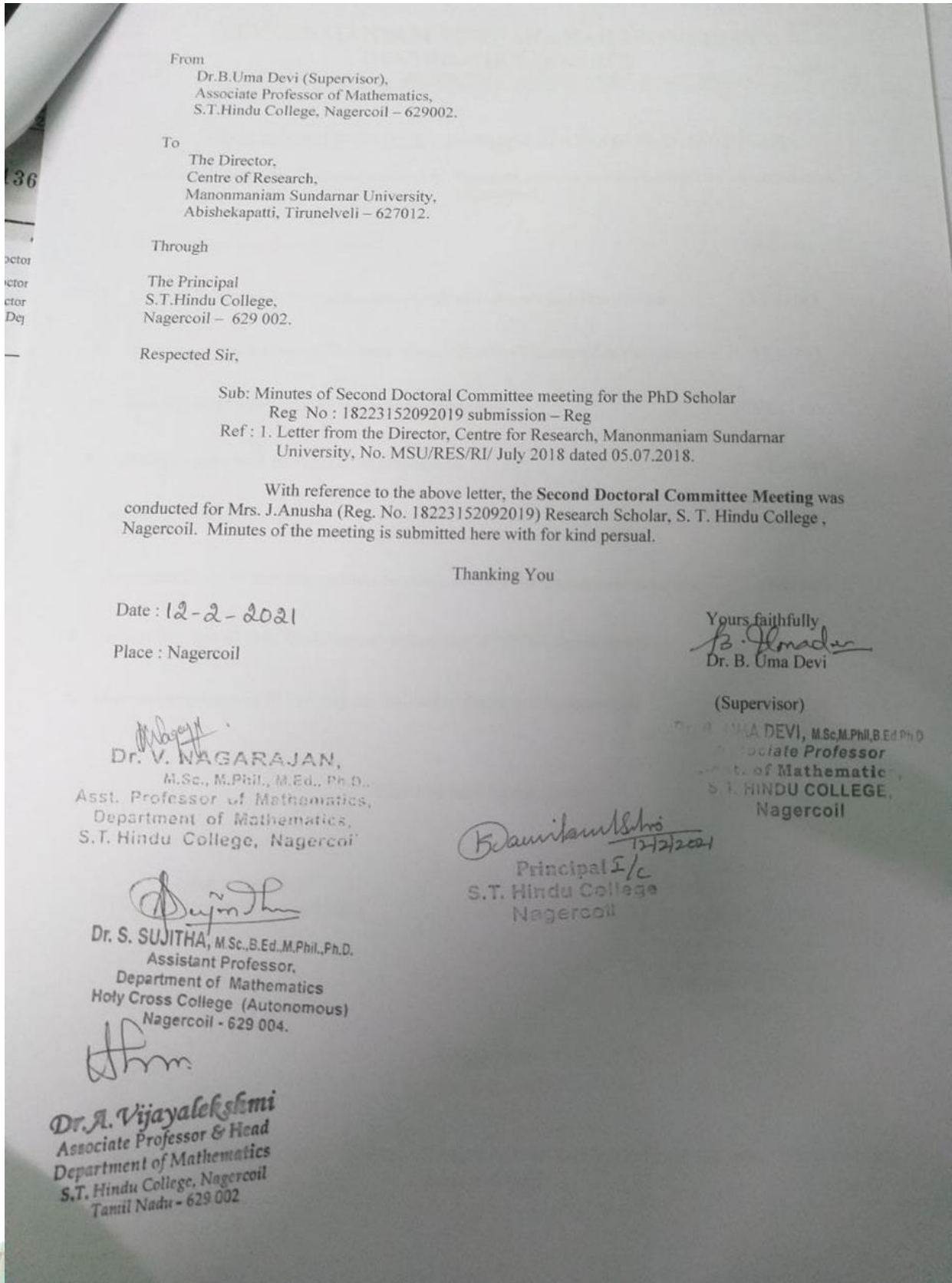Nesamony Memorial Christian College
Marthandam 629165

Forwarded

Supervisor
(Signature with name and seal)
KAVITHA
Assistant Professor
Department of Mathematics
Gobi Arts And Science College
Karattadipalayam Post - 638453
Gobichettipalayam, Erode.

Signature of the HOD/Director of the center/Principal of the institution where the supervisor is working
Dr.K.Paul Raj (Name and Seal)
Principal
Nesamony Memorial Christian College
Marthandam

<div align="center">

DEPARTMENT OF BOTANY

</div>

1. **Research Collaboration - Doctoral Committee Member**
   a. S.T, Hindu College, Nagercoil

First Doctoral Committee - reg. ▶ Inbox ×

Subramanian Harikrishnan <adiantumhari@gmail.com>
to cfrmsu, jasmineprabakar1983, parthipillai64, saxsxc, me, mavetha ▼

Wed, Sep 9, 2020, 4:09 PM ☆ ↩ ⋮

09.09.2020

From	To
Dr. S. Harikrishnan,	The Director,
Supervisor & Convener	Centre for Research,
Assistant Professor of Botany,	ManonmaniamSundaranar University,
T. D. M. N. S. College,	Tirunelveli - 627 012,
T. Kallikulam – 627 113	Tamilnadu, India.

Through

The Head,	The Principal,
Department of Botanyand Research Centre,	S. T. Hindu College,
S. T. Hindu College,	Nagercoil – 629 002.
Nagercoil – 629 002.	

Respected Sir / Madam,

Sub: **Ph.D, First Doctoral Committee - reg.**

*****

This is to inform you my student

S.No.	Name of the student	Reg. No.	Mode
1.	J. RANI JASMINE	20123152262026	Part Time

DEPARTMENT OF ZOOLOGY

1. **Research Collaboration – Doctoral Committee Member**

a. Scott Christian College (Autonomous), Nagercoil

SCOTT CHRISTIAN COLLEGE (AUTONOMOUS)
NAGERCOIL – 629 003, KANYAKUMARI DISTRICT,
TAMILNADU, INDIA.

Dr. R. Leena, M.Sc., M.Phil., Ph.D.
Assistant Professor
Department of Zoology and Research Centre,
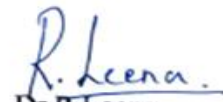
Date: 20/01/2021

To

Dr. Shyla Suganthi. A,

Assistant Professor of Zoology,

Holy Cross College (Autonomous),

Nagercoil.

Dear Madam,

Sub: Invite to attend Doctoral Committee Meeting- reg.

I invite you to the Doctoral Committee Meeting for Mrs. C. Angel Mary, full time Research Scholar, Department of Zoology and Research Centre, Scott Christian College (Autonomous), Nagercoil-3 which will be held on 22/01/2021 (Friday) at 02.00 pm in the Zoology Department Library. Kindly meet it convenient to attend the meeting.

Thank you

Dr.R.Leena

(Convener).

Dr. R. LEENA, M.Sc.,M.Phil.,Ph.D.
Assistant Professor
Dept. of Zoology and Research Centre
Scott Christian College (Autonomous)
Nagercoil - 629 001

Phone No. (off) : 04652 – 231807; Fax: 04652 – 229800
Mob : +91-9442704679, E-mail: rleenar@yahoo.co.in

2. Research Collaboration - Doctoral Committee Member
a. Scott Christian College, Nagercoil

SCOTT CHRISTIAN COLLEGE (AUTONOMOUS)
NAGERCOIL – 629 003, KANYAKUMARI DISTRICT,
TAMILNADU, INDIA.

Dr. R. Leena, M.Sc., M.Phil., Ph.D.
Assistant Professor
Department of Zoology and Research Centre,

Date: 01/02/2021

To

Dr. Brisca Renuga. F,

Associate Professor of Zoology,

Holy Cross College (Autonomous),

Nagercoil.

Dear Madam,

Sub: Invite to attend Doctoral Committee Meeting- reg.

I invite you to the Doctoral Committee Meeting for Ms. M. Asha Berlin, full time Research Scholar, Department of Zoology and Research Centre, Scott Christian College (Autonomous), Nagercoil-3 which will be held on 04/02/2021 (Thursday) at 02.00 pm in the Zoology Department Library. Kindly make it convenient to attend the meeting.

Thank you

Dr. R. Leena

(Convener).

Phone No. (off) : 04652 – 231807; Fax: 04652 – 229800
Mob : +91-9442704679, E-mail: rleenar@yahoo.co.in

DEPARTMENT OF COMMERCE (S.F-I)

1. Research Collaboration - Doctoral Committee Member
a. St. Jerome's College, Anandanadarkudy

MANONMANIAM SUNDARANAR UNIVERSITY
Reaccredited with 'A' Grade by NAAC (3rd Cycle)
CENTRE FOR RESEARCH
ABISHEKAPATTI, TIRUNELVELI – 627 012, TAMILNADU, INDIA
Phone : 0462 - 2333741, 9487907000, Intercom: 2563073, Mail: cfrmsu@msuniv.ac.in, web: msuniv.ac.in

DR. C. KANNAN
DIRECTOR

Ref : MSU/RES/Admn/July 2020 Session

Date : December 30, 2020

Ph.D., Programme Commencement Order

To
DEVIKRISHNA J G
SREE GAYAM, TRA-41,THITTAMANGALAM, VATTIYOORKAVU PO, TRIVANDRUM
TRIVANDRUM, Kerala, Pincode - 695013
Mobile No. : 8281858594, Email ID : krishnan.devi.devi8@gmail.com
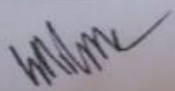
Sir/Madam,
Sub: Registration for doing Ph.D., programme - Date of Commencement of Research work -
Intimation - reg.
Ref: Counselling attended by the candidate for July 2020 session.
* * * * * * * * * * * * * * *

with reference to the above, you are provisionally registered for Ph.D., Programme as detailed below :

Name of the Scholar	DEVIKRISHNA J G
Registration No.	20213211012003
Discipline	Commerce
Gender & Community	Female & OC
Nationality	INDIAN
PWD Status	Not Applicable
Admission Based On & Mode	M.Phil & FULL TIME
Research Centre	St. Jeromes College, Ananthanadarkudy, Nagercoil
Name of the Supervisor with Address	Johnslin Sujitha G, Assistant Professor, Department of Commerce, St. Jerom's College of Arts and Sci., Ananthanadarkudy and PO., 629201 Mobile No. : 9486883440, Email ID : sujithasjc@gmail.com
Name of the Co-Supervisor with Address	NIL
Doctoral Commmittee Members	1. DR A USHA, Assistant Professor, Department of Commerce, St. Jerome's College, Anandhanadarkudy - 629201 Mobile No. : 9442441114, Email ID : toushadevan@gmail.com 2. DR R EVALIN LATHA, Assistant Professor, Department of Commerce, Holy Cross College (Autonomous), Nagercoil - 629004 Mobile No. : 9489838947, Email ID : evalinlatha@holycrossngl.edu.in
Proposed Title	EFFECTIVENESS OF ENTREPRENEURIAL DEVELOPMENT PROGRAMMES TOWARDS THE DEVELOPMENT OF WOMEN ENTREPRENEURS OF MSME SECTOR IN KERALA
Date of Commencement	30.12.2020

ASSISTANT   SUPERINTENDENT   ASSISTANT REGISTRAR

payment.in/admission/phdcounsell/payment/print_app.php

1

DEPARTMENT OF MATHEMATICS

1. Research Collaboration – Joint Author Publication
a. Department of Science and Research, University College of Engineering, Nagercoil

THE EDGE GEODETIC VERTEX COVERING NUMBER OF A GRAPH

J. ANNE MARY LEEMA[1,*], V.M. ARUL FLOWER MARY[1], P. TITUS[2]

[1]Department of Mathematics, Holy Cross College (Autonomous), Nagercoil, Affiliated College of Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli-627012, Tamilnadu, India

[2]Department of Science and Humanities, University College of Engineering Nagercoil, Anna University, Tirunelveli Region, Tirunelveli-627007, Tamilnadu, India

Abstract. For a connected graph G of order $n \geq 2$, a set $S \subseteq V(G)$ is an *edge geodetic vertex cover* of G if S is both an edge geodetic set and a vertex covering set of G. The minimum cardinality of an edge geodetic vertex cover of G is defined as the *edge geodetic vertex covering number* of G and is denoted by $g_{1v}(G)$. Any edge geodetic vertex cover of cardinality $g_{1v}(G)$ is a g_{1v} - set of G. Some general properties satisfied by edge geodetic vertex cover are studied. The edge geodetic vertex covering number of several classes of graphs are determined. Connected graphs of order n with edge geodetic vertex covering number 2 is characterized. A few realization results are given for the parameter $g_{1v}(G)$.

Keywords: geodesic; edge geodetic set; vertex covering set; edge geodetic vertex cover; edge geodetic vertex covering number.

2010 AMS Subject Classification: 05C12.

1. INTRODUCTION

By a graph $G = (V, E)$, we mean a finite undirected connected graph without loops and multiple edges. The *order* and *size* of G are denoted by n and m, respectively. For basic graph

*Corresponding author

E-mail address: annemary88ma@gmail.com

2. Research Collaboration – Joint Author Publication
a. Department of Science and Research, University College of Engineering, Nagercoil
b. S.T. Hindu College, Nagercoil

THE CONNECTED GEODETIC VERTEX COVERING NUMBER OF A GRAPH

V. M. Arul Flower Mary, J. Anne Mary Leema*, B. Uma Devi**
and P. Titus***

Department of Mathematics,
Holy Cross College (Autonomous), Nagercoil, Tamil Nadu - 629004, INDIA
E-mail : arulflowermary@gmail.com

*Department of Mathematics,
Manonmaniam Sundaranar University,
Abishekapatti, Tirunelveli, Tamil Nadu - 627012, INDIA
E-mail : annemary88ma@gmail.com

**Department of Mathematics,
S. T. Hindu College, Nagercoil, Tamil Nadu - 629002, INDIA
E-mail : umasub1968@gmail.com

***Department of Mathematics,
University College of Engineering, Nagercoil
Anna University, Tirunelveli Region,
Tirunelveli, Tamil Nadu - 627007, INDIA
E-mail : titusvino@yahoo.com

Abstract: For a connected graph G of order $n \geq 2$, a set $S \subseteq V(G)$ is a *geodetic vertex cover* of G if S is both a geodetic set and a vertex cover of G. The minimum cardinality of a geodetic vertex cover of G is defined as the *geodetic vertex covering number* of G and is denoted by $g_\alpha(G)$. Any geodetic vertex cover of cardinality $g_\alpha(G)$ is a g_α− set of G. A *connected geodetic vertex cover* of G is a geodetic vertex cover S such that the subgraph $G[S]$ induced by S is connected. The minimum cardinality of a connected geodetic vertex cover of G is the *connected geodetic vertex covering number* of G and is denoted by $g_{\alpha c}(G)$. A connected geodetic vertex cover of cardinality $g_{\alpha c}(G)$ is called a $g_{\alpha c}$ - set of G. Some general properties satisfied by connected geodetic vertex covering sets are studied. The connected geodetic
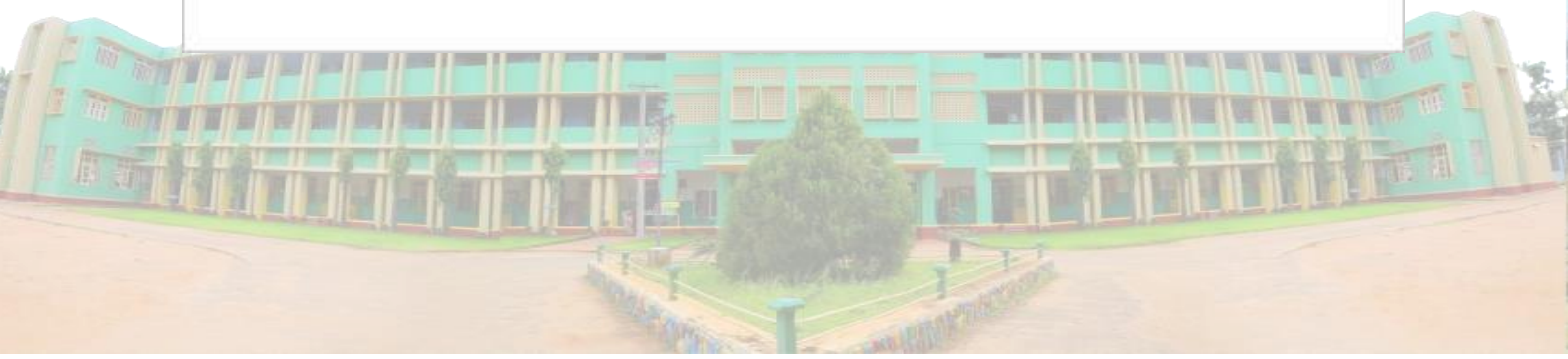
3. Research Collaboration – Joint Author Publication

a. Department of Mathematics, Sree Ayyappa College for Women, Chunkankadai

Stolarsky-3 Mean Cordial Labeling of Some More Graphs

[1]S. Kavitha and [2]S. S. Sandhya

[1]Department of Mathematics, Holy Cross College (Autonomous), Nagercoil.

[2]Department of Mathematics, Sree Ayyappa College for Women, Chunkankadai.

ABSTRACT

Let $G = (V, E)$ be a Simple graph and let f be a function from $V(G)$ to $\{0, 1, 2\}$. For each edge uv assign the label $f(e=uv) = \left\lceil \sqrt{\frac{f(u)^2 + f(u)f(v) + f(v)^2}{3}} \right\rceil$. f is called a Stolarsky-3 Mean Cordial Labeling of G if $|V_f(i) - V_f(j)| \leq 1$ and $|e_f(i) - e_f(j)| \leq 1$, $i, j \in \{0, 1, 2\}$ where $V_f(x)$ and $e_f(x)$ denote the number of vertices and edges labeled with x $(x=0,1,2)$ respectively. A graph is called Stolarsky-3 Mean Cordial if it admits a Stolarsky-3 Mean Cordial Labeling. In this paper we investigate Stolarsky-3 Mean cordial labeling behavior of Ladder, Flag graph, Middle graph, Total graph, $P_n \odot K_{1,2}$, $P_n \odot K_{1,x}$ and $P_n \odot K_3$ graphs.

Keywords: Ladder, Flag graph, Middle graph, Total graph, Stolarsky-3 Mean graph, Stolarsky-3 Mean Cordial graph.

1. Introduction

The graph $G = (V, E)$ considered here will be finite, simple and undirected. We follow Gallian[1] for all detailed survey of graph labeling and we refer Harary[2] for all other standard terminologies and notations.

We will give the following definitions and other information's which are helpful for our present investigation.

Definition 1.1: A walk in which $u_1, u_2, \ldots, u_m$ are distinct is called a path. A path on n vertices is denoted by P_n.

Definition 1.2: A closed path is called a cycle. A cycle on n vertices is denoted by C_n.

Definition 1.3: The Ladder graph L_n ($n \geq 2$) is the product graph $P_2 \times P_n$ which contains 2n vertices and 3n-2 edges.

Definition 1.4: The Flag graph Fl_n is obtained by joining one vertex of C_n to an extra vertex is called the root.

Definition 1.5: The Middle graph M(G) of a graph G is the graph whose vertex set is V(G)∪E(G) and in which two vertices are adjacent if and only if either they are adjacent edges of G or one is a vertex of G and the other is an edge incident on it.

DEPARTMENT OF PHYSICS

1. Research Collaboration – Joint Author Publication

a. Institute of Chemistry, Bioscience and Environmental Engineering, Faculty of Science and Technology, University of Stavanger, Box 8600 Forus, 4036, Stavanger, Norway
b. Département de Chimie, Biochimie et Physique, Université du Québec à Trois–Rivières (UQTR), Trois–Rivières, QC, G8Z 4M3, Canada
c. Division of Chemistry, Faculty of Science and Humanities, Sree Sowdambika College Engineering, Aruppukottai, Virudhunagar, Tamil Nadu, India
d. Department of Mechanical Engineering, Rajas Engineering College, Vadakkankulam, Tamil Nadu, India
e. Department of Chemistry & Research Centre, Mohamed Sathak Engineering College, Ramanathapuram, Tamil Nadu, India
f. Institution of Research and Development, Duy Tan University, Da Nang 550000, Vietnam

Fabrication and modeling of prototype bike silencer using hybrid glass and chicken feather fiber/hydroxyapatite reinforced epoxy composites

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ARTICLE INFO

ABSTRACT

Recently, the significant development and advantages of bioactive natural composite materials have been employed in modern engineering constructions, aerospace, packing industries, automotive fields, and more. The fiber materials are derived from natural plant materials (e.g., coir, jute, and bamboo) and animal waste products which show excellent physico–chemical, thermal, and mechanical properties compared to man–made fibers. In this study, the replacement of man–made fiber materials with polymer matrix composites using natural waste chicken feather fiber (CFF) based reinforced lightweight epoxy hybrid composite materials were prepared for the development of a prototype bike silencer. The hybrid composites were prepared from epoxy resin reinforced with synthetic inorganic glass fibers (GF) and natural organic CFFs (with 5, 10, and 20 % composition) together with 3 % of nano–hydroxyapatite (nHA) as a catalytic filler. The 3D modeling, design, and fabrication of a prototype bike silencer were undertaken, using Suzuki Samurai as a reference model specimen. The hybrid 82 G F/15CFF/3HA composite material showed optimum tensile strength and yield strength values of 167.00 and 58.10 MPa, respectively. The observed von–Mises stress, maximum displacement, Young's modulus, and Poisson's ratio values were 6.9260 MPa, 0.8661 mm, 13.90 GPa, and 0.39, respectively. Further, the presence of voids in the hybrid 82 G F/15CFF/3nHA composite bike silencer showed higher absorption capacity with effective reduction of toxic CO, HC, O_2, and CO_2 pollutants as well as remarkable heat releasing capacity, as compared to the steel silencer. The fabricated hybrid 82 G F/15CFF/3nHA composite material may effectively be utilized for the development of renewable, eco–friendly biocomposites with exceptional performances.

1. Introduction

Fibers are firmly considered as fundamental components in composite materials as they bear the main loading and have been widely used in aerospace, automotive, construction, and sporting industries [1–4]. Glass fibers (GF) are one of the most widely used reinforcements, owing to their strength and competitive price [5–7]. Recently, environment-friendly natural fibers derived from animal wastes have been used in various applications in the place of glass or synthetic fibers. This is because they show exceptional mechanical properties like high tensile strength, flame retardant nature, lightweight, high thermal stability, and prominent stiffness. The natural fibers derived from animal sources are an attractive reinforcement for the development of bio–composites. In this regard, chicken feather fibers (CFFs) are

2. Research Collaboration – Joint Author Publication

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FULL PAPER

Electronic Band Structure, Density of States, Phase Transitions, Metallization and Superconducting Transition of KBr under High Pressure

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Abstract:

The results of a full potential linear muffin-tin orbital (FP-LMTO) study on the electronic properties of ionic insulator potassium bromide (KBr) under pressure is presented. The phase transition pressure at which the compound undergoes structural phase transition from NaCl to CsCl structure is predicted from the total energy calculations. The ground state properties and band gap values are compared with the experimental results. At normal pressure KBr is a direct band gap insulator. In KBr, the metallization occurs through indirect closing of the band gap between Γ and H points at the reduced volume V/Vo=0.45 (CsCl structure), the corresponding metallization pressure is 1.274 Mbar. On further increase of pressure, KBr becomes superconductor, and this material comes under the class of electron-phonon-mediated high pressure superconductor. The superconducting transition temperatures (Tc) of KBr is obtained as a function of pressure for both NaCl and CsCl structures. The highest Tc estimated is 5.911 K and the corresponding pressure is 5 Mbar in the NaCl structure and 0.897 K in the CsCl structure. It is also confirmed that the metallization, structural phase transition and onset of superconductivity do not occur simultaneously in ionic compounds.

Keywords: band structure; density of states; phase transition; metallization; superconductivity

1. Introduction

Ionic compounds are ubiquitous materials and are characterized by their highly crystalline nature, high melting points and strong miscibility in polar media. Potassium bromide (KBr) is a large band gap ionic insulator with energy gap = 7.4 eV and its ionic crystalline structure produces its unique high ultraviolet transmissivity. The transition of an insulator to a metal (metallization) at high compression is generally the result of the pressure induced closure of the band gap. Potassium chloride is expected to have a uniquely high metallization pressure among large bandgap solid insulators [1]. Under strong shock compression, the insulating –conducting transition is enhanced by the thermal promotion of electrons across band gap. This is a result of high

temperature produced by high pressure (>1 Mbar) shock waves [1]. Recently, ramp compression has been used to compress materials to pressures above 8 Mbar while keeping the temperature low compared to that of shock waves [2]. Band structure calculations reveal that alkali halide compounds are wide-gap insulators that explain their optical transparency [3]. Ionic salts have gained substantial importance recently due to the ability of ionic liquids to dissolve a variety of organic substance including cellulose. Ionic crystals are probably the simplest system to understand, since the interactions among the ions are purely electrostatic in origin. Hence the description of their ground state energies is exact within the limit of calculation [3].

The physical properties of materials undergo a variety of changes when they are subjected to

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Curcumin-encased hydroxyapatite nanoparticles as novel biomaterials for antimicrobial, antioxidant and anticancer applications: A perspective of nano-based drug delivery

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Sandhanasamy Devanesan [c][d], Mohamad S. AlSalhi [c][d], Johnson Henry [e],
Marimuthu Govindarajan [f][g], Baskaralingam Vaseeharan [h]

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4. Research Collaboration – Joint Author Publication

a. Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli

Original Article

Green synthesis of cerium oxide nanoparticles using *aloevera leaf* extract and its optical properties

S. Sebastiammal[1], S. Sonia, J. Henry[2], and A. Lesly Fathima[1*]
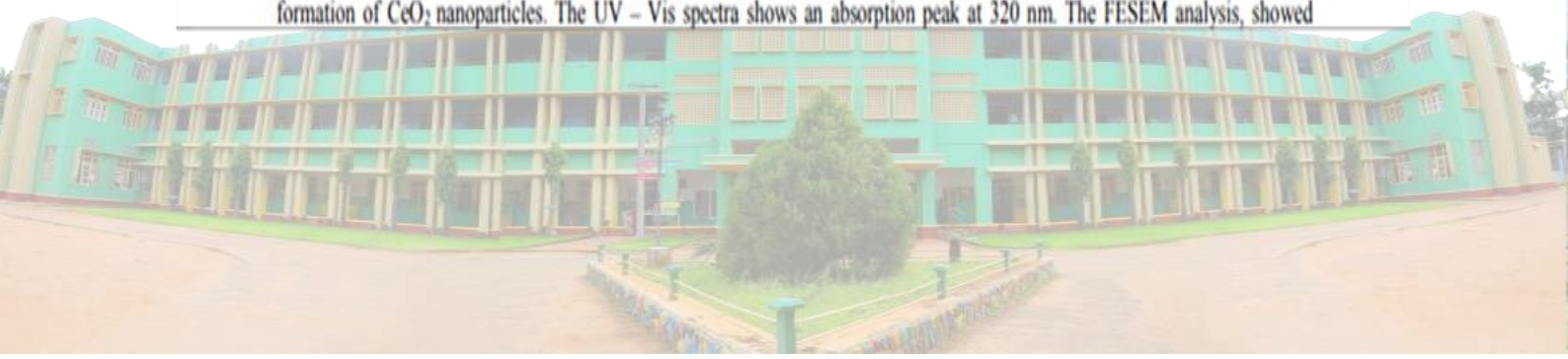
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Abstract

In the present report, bio-reduction of cerium nitrate into cerium oxide nanoparticles has been done using *aloevera* leaf extract. The synthesized CeO_2 nanoparticles were characterized by PXRD, FTIR, UV-DRS, FESEM, EDAX and PL. From the PXRD analysis, it is found that the synthesized CeO_2 nanoparticles were the face centered cubic structure. The crystalline size is found to be about 7 nm and 12 nm for the CeO_2 nanoparticles before and after calcination respectively. FTIR spectra exhibit the formation of CeO_2 nanoparticles. The UV – Vis spectra shows an absorption peak at 320 nm. The FESEM analysis, showed

5. Research Collaboration – Joint Author Publication
a. Malankara Catholic College, Mariagiri, Tamil Nadu, India

Jordan Journal of Physics

ARTICLE

Physicochemical Properties and Antimicrobial Potential of Green Synthesized Cerium Oxide (CeO₂) Nanoparticles from Pomegranate Peel Extract

S. Sebastiammal[a], **S. Sonia**[b], **C. S. Biju**[c] and **A. Lesly Fathima**[b]

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Abstract: Green synthesis of CeO₂ Nanoparticles (NPs) with small size and high stability paved the approach to recover and protect the environment by decreasing the use of toxic chemicals and eliminating biological risks in biomedical applications. Peel-mediated synthesis of CeO₂ NPs is gaining more importance owing to its easiness and eco-friendliness. In this study, biosynthesis of CeO₂ NPs using the fruit peel extract of *punica granatum* is reported. The synthesized CeO₂ NPs are characterized by Powder X-ray Diffraction (PXRD), UV-Diffused Reflection Spectroscopy (UV-DRS), Field Emission Scanning Electron Microscopy (FESEM), Energy Dispersive X-Ray Analysis (EDAX) and antimicrobial activity. The CeO₂ NPs show more lethal activity towards gram +ve bacteria than towards gram –ve bacteria.

Keywords: Biosynthesis, Optical properties, Antimicrobial activity.

Introduction

Pathogenic microorganisms have become a major problem in our today life, since they pose a threat to health and food materials. This paves the way to the research community to investigate solutions to remove or reduce these hazardous species from the environment. Emergence of new bacterial strains which are resistant to current antibiotics has become a serious health issue. From recent literature, it is believed that nanotechnology is one of the most active research areas in providing solutions for such problems. Synthesis of nanoparticles (NPs) with various sizes and shapes has gained much importance in nanotechnological applications [1-5]. In general, nanoparticles have a higher surface-to-volume ratio with an enlarged contact area with microbes. This feature enhances the biological activity of NPs and finds applications in the medical field.

CeO₂ is a semiconductor material which has a wide bandgap ranging between 3.0 eV and 3.9 eV with large excitation energy [6]. CeO₂ NPs have received much attention in nanotechnology due to their useful applications as catalysts, fuel cells and antioxidants in biological systems [7-10]. CeO₂ can be prepared by several methods,

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DEPARTMENT OF CHEMISTRY

1. Research Collaboration – Joint Author Publication
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¹H NMR – A validation tool for supramolecular complexes of α-cyclodextrin with Antidiabetic drugs

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ARTICLE INFO

ABSTRACT

Metformin hydrochloride, Pioglitazone hydrochloride and Glimepiride are antidiabetic drugs used in the treatment of Type-2 diabetes. In this study, supramolecular complexes of these three drugs were synthesized and characterized using ¹H NMR spectroscopy. The possible encapsulation of the drugs inside the supramolecular complexes were depicted according to the chemical shift variances of ¹H NMR of the host and guest molecules inside the inclusion complex. Nuclear Magnetic Resonance spectroscopy has been extensively employed in Chemistry and can be considered as one of the most complete spectroscopic techniques, due to its widefield of applications from structural elucidation of structures to investigations on intra/inter-molecular. ¹H NMR spectroscopy served as a validation tool for the supramolecular complexes. Therefore the supramolecular complexes could be used in enhancing the physico-chemical properties of the drugs thereby improving the efficacy of the drugs in the pharmaceutical industry.

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1. Introduction

Metformin hydrochloride, Pioglitazone hydrochloride and Glimepiride are antidiabetic drugs used in the treatment of Type-2 diabetes. Cyclodextrins(CDs) are cyclic oligomers of glucopyranose units that play an important role as a host in inclusion complexes, where non-covalent interactions are involved. They have been extensively studied in supramolecular chemistry. Because of its biocompatibility, relatively non-toxicity and relatively low price, CDs have been widely employed for encapsulation of several substances, being used in food, cosmetic and pharmaceutical industries. Nuclear Magnetic Resonance spectroscopy has been extensively employed in Chemistry and can be considered as one of the most complete spectroscopic techniques, due to its widefield of applications from structural elucidation of structures to investigations on intra/inter-molecular [1–3].

Applications of NMR on CDs chemistry is so important that no other spectroscopic technique can provide the same wealth of chemical information on the supramolecular systems and it is the only technique that provides information on the right orientation of the guest molecule inside the cavity and also on other important parameters related to the physico-chemical characteristics of the inclusion complexes [4–7].The main advantages of using CDs in drug delivery systems includes: the increase the biodisponibility, solubility enhancer, improve the stability of the drug, increase the therapeutic index, the efficacy/pharmacokinetics properties, and decrease the drug toxicity. In this study, ¹H NMR spectroscopy is employed to evaluate the supramolecular complexes of α-cyclodextrin with the three antidiabetic drugs namely Metformin hydrochloride,Pioglitazone hydrochloride and Glimepiride as shown in Fig. 1 and thereby used as a potential candidate in drug industry for desired pharmokinetic properties in drugs.

2. Materials and methods

2.1. Reagents and materials

Analytical grade of Metformin hydrochloride (MFH), Pioglitazone hydrochloride (PGH), Glimipiride (GMP), α-cyclodextrin (α-CD) were purchased from Sigma Aldrich. The solvents used were also of analytical grade. Triply distilled water was used for the preparation of stock solutions.

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DEPARTMENT OF BOTANY

1. **Research Collaboration – Joint Author Publication**
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Computational calculations and molecular docking studies on 2-(2-ethylaminothiazol-5-oyl)benzothiazole

N S Femila Nirmal*, Bojaxa A Rosy[b] & T F Abbs Fen Reji**

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2-(2-Ethylaminothiazol-5-oyl)benzothiazole has been synthesized and its bond length, bond angle, dihedral angle, HOMO-LUMO and Mulliken charges on the atoms have been calculated by density functional theory (DFT/B3LYP) method with 6-311++G(d,p) basis sets. Biological properties like the target receptor identification and identification of interacting residues, of this compound is identified and analyzed by using Openbabel GUI (C) software.

Keywords: DFT method, marine alkaloids, benzothiazole and molecular docking

Alkaloids have attracted the attention of humans due to their significant bioactivity. The chemical compounds, which are isolated from marine sources usually consists of nitrogen containing heterocyclic rings. Due to these promising biological activities, there has been a rapid growth of interest in the synthesis of this class of compounds and their analogues. Benzothiazole is a privileged heterocyclic scaffold found in a number of biologically important molecules and chemotherapeutic agents, which includes clinically used drugs. Based on this conjecture, we have conceived a tentative, retro synthetic analysis for the synthesis of benzothiazole analogs of alkaloid topsentin[1]. However, so far, no work has been reported on the vibrational analysis and molecular docking of 2-(2-ethylaminothiazol-5-oyl)benzothiazole (Figure 1). Hence, in the present work, a detailed vibrational analysis is carried out and for a proper understanding of the IR spectra a reliableassignment of all vibrational bands is essential. DFT calculations, particularly those based on hybrid functional methodshave evolved to a powerful quantum chemical tool for the determination of the electronic structure of molecules[2-8]. In this framework, the B3LYP hybrid exchange–correlation functional is one of the most used since it proved its ability in reproducing various molecular properties, including vibrational spectra[9-15] (Figure 2). The combined use of B3LYP functional and standard split valence basis set 6-31G(d) has been previously

shownto provide an excellent compromise between accuracy and computational efficiency of vibrational spectra for large and medium-size molecules. In addition, molecular docking studies were carried out and, the mechanism of action of this compound on pancreas cancer cell line (PDB ID: BCL2), HIV-1 reverse transcriptase (PDB ID: 1RT2) and cytochrome P450 enzyme 14-alpha-demethylase of *M. tuberculosis* (PDB ID: 1EA1) is found and it is very much useful to develop efficient drugs.

Experimental Section

The title compound was prepared from 1-alkyl-3-(N,N-dimethylimidoyl)thiourea and 2-(2-bromo-acetyl)benzothiazole, which was prepared from 2-(1-hydroxyethyl)benzothiazole in DMF. The reaction mixture was stirred well and triethylamine was added. The reaction mixture was warmed at 80-85°C for 5 minutes. It was then cooled and poured into ice cold water with constant stirring. An orange precipitate thus obtained was filtered, washed with water and dried. The crude product was crystallized from methanol: water (2:1) and then from benzene:
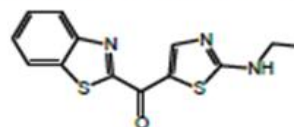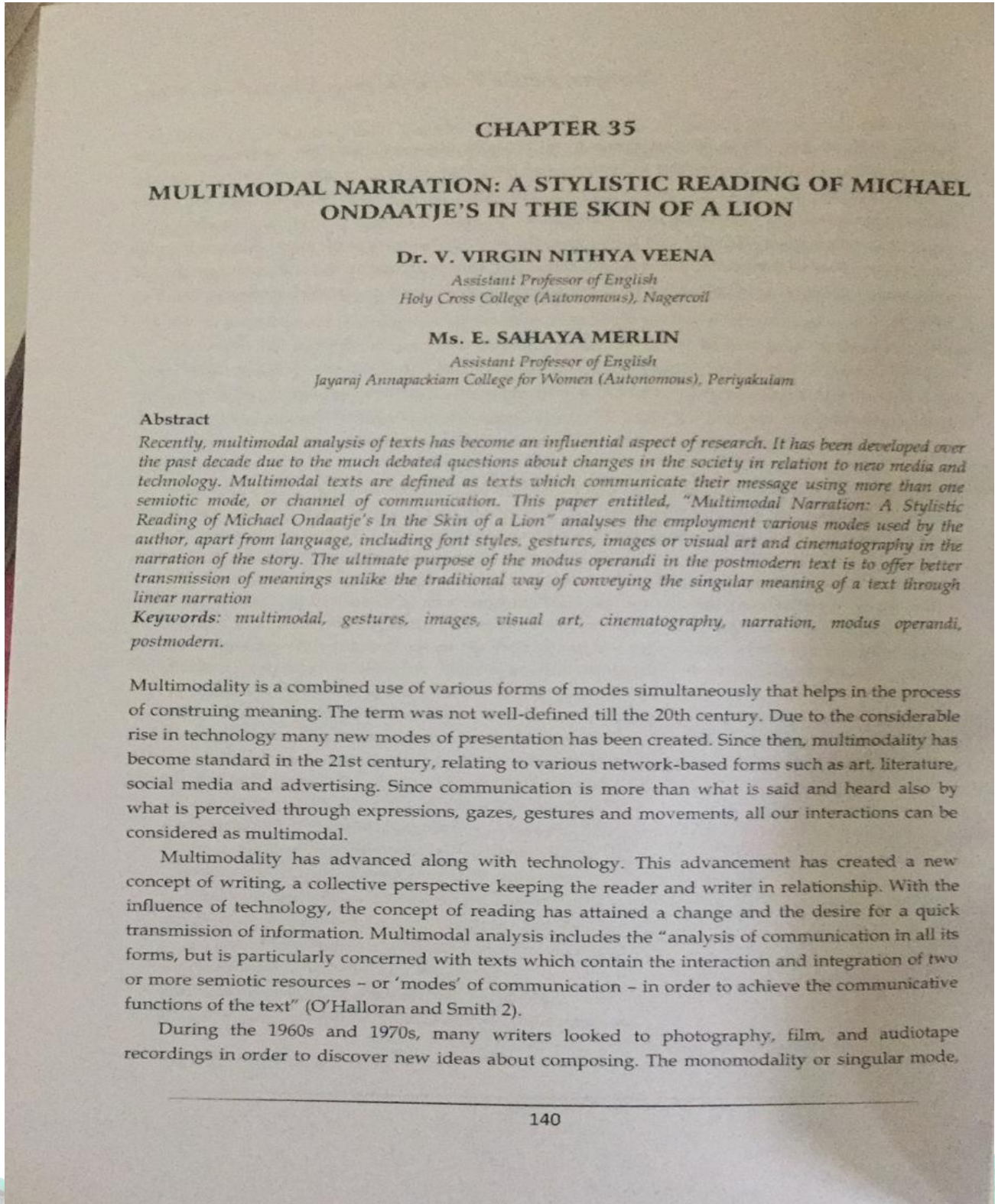

Figure 1 — Structure of 2-(2-ethylaminothiazol-5-oyl) benzothiazole

DEPARTMENT OF ENGLISH

1. Research Collaboration – Joint Author Publication
   a. Jayaraj Annapackiam College for Women, Periyakulam

CHAPTER 35

MULTIMODAL NARRATION: A STYLISTIC READING OF MICHAEL ONDAATJE'S IN THE SKIN OF A LION

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Ms. E. SAHAYA MERLIN
Assistant Professor of English
Jayaraj Annapackiam College for Women (Autonomous), Periyakulam

Abstract

Recently, multimodal analysis of texts has become an influential aspect of research. It has been developed over the past decade due to the much debated questions about changes in the society in relation to new media and technology. Multimodal texts are defined as texts which communicate their message using more than one semiotic mode, or channel of communication. This paper entitled, "Multimodal Narration: A Stylistic Reading of Michael Ondaatje's In the Skin of a Lion" analyses the employment various modes used by the author, apart from language, including font styles, gestures, images or visual art and cinematography in the narration of the story. The ultimate purpose of the modus operandi in the postmodern text is to offer better transmission of meanings unlike the traditional way of conveying the singular meaning of a text through linear narration

Keywords: multimodal, gestures, images, visual art, cinematography, narration, modus operandi, postmodern.

Multimodality is a combined use of various forms of modes simultaneously that helps in the process of construing meaning. The term was not well-defined till the 20th century. Due to the considerable rise in technology many new modes of presentation has been created. Since then, multimodality has become standard in the 21st century, relating to various network-based forms such as art, literature, social media and advertising. Since communication is more than what is said and heard also by what is perceived through expressions, gazes, gestures and movements, all our interactions can be considered as multimodal.

Multimodality has advanced along with technology. This advancement has created a new concept of writing, a collective perspective keeping the reader and writer in relationship. With the influence of technology, the concept of reading has attained a change and the desire for a quick transmission of information. Multimodal analysis includes the "analysis of communication in all its forms, but is particularly concerned with texts which contain the interaction and integration of two or more semiotic resources – or 'modes' of communication – in order to achieve the communicative functions of the text" (O'Halloran and Smith 2).

During the 1960s and 1970s, many writers looked to photography, film, and audiotape recordings in order to discover new ideas about composing. The monomodality or singular mode,

2. Research Collaboration – Joint Author Publication

a. Noorul Islam Centre for Higher Education, Kumaracoil

b. V.O. Chidambaram College, Thoothukudi

Function of Brain in L2 Learning - Neurolinguistic Perspective

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Abstract

Language learning is a basic concept of all over the world. To learn a foreign language, there should be proper guidance and proper coaching. The students should know the rules and principles which are followed by the native speakers. L2 learning is not an easy task, at first all grammatical rules and the phonetics have to be taught to the learners. There are several methods which are used for training an individual in English. Grammar Translation method is the pioneer method which is followed in 19th century. After few years, Bilingual method, Translation method, Eclectic method are introduced for foreign language teaching. All these methods are completely formal and focus upon direct learning and teaching process. These methods are formal and boring so that there is a lot of chance for the students to get deviated from learning. Grammatical rules and syntax are boring part in a language study. So there should be a better method for learning a language. The present generation focuses on Neuro science as

the best way to learn English. Neuro is related to nervous system and sensory organs. The researchers focus that when language is taught with the help of sensory organs that will be the best way for learning English. This paper aims at bringing the function of brain in acquiring the language and neuro linguistic programming technique to teach the target language.

Keywords: Brain, Cerebrum, Cerebellum, Medulla Oblongata, Language Learning, Visual Cortex, Auditory Cortex and Primary Motor Cortex

DEPARTMENT OF TAMIL AIDED

1. Research Collaboration – International Webinar
a. Department of Tamil, University of Kerala, Kariavattom

INTERNATIONAL WEBINAR ON

WOMEN IN TAMIL LITERATURE

Jointly organized by

Department of Tamil
University of Kerala
Kariavattom
&
Department of Tamil
Holy Cross College (Autonomous)
Nagercoil

From 30th to 31st March 2021
Through online

Link: https://meet.google.com/utq-ruen-ojm

https://youtube.com/channel/UCU9ZRNaUi4j7cQ2WnD6CgKA

Department of Tamil
Holy Cross College (Autonomous), Nagercoil

PROGRAMME

Date: 30.03.2021
Inaugural Session: 2.30 pm

WELCOME
Dr.Hepsy Rose Mary A,
Head, Dept.of Tamil, University of Kerala.

PRESIDENTIAL ADDRESS
Dr.S.Thenmozhi,
Head, Dept.of Tamil, Holy Cross College, Nagercoil

INAUGURATION & KEYNOTE ADDRESS
Dr.C.Subramania Pillai,
Former Professor& Head, Dept.of Tamil,
University of Kerala

FELICITATION
Dr.Sr.Leema Rose,
Vice Principal, Holy Cross College, Nagercoil

Dr.K.Manikaraj,
Former Syndicate Member,
Associate Professor, Dept. of Tamil,
University College, TVM

VOTE OF THANKS
Dr.V.Antony Prakash Babila,
Assistant Professor, Dept.of Tamil,
Holy Cross College, Nagercoil.

MASTER OF CEREMONY

Dr.S.Sunitha,
Assistant Professor, Dept. of Tamil,Holy Cross College, Nagercoil.

Academic Session : 1
Date : 30.03.2021 Time : 3.00pm

CHAIR:
Dr.P.Jeyakrishnan,
Professor, Dept. of Tamil, University of Kerala

PRESENTATION
Poet Thirukumaran, Ireland.
'The Literary Contribution of Women Fighters of Tamil Ezham'

VOTE OF THANKS
Dr.M.D.Arunmozhi Nangai,
Assitant Professor, Dept. of Tamil,Holy Cross College, Nagercoil

Academic Session : 2
Date : 31.03.2021 Time : 11.00am

CHAIR:
Dr.M.Justin Buela,
Assistant Professor, Dept. of Tamil,Holy Cross College, Nagercoil

PRESENTATION
Dr.T.Vijayalakshmi,
Associate Professor, Dept. of Tamil,
University of Kerala
'Language of Women and their Space in Tamil Literature'

VOTE OF THANKS
Dr.A.Leema Metilda,
AssistantProfessor, Dept. of Tamil,University of Kerala

Valedictory Session
Date: 31.03.2021 Time :12.00am

WELCOME
Dr.V.Antony Prakash Babila,
Assistant Professor, Dept.of Tamil, Holy Cross College, Nagercoil

PRESIDENTIAL ADDRESS
Dr.Hepsy Rose Mary A,
Head, Dept.of Tamil, University of Kerala.

VALEDICTORY ADDRESS
Poet. Sukritha Rani,
Renowned Writer, Tamil Nadu

FELICITATION
Dr.Sr.Anne Perpet Sophy,
Principal, Holy Cross College, Nagercoil

Dr.M.Pushpam,
Associate Professor, Dept.of Sociology, University of Kerala

VOTE OF THANKS
Dr.S.Thenmozhi,
Head, Dept.of Tamil, Holy Cross College, Nagercoil

MASTER OF CEREMONY
Dr.M.D.Arunmozhi Nangai,