1.3 - Curriculum Enrichment

1.3.3- Number of students undertaking project work/field work/ internships

Pravin Khodke Memorial Trust, Amravati's

VINAYAK VIDNYAN MAHAVIDYALAYA

Nandgaon Khandeshwar, Dist. Amravati

NAAC Accredited B++ Grade with CGPA 2.83

Sau. Sulbha Sanjay Khodke
(MLA, Amravati)
President, PKM Trust, Amravati

College Code :197 Ph. No.07221-222245
E-mail: vvm197@sgbau.ac.in

Dr. Alka A. Bhise
Principal
Mob. 98235 26341

Outward no/PKMT/VVM/1224/Q Dt.04/12/2024

Self- Declaration

This is to certify that the information, reports, true copies of the supporting documents, numerical data and web links furnished in this files are verified by I.Q.A.C and head of the institute and found correct.

Hence this certificate is issued

Dr Suchita Khodke
I.Q.A.C. Co-ordinator
Vinayak Vidnyan Mahavidyalaya
Nandgaon Kh.

Dr Alka A.Bhise
PRINCIPAL
Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khan. Dist. Amravati

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Programme name	Program Code	List of students undertaking Internship	Remark
BOT BSc. II	BOT SEM-III	Internship	List Attached
BOT BSc. II	BOT SEM-IV		
ZOO BSc. II	ZOO SEM-III	Internship	List Attached
ZOO BSc. II	ZOO SEM-IV		
CHE BSc. II	CHE SEM-III	Internship	List Attached
CHE BSc. II	CHE SEM-IV		
PHY BSc. II	PHY SEM-III	Internship	List Attached
PHY BSc. II	PHY SEM-IV		
MTH BSc. II	MTH SEM-III	Internship	List Attached
MTH BSc. II	MTH SEM-IV		
CS BSc. II	CS SEM-III	Internship	List Attached
CS BSc. II	CS SEM-IV		
ELE BSc. II	ELE SEM-III	Internship	List Attached
ELE BSc. II	ELE SEM-IV		

List of Students undertaking project
Class : B.Sc II Sem III and Sem IV **Subject : Botany**
Programme name : BOT BSc. II **Program Code :** BOT SEM-III and BOT SEM-IV

Roll No	Name
1.	Achal Ashok Pachpor
2.	Achal Vijay Agham
3.	Aditi Sunil Diwekar
4.	Akansha Baburao Waghade
5.	Akash Vijay Deshmukh
6.	Alfiya Firdos Firoz Zarina .
7.	Aziz Khan Faizan Khan .
8.	Darshana Vinod Bale
9.	Ishwari Sharad Bhuse
10.	Karan Dipakrao Gawai
11.	Khansa Firdos Shiakh Nisar .
12.	Khushi Ravindra Thakare

Class : B.Sc II Sem III and Sem IV **Subject : Zoology**
Programme name : ZOO BSc. II **Program Code :** ZOO SEM-III and ZOO SEM-IV

Roll No	Name
1.	Komal Mukund Tupatkar
2.	Lakshmi Vijayrao Raut
3.	Mauli Sudhi Tayade
4.	Mohd Saad Mohd Salim .
5.	Nividita Anil Pawar
6.	Pornima Gajanan Ugale

7.	Pragati Kailas Barde
8.	Radhika Rajeshrao Deshmukh
9.	Reshma Shahid Khan
10.	Reva Gajanan Khadse
11.	Rutuja Milind Thakare

Class : B.Sc II Sem III and Sem IV **Subject : Chemistry**
Programme name : CHE BSc. II **Program Code :** CHE SEM-III and CHE SEM-IV

Roll No	Name
1.	Sakshi Sudhakar Dandge
2.	Samiksha Pramod Chore
3.	Sanket Meghraj Wankhade
4.	Shaikh Yunus Mohd Awez .
5.	Shreya Anil Khandar
6.	Sneha Pravin Sonone
7.	Snehal Chandrashekhar Dhulandar
8.	Vaishnavi Avinash Bhoyar
9.	Vaishnavi Sudhakar Gilabe
10.	Yash Anilrao Tayade
11.	Ahmar Waqqas Muhammad Rafique .
12.	Divya Nilesh Gawande

Class : B.Sc II Sem III and Sem IV **Subject : Physics**
Programme name : PHY BSc. II **Program Code :** PHY SEM-III and PHY SEM-IV

Roll No	Name
1.	Ajay Vijay Bisane
2.	Damini Ravidra Gatule
3.	Gaurav Prakash Ingole
4.	Gauri Ajay Tayade
5.	Gayarti Aniil Wagh
6.	Jayesh Narendra Ghawat
7.	Karan Sunil Bramhanwade
8.	Kaustubh Gajanan Deshmukh
9.	Likhit Ashokarao Take
10.	Nivedita Diliprao Deshmukh
11.	Parthraj Lalitrao Raut
12.	Prachi Pramodrao Gawande
13.	Pranali Buddhadas Agham
14.	Pratik Harshchandra Rathod
15.	Priya Anil Shambharkar
16.	Priya Dashrath Hiwrale

Class : B.Sc II Sem III and Sem IV **Subject : Mathematics**
Programme name : MTH BSc. II **Program Code :** MTH SEM-III and MTH SEM-IV

Roll No	Name
1.	Divya Santosh Raut
2.	Gitanjali Gajanan Gudadhe
3.	Om Dattatray Puri
4.	Sahil Dipak Gedam
5.	Saurav Amardeep Meshram
6.	Shantanu Pramod Thakare
7.	Shraddha Santosh Raut
8.	Sujal Bharat Bhagat
9.	Suyog Vishnu Gadling
10.	Vansh Chandrashekhar Dandge
11.	Vedant Vinodrao Gayakwad

Class : B.Sc II Sem III and Sem IV **Subject : Computer Science**
Programme name : CS BSc. II **Program Code :** CS SEM-III and CS SEM-IV

Roll No	Name
1.	Sakshi Naresh Chawate
2.	Sakshi Rajendra Banarase
3.	Samiksha Ramdas Jambhole
4.	Samiksha Vijay Kanse
5.	Sanika Rameshwar Wankhade
6.	Sanket Dnyaneshwar Payghan
7.	Suhani Vijay Nagrale
8.	Tejashri Ashok Jewade
9.	Trupti Subhash Kakade
10.	Vaishali Gajanan Gudadhe
11.	Vaishnavi Rajesh Bhosale

Class : B.Sc II Sem III and Sem IV **Subject : Electronics**
Programme name : CS BSc. II **Program Code :** CS SEM-III and CS SEM-IV

Roll No	Name
1.	Abhijit Pradip Chore
2.	Arpita Shankar Waghmare
3.	Dhiraj Madhukarrao Kadu
4.	Gayatri Ajay Sokare
5.	Pallavi Purushottam Mehare
6.	Pankaj Gajanan Marotkar
7.	Pratik Raju Vanjari
8.	Roshan Arun Bandabuche
9.	Sanket Anil More
10.	Satish Dnyaneshwar Thakare

I.Q.A.C. Co-ordinator
Vinayak Vidnyan Mahavidyalaya
Nandgaon Kh.

PRINCIPAL
Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khan. Dist. Amravati

Programme name	Program Code	List of students undertaking project work	Remark
BOT BSc. III	BOT SEM-V	**project work**	**List Attached**
BOT BSc. III	BOT SEM-VI	**project work**	
ZOO BSc. III	ZOO SEM-V	**project work**	**List Attached**
ZOO BSc. III	ZOO SEM-VI	**project work**	
CHE BSc. III	CHE SEM-V	**project work**	**List Attached**
CHE BSc. III	CHE SEM-VI	**project work**	
PHY BSc. III	PHY SEM-V	**project work**	**List Attached**
PHY BSc. III	PHY SEM-VI	**project work**	
MTH BSc. III	MTH SEM-V	**project work**	**List Attached**
MTH BSc. III	MTH SEM-VI	**project work**	
CS BSc. III	CS SEM-V	**project work**	**List Attached**
CS BSc. III	CS SEM-VI	**project work**	
ELE BSc. III	ELE SEM-V	**project work**	**List Attached**
ELE BSc. III	ELE SEM-VI	**project work**	

Class : B.Sc III Sem V and VI **Subject : BOTANY**
Programme name: BOT BSc. III **Program Code :** BOT SEM-V and BOT SEM-VI

Roll No	Name
1.	Aarati Nandkishor Mokalekar
2.	Adarsh Sanjayrao Pande
3.	Adeeba Anam Ikramuddin .
4.	Aditya Kishor Pawar
5.	Aniket Rupraoji Chawale
6.	Aniket Sambhaji Meshram
7.	Anisha Vijay Deshmukh
8.	Ankush Maroti Jadhao
9.	Anushri Gajanan Rohankar
10.	Ashwini Dhanraj Tirmare
11.	Ashwini Ravindra Wankhade
12.	Ayan Naim Khan
13.	Bhushan Yogeshwar Chawale
14.	Disha Vijay Khobragade
15.	Hassan Ahmad Rizwanullah Khan
16.	Jayshri Shamraoji Solanke
17.	Jyotsna Gajanan Laybar
18.	Leena Ganesh Ghodeswar
19.	Mohini Sunil Makode
20.	Nayana Dadarao Gopnarayan
21.	Pallavi Vilas Khune
22.	Prajkta Pramod Inzalkar

23.	Price Arvind Nandagawali
24.	Reva Mahendra Gedam
25.	Rohini Jagdish Bahurupi
26.	Sakshi Shyam Bavankule
27.	Sanika Sahadev Lute
28.	Sayyed Maaz Misbahuddin
29.	Shraddha Rajkumar Dhage
30.	Sneha Manohar Satpaise
31.	Vaishnavi Anil More
32.	Vaishnavi Rajendra Ghawat
33.	Yogini Lileshwar Mate
34.	Zuberkha Gaffarkha Pathan

Class : B.Sc III Sem V and VI **Subject : Zoology**
Programme name: ZOO BSc. III **Program Code :** ZOO SEM-V and ZOO SEM-VI

Roll No	**Name**
1.	Aarati Nandkishor Mokalekar
2.	Adarsh Sanjayrao Pande
3.	Adeeba Anam Ikramuddin .
4.	Aditya Kishor Pawar
5.	Aniket Rupraoji Chawale
6.	Aniket Sambhaji Meshram
7.	Anisha Vijay Deshmukh
8.	Ankush Maroti Jadhao
9.	Anushri Gajanan Rohankar
10.	Ashwini Dhanraj Tirmare
11.	Ashwini Ravindra Wankhade
12.	Ayan Naim Khan
13.	Bhushan Yogeshwar Chawale
14.	Disha Vijay Khobragade
15.	Hassan Ahmad Rizwanullah Khan
16.	Jayshri Shamraoji Solanke
17.	Jyotsna Gajanan Laybar
18.	Leena Ganesh Ghodeswar
19.	Mohini Sunil Makode
20.	Nayana Dadarao Gopnarayan
21.	Pallavi Vilas Khune
22.	Prajkta Pramod Inzalkar
23.	Price Arvind Nandagawali
24.	Reva Mahendra Gedam
25.	Rohini Jagdish Bahurupi
26.	Sakshi Shyam Bavankule
27.	Sanika Sahadev Lute
28.	Sayyed Maaz Misbahuddin

29.	Shraddha Rajkumar Dhage
30.	Sneha Manohar Satpaise
31.	Vaishnavi Anil More
32.	Vaishnavi Rajendra Ghawat
33.	Yogini Lileshwar Mate
34.	Zuberkha Gaffarkha Pathan

Class : B.Sc III Sem V and VI **Subject : Chemistry**
Programme name: CHE BSc. III **Program Code :** CHE SEM-V and CHE SEM-VI

Roll No	**Name**
1.	Aarati Nandkishor Mokalekar
2.	Adarsh Sanjayrao Pande
3.	Adeeba Anam Ikramuddin .
4.	Aditya Kishor Pawar
5.	Aniket Rupraoji Chawale
6.	Aniket Sambhaji Meshram
7.	Anisha Vijay Deshmukh
8.	Ankush Maroti Jadhao
9.	Anushri Gajanan Rohankar
10.	Ashwini Dhanraj Tirmare
11.	Ashwini Ravindra Wankhade
12.	Ayan Naim Khan
13.	Bhushan Yogeshwar Chawale
14.	Disha Vijay Khobragade
15.	Hassan Ahmad Rizwanullah Khan Khan
16.	Jayshri Shamraoji Solanke
17.	Jyotsna Gajanan Laybar
18.	Leena Ganesh Ghodeswar
19.	Mohini Sunil Makode
20.	Nayana Dadarao Gopnarayan
21.	Pallavi Vilas Khune
22.	Prajkta Pramod Inzalkar
23.	Price Arvind Nandagawali
24.	Reva Mahendra Gedam
25.	Rohini Jagdish Bahurupi
26.	Sakshi Shyam Bavankule
27.	Sanika Sahadev Lute
28.	Sayyed Maaz Misbahuddin
29.	Shraddha Rajkumar Dhage
30.	Sneha Manohar Satpaise
31.	Vaishnavi Anil More
32.	Vaishnavi Rajendra Ghawat
33.	Yogini Lileshwar Mate
34.	Zuberkha Gaffarkha Pathan

35.	Chetan Ganeshrao Vaidya
36.	Komal Rajesh Narode
37.	Pratik Rajendra Shendre
38.	Sakshi Hemantrao Sonone
39.	Sameer Damodhar Dhomane
40.	Shyam Niranjan Kanse
41.	Vaishnavi Ratnakar Belsare

Class : B.Sc III Sem V and VI **Subject : Physics**
Programme name: PHY BSc. III **Program Code :** PHY SEM-V and PHY SEM-VI

Roll No	Name
1.	Chetan Ganeshrao Vaidya
2.	Komal Rajesh Narode
3.	Pratik Rajendra Shendre
4.	Sakshi Hemantrao Sonone
5.	Sameer Damodhar Dhomane
6.	Shyam Niranjan Kanse
7.	Vaishnavi Ratnakar Belsare
8.	Aachal Rajesh Tobre
9.	Nikhil Rajendra Dabre
10.	Pratik Dattatray Khandar
11.	Yash Vinod Ravekar
12.	Ajinkya Sureshrao Daroi
13.	Pratik Jayvantrao Gadekar
14.	Prerna Sanjay Deshmukh
15.	Shantanu Avinash Solanke
16.	Vijay Niranjan Gedam

Class : B.Sc III Sem V and VI **Subject : Mathematics**
Programme name: MTH BSc. III **Program Code :** MTH SEM-V and MTH SEM-VI

Roll No	Name
1.	Chetan Ganeshrao Vaidya
2.	Komal Rajesh Narode
3.	Pratik Rajendra Shendre
4.	Sakshi Hemantrao Sonone
5.	Sameer Damodhar Dhomane
6.	Shyam Niranjan Kanse
7.	Vaishnavi Ratnakar Belsare
8.	Ajinkya Sureshrao Daroi
9.	Pratik Jayvantrao Gadekar
10.	Prerna Sanjay Deshmukh
11.	Shantanu Avinash Solanke
12.	Vijay Niranjan Gedam

Class : B.Sc III Sem V and VI **Subject : Computer Science**
Programme name: CS BSc. III **Program Code :** CS SEM-V and CS SEM-VI

Roll No	Name
1.	Aachal Rajesh Tobre
2.	Nikhil Rajendra Dabre
3.	Pratik Dattatray Khandar
4.	Yash Vinod Ravekar
5.	Ajinkya Sureshrao Daroi
6.	Pratik Jayvantrao Gadekar
7.	Prerna Sanjay Deshmukh
8.	Shantanu Avinash Solanke
9.	Vijay Niranjan Gedam

Class : B.Sc III Sem V and VI **Subject : Electronics**
Programme name: ELE BSc. III **Program Code :** ELE SEM-V and ELE SEM-VI

Roll No	Name
1.	Aachal Rajesh Tobre
2.	Nikhil Rajendra Dabre
3.	Pratik Dattatray Khandar
4.	Yash Vinod Ravekar

I.Q.A.C. Co-ordinator
Vinayak Vidnyan Mahavidyalaya
Nandgaon Kh.

PRINCIPAL
Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khan. Dist. Amravati

Sample Copies of Internship Certificates of Students

2023-24

Shree Ganesha Organic Fertilizer's Amravati

Shree Ganesha Organic Fertilizer's Amravati.

15, Datta Vihar Colony, Badnera Road, Amravati.

To,
The Principal,
Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khandeshwar, Dist. Amravati.

Subject: Summer Internship Programme 2023-24

This is to certified that, following students of the class **B.Sc. Part II** with subject **Zoology** from your institutes have completed a **"Summer Internship"** on **"Packing and marketing of organic fertilizer's "** at our " **Shree Ganesha Organic Fertilizer's, Amravati"** from **24th June 2024 to 29th June 2024. (30 Hrs)**

During this internship, we had given enough exposure to theory as well as practical aspects of the soil testing which will be proven helpful for their academic progress in future. All the students were **Curious**, **Hardworking**, and **Diligent** during this internship programme.

We wish them every success in their life and career. Looking forward for the same cooperation in future.

ASTinkhede

Mrs. Anushree S. Tinkhede
Director
Shree Ganesha Organic Fertilizers's Amravati.

राहुल प्र. उडबगले ☎ : 9975597845

उडबगले ॲग्रो प्रोडक्टस्

[illegible] रेल्वे गेट, नांदगाव खंडेश्वर, जि. अमरावती

बि-बियाणे, रासायनिक खते, औषधींचे विक्रेता

जावक क्र. :

दिनांक : / /२०

To,
The Principal,
Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khandeshwar, Dist. Amravati.

Subject: Winter Internship Programme 2023-24

This is to certified that, following students of the class **B.Sc. Part II** with subject **Botany** from your institutes have completed a **"Winter Internship"** on **"Farm Resource Management"** at our "**Woodbagale Agro Proiducts, Nandgaon kh., Amravati"** from **20th November 2023 to 25th November 2023. (30 Hrs)**

During this internship, we had given enough exposure to theory as well as practical aspects of the Farm resources which will be proven helpful for their academic progress in future. All the students were **Curious**,

List of the students for Winter Internship Programme 2023-24			
Sr. No	**Name of Student**	**Class**	**Name of the Institute**
1	Achal Ashok Pachpor	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
2	Achal Vijay Agham	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
3	Aditi Sunil Diwekar	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
4	Akansha Baburao Waghade	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
5	Akash Vijay Deshmukh	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
6	Alfiya Firdos Firoz Zarina .	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
7	Aziz Khan Faizan Khan .	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
8	Darshana Vinod Bale	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
9	Ishwari Sharad Bhuse	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
10	Karan Dipakrao Gawai	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
11	Khansa Firdos Shiakh Nisar .	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
12	Khushi Ravindra Thakare	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.

Hardworking, and **Diligent** during this internship programme.

We wish them every success in their life and career. Looking forward for the same cooperation in future also.

राहुल प्र. उडबगले • : 9975597845

उडबगले ॲग्रो प्रोडक्टस्

जावक क्र.   दिनांक   /   /२०

To,
The Principal,
Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khandeshwar, Dist. Amravati.

Subject: Summer Internship Programme 2023-24

This is to certified that, following students of the class **B.Sc. Part II** with subject **Botany** from your institutes have completed a **"Summer Internship"** on **"Soil Science Management"** at our "**Woodbagale Agro Proiducts, Nandgaon kh., Amravati"** 24th June 2024 to 29th June 2024**, (30 Hrs)**

During this internship, we had given enough exposure to theory as well as practical aspects of the soil Science which will be proven helpful for their academic progress in future. All the students were **Curious**,

List of the students for Summer Internship Programme 2023-24			
Sr. No	**Name of Student**	**Class**	**Name of the Institute**
1	Achal Ashok Pachpor	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
2	Achal Vijay Agham	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
3	Aditi Sunil Diwekar	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
4	Akansha Baburao Waghade	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
5	Akash Vijay Deshmukh	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
6	Alfiya Firdos Firoz Zarina .	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
7	Aziz Khan Faizan Khan .	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
8	Darshana Vinod Bale	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
9	Ishwari Sharad Bhuse	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
10	Karan Dipakrao Gawai	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
11	Khansa Firdos Shiakh Nisar .	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.
12	Khushi Ravindra Thakare	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.

Hardworking, and **Diligent** during this internship programme.

We wish them every success in their life and career. Looking forward for the same cooperation in future also.

P-SQUARE AGRITECH
(शासन मान्यताप्राप्त)
माती व पाणी परिक्षण प्रयोगशाळा
बी.डी.एम.सी. च्या समोर, पंचवटी चौक, नागपूर रोड, अमरावती
Email : psquareagritech@gmail.com Mob. 9673566335

To,
The Principal,
Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khandeshwar, Dist. Amravati.

Subject: Winter Internship Programme 2023-24

This is to certified that, following students of the class **B.Sc. Part II** with subject **Chemistry** from your institutes have completed a **"Winter Internship"** on **"Soil Testing and Analysis"** at our **"B Square Soil Testing Lab, Amravati"** from **20th November 2023 to 25th November 2023. (30 Hrs)**

During this internship, we had given enough exposure to theory as well as practical aspects of the soil testing which will be proven helpful for their academic progress in future. All the students were **Curious**, **Hardworking**, and **Diligent** during this internship programme.

We wish them every success in their life and career. Looking forward for the same cooperation in future also.

List of the students for Winter Internship Programme 2023-24

Sr. No	Name of Student	Class	Name of the Institute
1	SAKSHI SUDHAKAR DANDGE	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar.
2	SAMIKSHA PRAMOD CHORE		
3	SANKET MEGHRAJ WANKHADE		
4	SHAIKH YUNUS MOHD AWEZ		
5	SHREYA ANIL KHANDAR		
6	SNEHA PRAVIN SONONE		
7	SNEHAL C. DHULANDAR		
8	VAISHNAVI AVINASH BHOYAR		
9	VAISHNAVI SUDHAKAR GILABE		
10	YASH ANILRAO TAYADE		
11	AHMAR WAQQAS MUHD RAFIQUE		
12	DIVYA NILESH GAWANDE		

P-SQUARE AGRITECH AMRAVATI

Incharge
P-Square Agritech,
Soil and Water Testing Laboratory, Amravati

P-SQUARE AGRITECH
(शासन मान्यताप्राप्त)
माती व पाणी परिक्षण प्रयोगशाळा
पी.डी.एम.सी. च्या समोर, पंचवटी चौक, नागपूर रोड, अमरावती
Email : psquareagritech@gmail.com Mob. 9673566335

To,
The Principal,
Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khandeshwar, Dist. Amravati.

Subject: Summer Internship Programme 2023-24

This is to certified that, following students of the class **B.Sc. Part II** Semester IV with subject Chemistry from your institutes have completed a **"Summer Internship"** in **"Water Analysis"** at our **"B Square Soil Testing Lab, Amravati"** from **24th June 2024 to 29th June 2024**. (30 Hrs)

During this internship, we had given enough exposure to theory as well as practical aspects of the soil testing which will be proven helpful for their academic progress in future. All the students were Curious, **Hardworking,** and **Diligent** during this internship programme.

We wish them every success in their life and career. Looking forward for the same cooperation in future also.

List of the students for Winter Internship Programme 2023-24			
Sr. No	Name of Student	Class	Name of the Institute
1	SAKSHI SUDHAKAR DANDGE	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar.
2	SAMIKSHA PRAMOD CHORE		
3	SANKET MEGHRAJ WANKHADE		
4	SHAIKH YUNUS MOHD AWEZ		
5	SHREYA ANIL KHANDAR		
6	SNEHA PRAVIN SONONE		
7	SNEHAL C. DHULANDAR		
8	VAISHNAVI AVINASH BHOYAR		
9	VAISHNAVI SUDHAKAR GILABE		
10	YASH ANILRAO TAYADE		
11	AHMAR WAQQAS MUHD RAFIQUE		
12	DIVYA NILESH GAWANDE		

P-SQUARE AGRITECH AMRAVATI

Incharge
P-Square Agritech,
Soil and Water Testing Laboratory, Amravati

mahindra SOLARIZE

REVOLT GREEN CLEAN SMART

Certificate

To,
The Principal,
Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khandeshwar, Dist. Amravati.

Subject: Summer Internship Programme 2023-24

This is to certified that, following students of the class **B.Sc. Part II Semester IV** with subject **PHYSICS** from your institutes have completed a **"Summer Internship"** in **"Mahindra Solarize"** at our "**REVOLT Greenpower Pvt. Ltd. "** at Amravati site from **24th June 2024 to 29th June 2024. (30 Hrs)**

During this internship, we had given enough exposure to theory as well as practical aspects of the soil testing which will be proven helpful for their academic progress in future. All the students were Curious, Hardworking, and Diligent during this internship programme.

We wish them every success in their life and career. Looking forward for the same cooperation in future also.

List of the students for Summer Internship Programme 2023-24

S. No	Name	Class	Name of the Institute
1.	Ajay Vijay Bisane	B.Sc. Part II	Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar Dist.: Amravati
2.	Damini Ravidra Gatule	B.Sc. Part II	
3.	Gaurav Prakash Ingole	B.Sc. Part II	
4.	Gauri Ajay Tayade	B.Sc. Part II	
5.	Gayatri Anil Wagh	B.Sc. Part II	
6.	Jayesh Narendra Ghawat	B.Sc. Part II	
7.	Karan Sunil Bramhanwade	B.Sc. Part II	
8.	Kaustubh Gajanan Deshmukh	B.Sc. Part II	
9.	Likhit Ashokarao Take	B.Sc. Part II	
10.	Nivedita Dilipraо Deshmukh	B.Sc. Part II	
11.	Parthraj Lalitrao Raut	B.Sc. Part II	
12.	Prachi Pramodrao Gawande	B.Sc. Part II	
13.	Pranali Buddhadas Agham	B.Sc. Part II	
14.	Pratik Harshchandra Rathod	B.Sc. Part II	
15.	Priya Anil Shambharkar	B.Sc. Part II	
16.	Priya Dashrath Hiwrale	B.Sc. Part II	

Pravin Wasudeorao Ingle
Director
Revolt Greenpower Pvt. Ltd.

REVOLT GREEN POWER PVT.LTD.

Reg.Office - Pushpkabir Apartment,near Bharat computer, Aasara colony, Akola road naka, Akot – 444101
Corporate Office – B-1, Royal Estate, Opp.Malkapur co-op bank, Jatharpeth chowk, Akola - 444005
Mo.no – 9767199222, 8380053982 e-mail : revoltgreenpower@gmail.com

Sample Copies of Project Records

2023-24

Pravin Khodke Memorial Trust's
VINAYAK VIDNYAN MAHAVIDYALAYA, NANDGAON KH. DIST-AMRAVATI

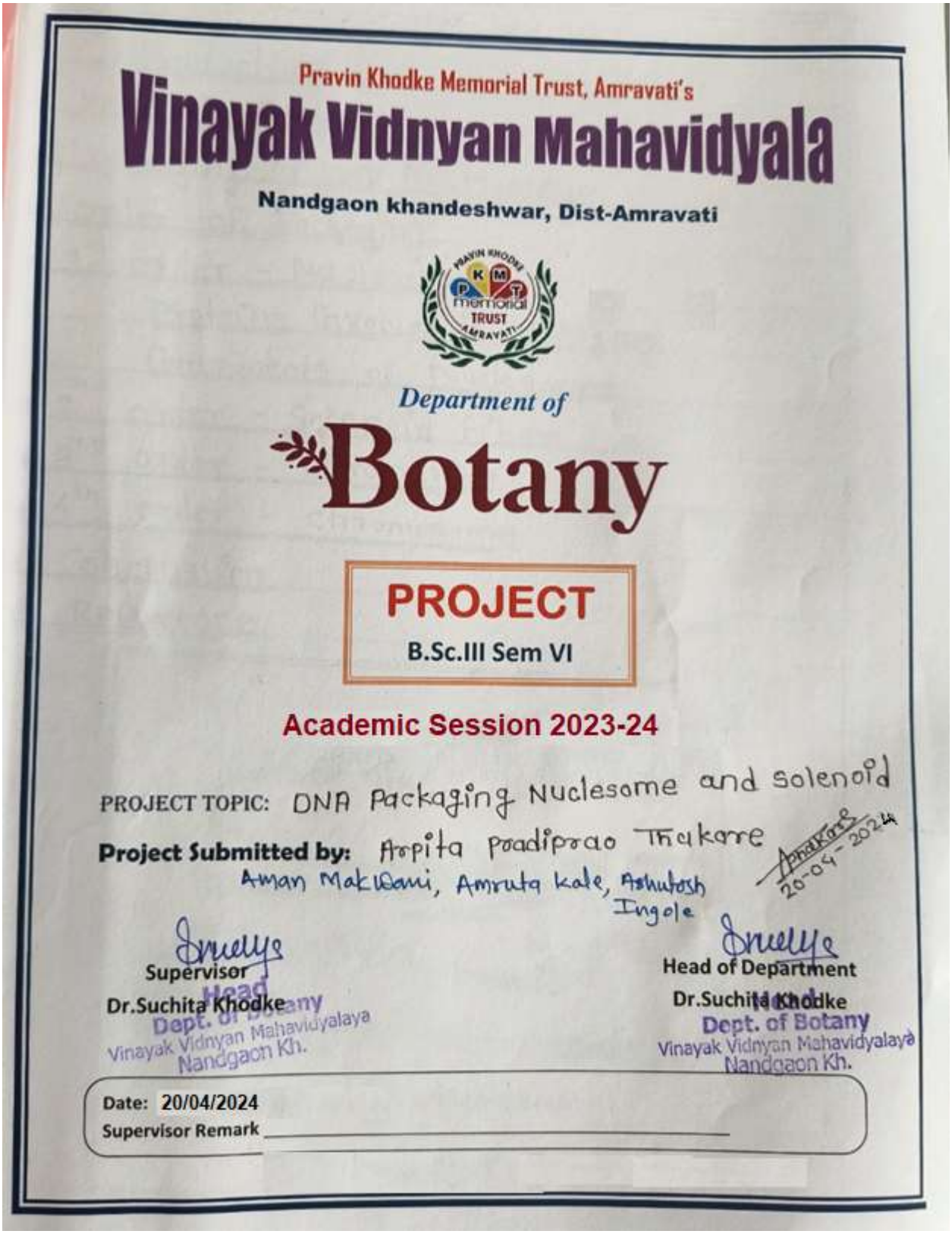
Department of
BOTANY

Project Topics B.Sc III Sem VI (Summer 2024)

Session 2023-24

Sr. No.	Name of Students	Topics	Date	Signature
1	Aarati N.Mokalekar	Cell wall –Structure and Functions	18/4/2023	ANMokalekar
2	Adarsh S.Pande	Mitochondrial DNA and Chloroplast DNA	18/4/2023	
3	Adeeba Anam	Nomenclature of Enzymes	18/4/2023	
4	Aditya K. Pawar	Mitochondrial DNA and Chloroplast DNA	18/4/2023	
5	Aniket R. Chawale	Mitochondrial DNA and Chloroplast DNA	18/4/2023	
6	Aniket S.Meshram	Mitochondrial DNA and Chloroplast DNA	18/4/2023	
7	Anisha V.Deshmukh	Cell wall –Structure and Functions	18/4/2023	
8	Ankush M. Jadhao	Numerical aberrations of chromosome	18/4/2023	
9	Anushri G. Rohankar	Numerical aberrations of chromosome	18/4/2023	
10	Amrapali R. Kale	Numerical aberrations of chromosome	18/4/2023	
11	Ashwini D. Tirmare	Cell wall –Structure and Functions	18/4/2023	
12	Ashwini R. Wankhade	Numerical aberrations of chromosome	18/4/2023	
13	Ayan N.Khan	Characteristics of Enzymes	18/4/2023	
14	Bhushan Y.Chawale	Chromosome- Morphology	18/4/2023	
15	Diksha V. Khobragade	Cell wall –Structure and Functions	18/4/2023	
16	Gaurav M. Avhale	Chromosome- Morphology	18/4/2023	
17	Gaurav R. Rathod	Structural aberrations of chromosome	18/4/2023	
18	Hassan R.Khan	Nomenclature of Enzymes	18/4/2023	
19	Indrajeet P.Tirsinge	Structural aberrations of chromosome	18/4/2023	
20	Jayshri S.Solanke	Plasma membrane –Structure and Functions	18/4/2023	J. S. Solanke
21	Jyotsna G. Laybar	Gene mutations- Spontaneous and Induced	18/4/2023	
22	Leena G. Ghodeswar	Plasma membrane –Structure and Functions	18/4/2023	
23	Maaz M. Sayyed	Characteristics of Enzymes	18/4/2023	
24	Mamta V. Vaidya	Chromosome- Morphology	18/4/2023	
25	Mohini S.Makode	Gene mutations- Spontaneous and Induced	18/4/2023	
26	Nayana D. Gopnarayan	Plasma membrane –Structure and Functions	18/4/2023	
27	Pallavi V.Khune	Plasma membrane –Structure and Functions	18/4/2023	
28	Payal D.Burade	Nomenclature of Enzymes	18/4/2023	
29	Pooja D. Zodape	Nomenclature of Enzymes	18/4/2023	
30	Prajkta P.Inzalkar	Cell cycle: Meiosis	18/4/2023	
31	Prince A.Nandagawal	Characteristics of Enzymes	18/4/2023	
32	Reva M. Gedam	Cell cycle: Meiosis	18/4/2023	
33	Rohini J. Bahurupi	Gene mutations- Spontaneous and Induced	18/4/2023	
34	Rushi S. Gadge	Characteristics of Enzymes	18/4/2023	
35	Sakshi S. Bavankule	Gene mutations- Spontaneous and Induced	18/4/2023	
36	Salman Kh.Y.Khan	Structural aberrations of chromosome	18/4/2023	
37	Sanika S. Lute	Cell cycle: Meiosis	18/4/2023	
38	Sk. Sohel Sk. Rashid	Structural aberrations of chromosome	18/4/2023	
39	Shraddha R. Dhage	Cell cycle: Meiosis	18/4/2023	S.R.Dhage
40	Sneha M. Satpaise	Cell cycle: Mitosis	18/4/2023	S.M.Satpaise.
41	Syed U. Syed Jameel	Characteristics of Enzymes	18/4/2023	
42	Tejas P. Tambatkar	Chromosome- Morphology	18/4/2023	
43	Vaishnavi A. More	Cell cycle: Mitosis	18/4/2023	V.A.more
44	Vaishnavi R. Ghawat	Cell cycle: Mitosis	18/4/2023	
45	Yogini L. Mate	Cell cycle: Mitosis	18/4/2023	
46	Zuberkha G. Pathan	Characteristics of Enzymes	18/4/2023	

Dr.Suchita Khodke
Head Department of Botany
Vinayak Vidnyan Mahavidyalaya
Nandgaon Kh.



Pravin Khodke Memorial Trust, Amravati's

Vinayak Vidnyan Mahavidyala

Nandgaon khandeshwar, Dist-Amravati

Department of

Botany

PROJECT

B.Sc.III Sem VI

Academic Session 2023-24

PROJECT TOPIC: DNA Packaging Nuclesome and Solenoid

Project Submitted by: Arpita Pradiprao Thakare
Aman Makwani, Amruta kale, Ashutosh Ingole

20-04-2024

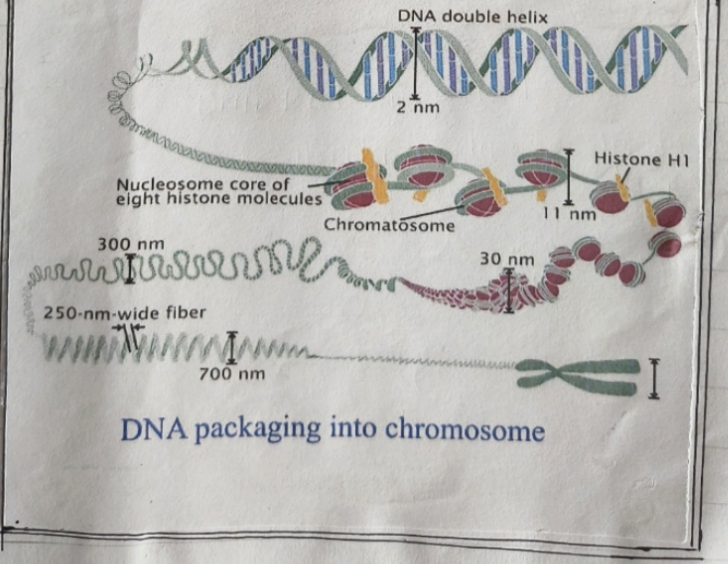
Supervisor
Dr.Suchita Khodke
Dept. of Botany
Vinayak Vidnyan Mahavidyalaya
Nandgaon Kh.

Head of Department
Dr.Suchita Khodke
Dept. of Botany
Vinayak Vidnyan Mahavidyalaya
Nandgaon Kh.

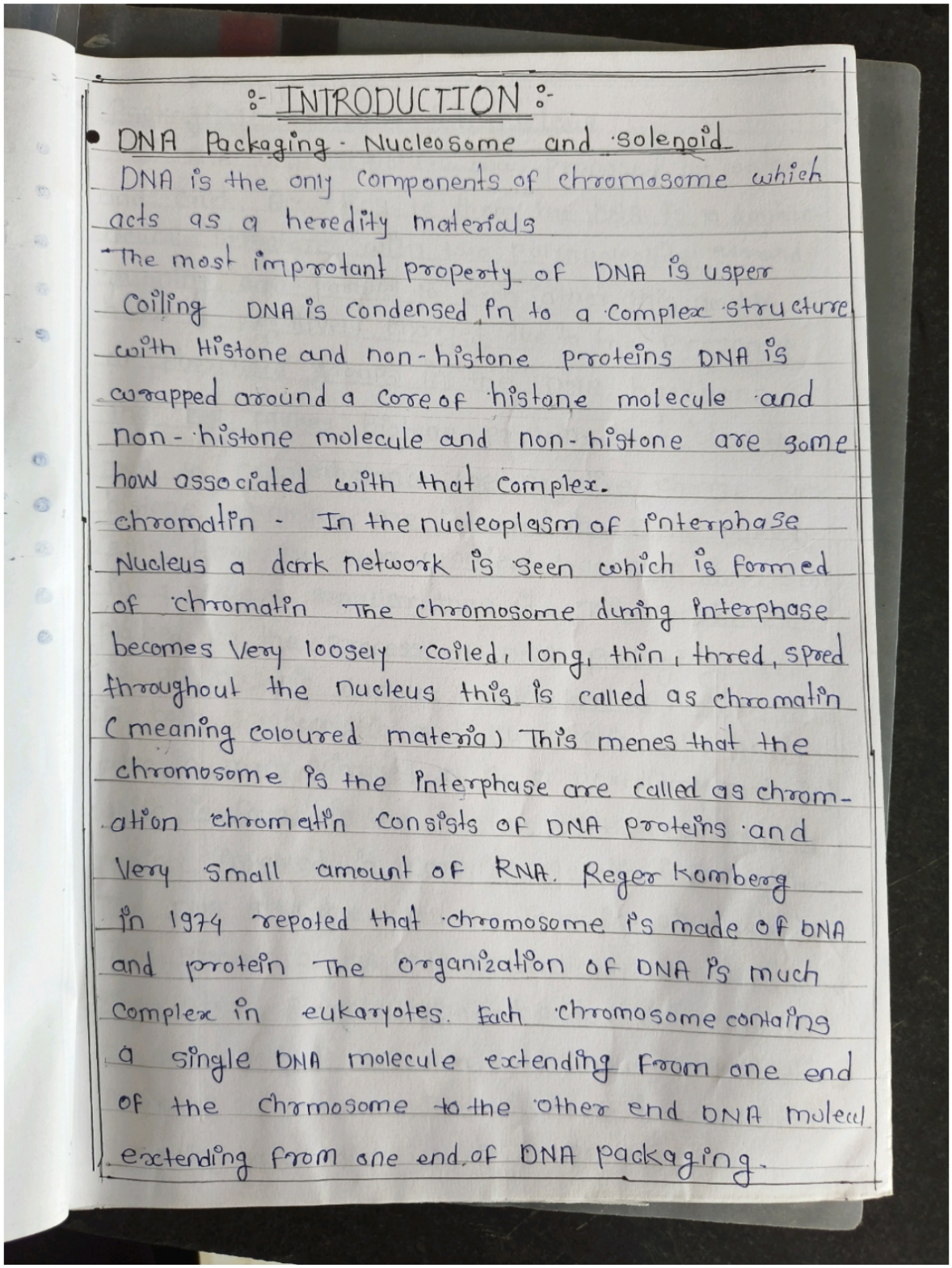
Date: 20/04/2024
Supervisor Remark _____

∴ Contain :-

- Introduction
- Need for Packaging
- Packaging of DNA intonucleus
- order of Packaging
- 1st order - Nucleosome
  - proteins involved in packaging
  - Components of Nucleosome
- 2nd order - Solenoid fiber
- 3rd order - Chromatids
- 4th order - chromosome
- Conclusion
- Reference



DNA packaging into chromosome



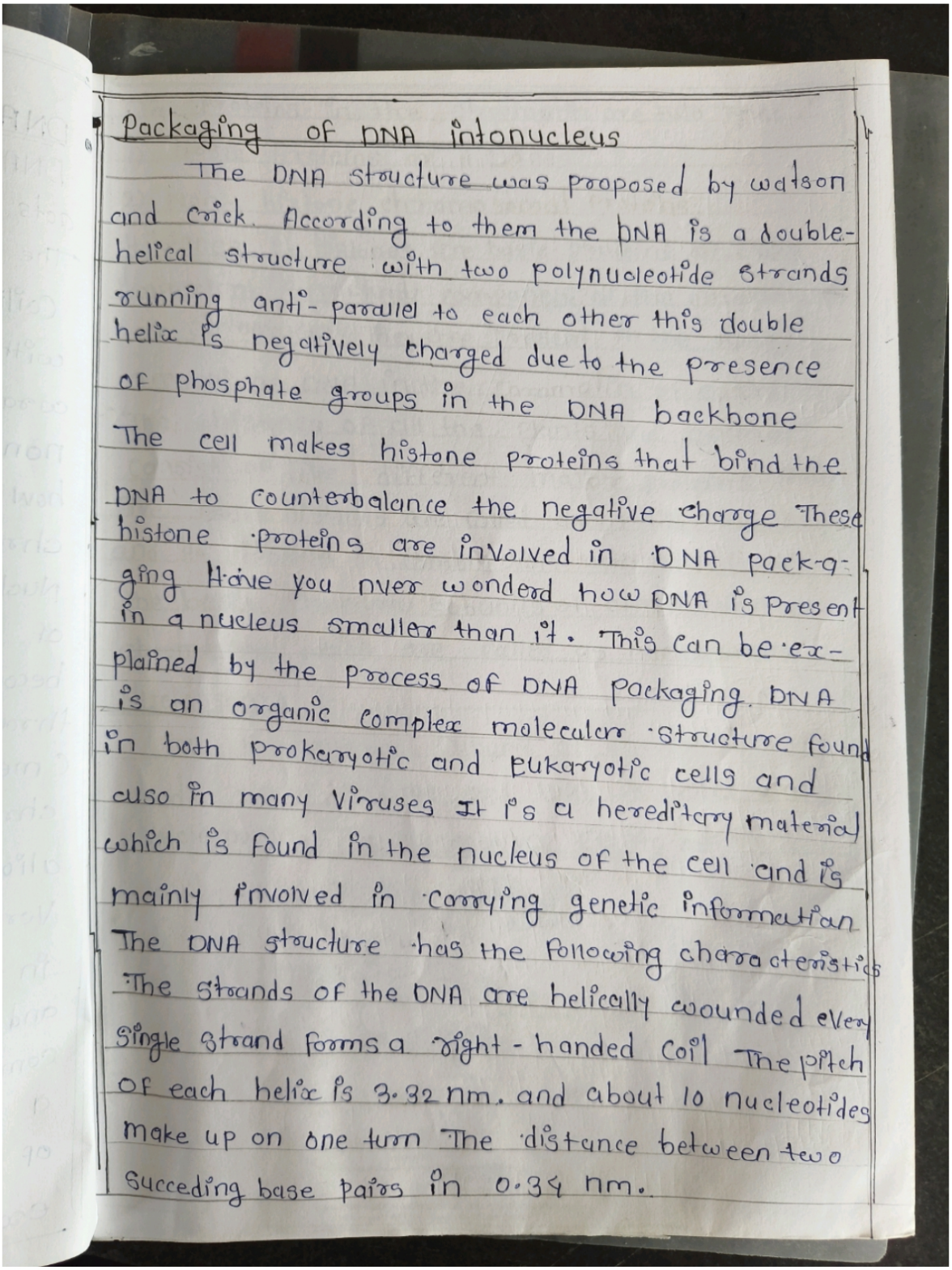
:- INTRODUCTION :-

- DNA Packaging - Nucleosome and solenoid

DNA is the only components of chromosome which acts as a heredity materials

The most improtant property of DNA is usper coiling DNA is condensed in to a complex structure with Histone and non-histone proteins DNA is wrapped around a core of histone molecule and non-histone molecule and non-histone are some how associated with that complex.

chromatin - In the nucleoplasm of interphase Nucleus a dark network is seen which is formed of chromatin The chromosome during interphase becomes very loosely coiled, long, thin, thred, spred throughout the nucleus this is called as chromatin (meaning coloured materia) This menes that the chromosome is the interphase are called as chrom-ation chromatin consists of DNA proteins and very small amount of RNA. Reger Komberg in 1974 repoted that chromosome is made of DNA and protein The organization of DNA is much complex in eukaryotes. Each chromosome contains a single DNA molecule extending from one end of the chromosome to the other end DNA molecul extending from one end of DNA packaging.



Packaging of DNA intonucleus

The DNA structure was proposed by watson and crick. According to them the DNA is a double-helical structure with two polynucleotide strands running anti-parallel to each other this double helix is negatively charged due to the presence of phosphate groups in the DNA backbone The cell makes histone proteins that bind the DNA to counterbalance the negative charge These histone proteins are involved in DNA packaging Have you ever wonderd how DNA is present in a nucleus smaller than it. This can be explained by the process of DNA packaging. DNA is an organic complex molecular structure found in both prokaryotic and Eukaryotic cells and also in many Viruses It is a hereditary material which is found in the nucleus of the cell and is mainly involved in carrying genetic information The DNA structure has the following characteristics The strands of the DNA are helically wounded every single strand forms a right-handed coil The pitch of each helix is 3.32 nm. and about 10 nucleotides make up on one turn The distance between two succeding base pairs in 0.34 nm.

The Proteins in the chromatin are two Types

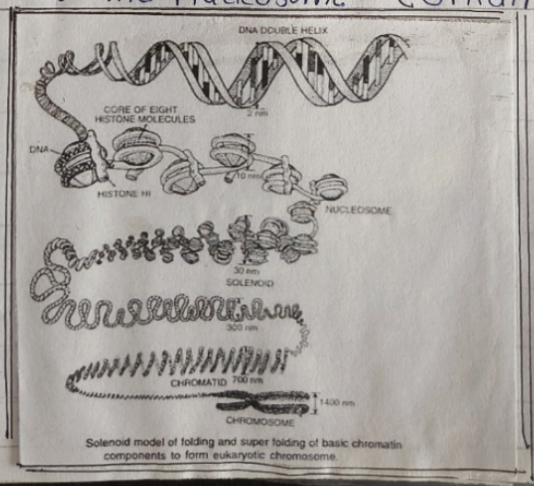
1) Basic Proteins or Histones

2) Non- histone chromosomal Proteins.

Histones :- Histones are basic proteins whic are important structural component of the chromosome or chromation. They are present in the equal amount as DNA in the chromatin of eukaryotes. The histones of all the plants and animals consist of five different major proteins. These five major histones are called as H1 H2a, H2b, H3 and H4 Histone in Combination with DNA form the basis structural subunits of chromation or chromosome which are called as nucleosomes.

Nucleosome :-

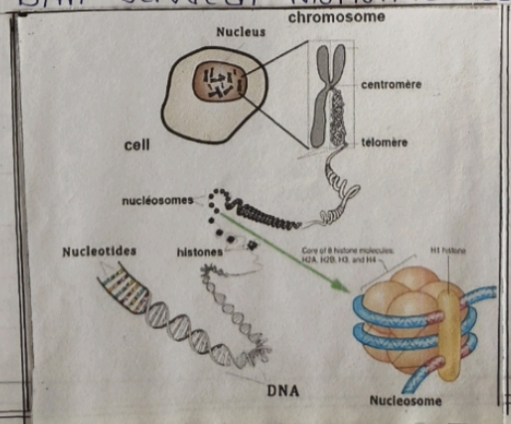
The fundamental subunit of chromation made up of histone and DNA is called as Nucleosome. The nucleosome Contains

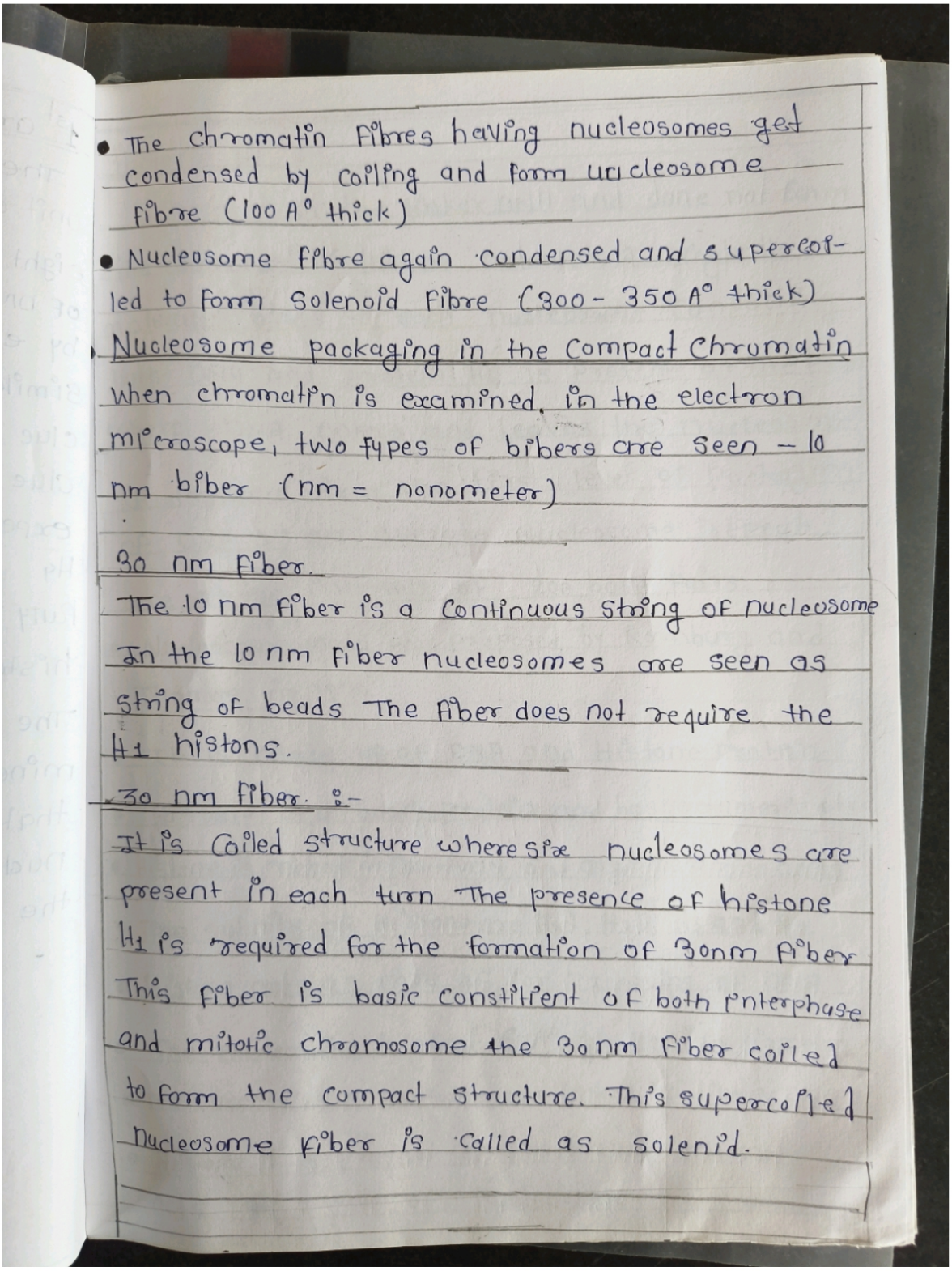


Solenoid model of folding and super folding of basic chromatin components to form eukaryotic chromosome.

1st order - Nucleosome

The basic repeating structural (and function) unit of chromatin is the nucleosome which contain eight histone proteins and about 166 base pairs of DNA (Van Holde 1988: Wiffe) The observation by electron microscopists that chromation appeard similar to beads on a string provided an early clue that nucleosome exist (olins and olins another clue come from chemically cross-liking) This experiment demonstrated that H_2A, H_2B, H_3 and H_4 form a discrete protein octamer which is fully consistent with the presence of a repeating histone-containing unit in the chromatin fiber The amount of DNA per nucleosome was determined by treating chromatin with an enzyme that cuts DNA one such enzyme micrococcal nuclease has the important property of cutting the linker DNA between mononucleosome





- The chromatin fibres having nucleosomes get condensed by coiling and form nucleosome fibre (100 A° thick)
- Nucleosome fibre again condensed and supercoiled to form Solenoid fibre (300 - 350 A° thick)

Nucleosome packaging in the Compact Chromatin

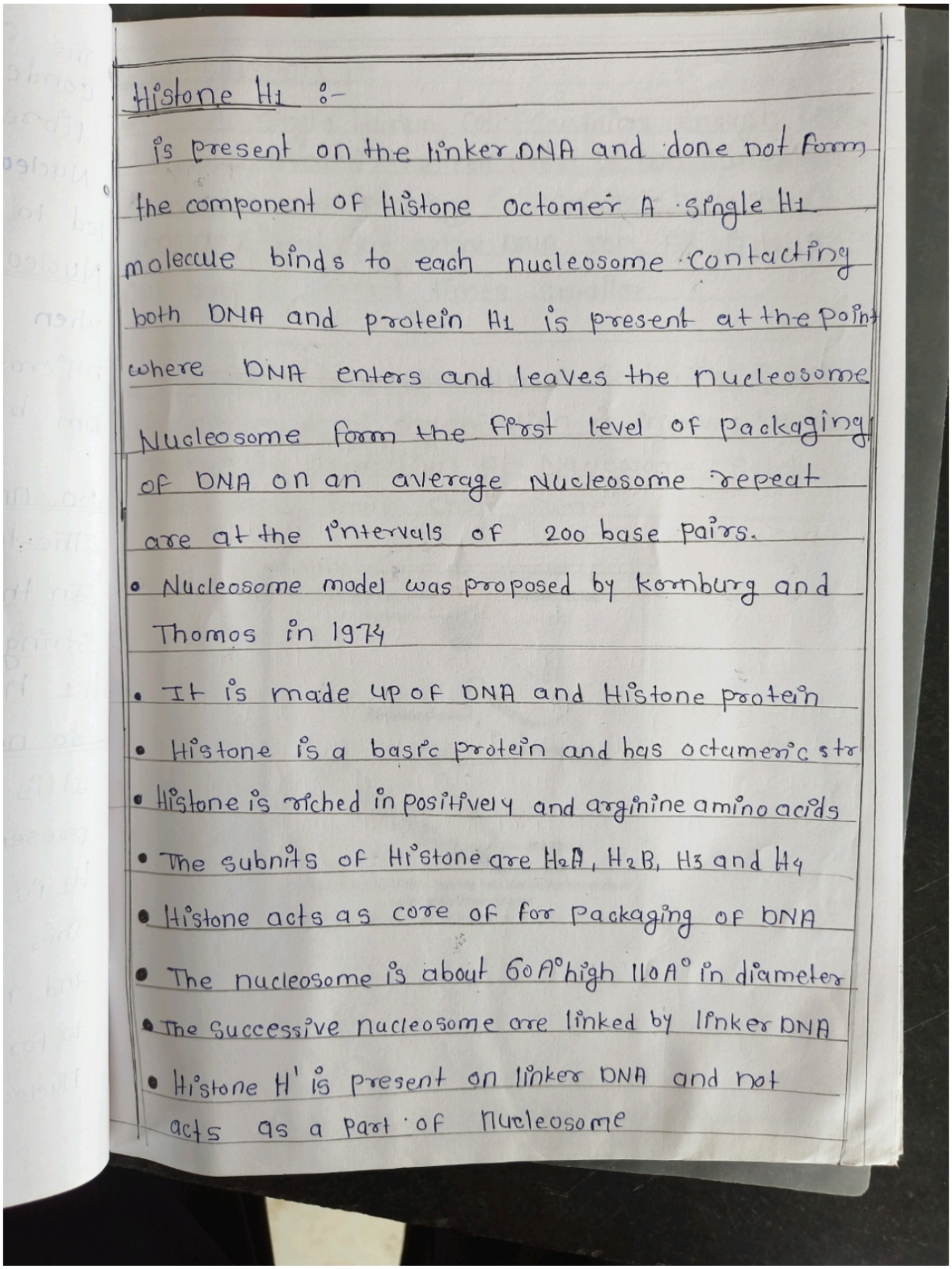
When chromatin is examined, in the electron microscope, two types of bibers are seen - 10 nm biber (nm = nonometer)

30 nm fiber.

The 10 nm fiber is a continuous string of nucleosome In the 10 nm fiber nucleosomes are seen as string of beads The fiber does not require the H1 histons.

30 nm fiber :-

It is coiled structure where six nucleosomes are present in each turn The presence of histone H1 is required for the formation of 30nm fiber This fiber is basic constitient of both interphase and mitotic chromosome the 30 nm fiber coiled to form the compact structure. This supercoiled nucleosome fiber is called as solenid.



Histone H_1 :-

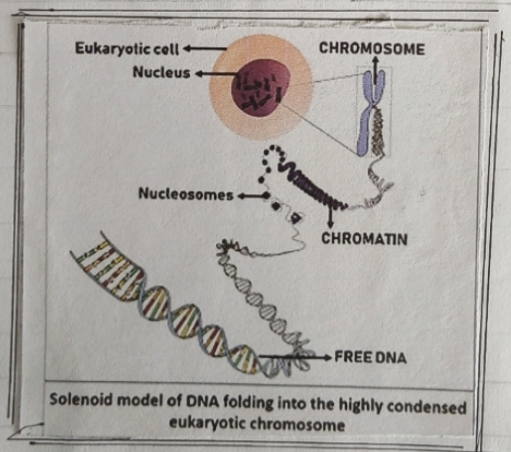
is present on the linker DNA and done not form the component of Histone octomer A single H_1 molecule binds to each nucleosome contacting both DNA and protein H_1 is present at the point where DNA enters and leaves the nucleosome Nucleosome form the first level of packaging of DNA on an average Nucleosome repeat are at the intervals of 200 base pairs.

- Nucleosome model was proposed by kornburg and Thomos in 1974
- It is made up of DNA and Histone protein
- Histone is a basic protein and has octameric str
- Histone is riched in positively and arginine amino acids
- The subnits of Histone are H_2A, H_2B, H_3 and H_4
- Histone acts as core of for packaging of DNA
- The nucleosome is about 60 A° high 110 A° in diameter
- The successive nucleosome are linked by linker DNA
- Histone H' is present on linker DNA and not acts as a part of Nucleosome

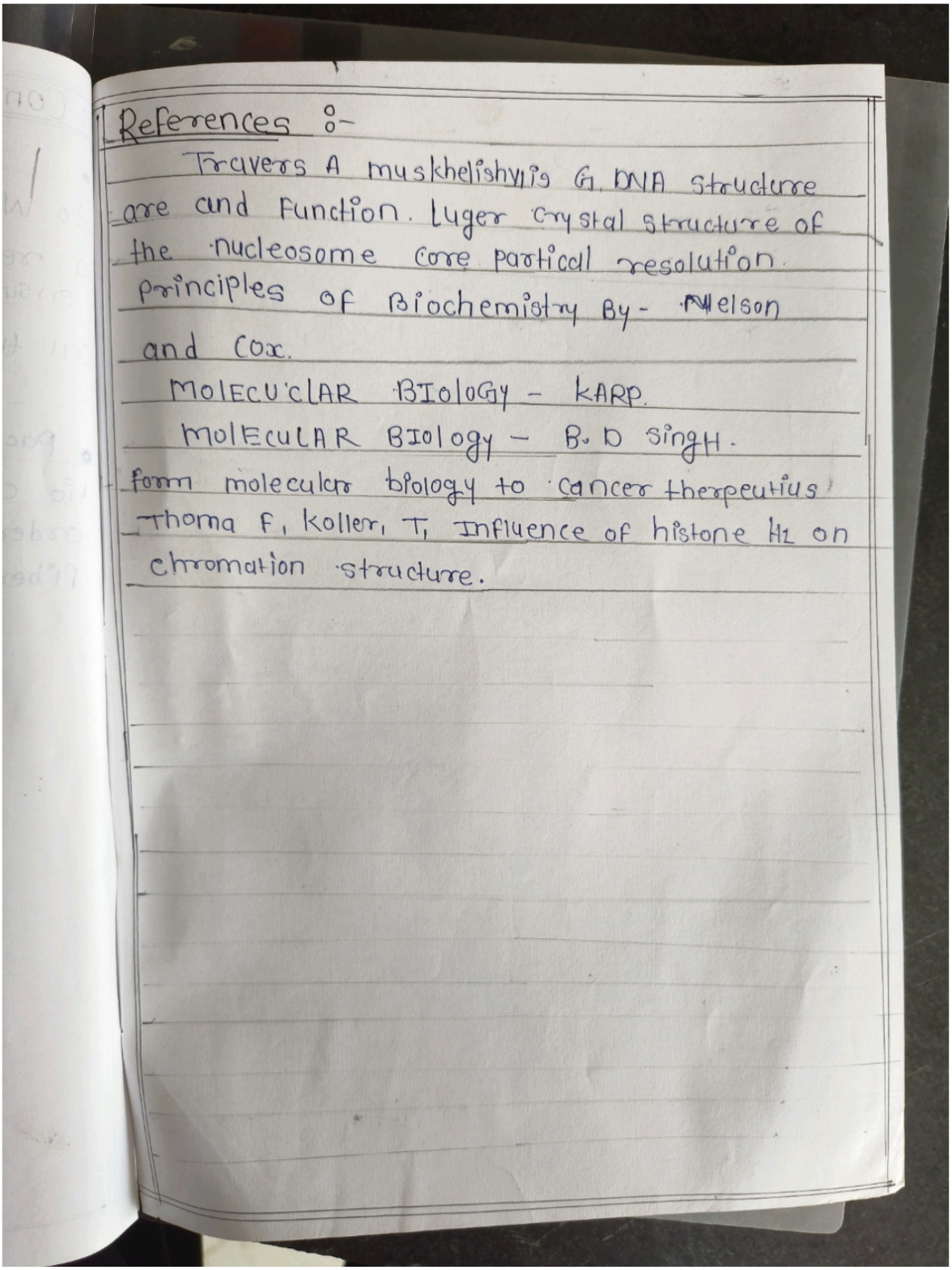
:-Conclusion :-

- A single human cell contains enough DNA to wrap around the cell over 15,000 Times As a result DNA packing is critical because it ensures that the extra DNA can fit into a cell that is several times smaller

- Packaging is a characterstic feature of Eukaryotic chromosomal organization it involves various orders like formation of Nucleosome Solenoid fiber and then chromosome.



Solenoid model of DNA folding into the highly condensed eukaryotic chromosome



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Travers A muskhelishvili G. DNA structure are and Function. Luger Crystal structure of the nucleosome core partical resolution. principles of Biochemistry By- Nelson and Cox.

MOLECULAR BIOLOGY - KARP.

MOLECULAR BIOLOGY - B. D SINGH.

form molecular biology to cancer therpeutius Thoma F, Koller, T, Influence of histone H1 on chromation structure.

Vinayak Vidnyan Mahavidyalaya Nandgaon Khandeshwar
Department of Physics
NOTICE

All the students of B.Sc. physics III year in the **academic year 2023-24** are here by inform that student must completed the project prepare a project report with help of concern teacher mentioned in the table below and submit it before **5th April 2024** on the topic assigned In the table below.

LIST OF STUDENTS

Class : B.Sc III Sem V and VI **Subject : Physics**

Programme name: PHY BSc. III **Program Code :** PHY SEM-V and PHY SEM-VI

Sr. No.	Name	Topic	Guide
17.	Chetan Ganeshrao Vaidya	Water Level Indicator	Dr. A.S. Wadatkar
18.	Komal Rajesh Narode		
19.	Pratik Rajendra Shendre	Renewable Energy Sources	Dr. A.S. Wadatkar
20.	Sakshi Hemantrao Sonone		
21.	Sameer Damodhar Dhomane	E Waste Management In India	Dr. P. B. Kharat
22.	Shyam Niranjan Kanse		
23.	Vaishnavi Ratnakar Belsare	Optical Fiber Communication	Dr. P. B. Kharat
24.	Aachal Rajesh Tobre		
25.	Nikhil Rajendra Dabre	Three Digit Counter Machine	Dr. P. B. Kharat
26.	Pratik Dattatray Khandar		
27.	Yash Vinod Ravekar	Satellite Communication	Mr. A. V. Ambhore
28.	Ajinkya Sureshrao Daroi		
29.	Pratik Jayvantrao Gadekar	Applications of Laser	Mr. A. V. Ambhore
30.	Prerna Sanjay Deshmukh		
31.	Shantanu Avinash Solanke	Applications of Solar Energy	Mr. A. V. Ambhore
32.	Vijay Niranjan Gedam		

Mr. A. V. Ambhore **Dr. P. B. Kharat** **Dr. A.S. Wadatkar**

Dr. Anant S. Wadatkar
Assistant Professor and Head
Department of Physics
Vinayak Vidnyan Mahavidyalaya
Nandgaon (Kh.), Dist.Amravati

APPLICATIONS OF LASER

Mr. Pratik J. Gadekar
Ms.Prerna Sanjay Deshmukh

VINAYAK VIDNYAN MAHAVIDYALAYA,
NANDGAON KH.

Contents:

- Introduction
- Industrial Applications
- Medical Applications
- Other Applications

- **Laser Stands For**

Light
Amplification by
Stimulated
Emission of
Radiation

- Laser is a device which emits powerful monochromatic collimated beam of light
- The emitted light wave are coherent in nature.
- The development of laser is extremely rapid.
- The laser action is being demonstrated in many solids liquids gases and semiconductors.

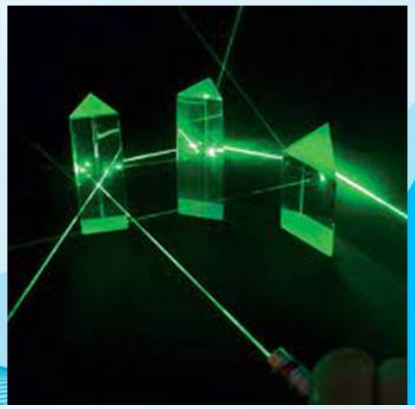
Industrial Applications

- **Lasers are used in industries for applications like cutting and welding metals and fabrics.**

- **Highly focused spot, where the heating is very much localized.**

- **In printing technology lasers can be used.**

- Laser beam is highly energetic so it can be used as war weapon.
- Lasers are used for high speed of processing.
- Lasers are used for testing the quality of optical components such as prisms and lenses..



❖Medical Applications

•Laser has been used in ophthalmology in the treatment of detached retina.

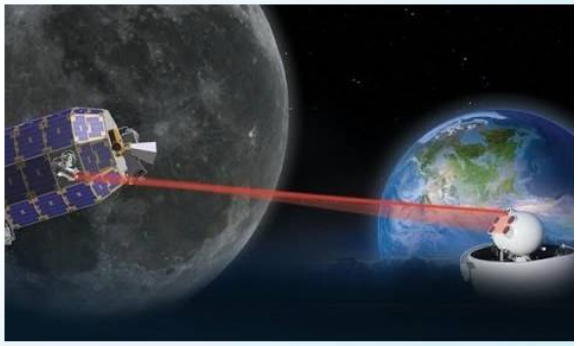
•Laser beam is used in the surgery of cancer.

•In the treatment of liver, lungs, and developing tumors, laser beam can be used.

•Laser technology makes many surgical procedures less painful for patient.

❖Other Applications

- Laser is used to measure the distance between earth to the moon.



- Lasers are used to fiber optics communications systems.

❖Other Applications

- Laser is use to read the barcode

- Lasers are used in Holography.

A Project Report on

Title: Applications of Integral Transform

Submitted to

Department of Mathematics

Vinayak Vidnyan Mahavidyalaya, Nandgaon Kh.

Submitted by

Name of student : Prerna Sanjay Deshmukh

Class : B.Sc.- III Semester: V Project Group No.- 1

Name of Paper:- Mathematical Methods.

Under the Guidance of

Dr. Priti B. Deshmukh, Department of Mathematics, VVM

Session: 2023-24

October-2023

Signature of student : Pdeshmukh.

Signature of Supervisor:

Signature of Head : Head Dept. of Mathematics Vinayak Vidnyan Mahavidyala Nandgaon Kh.

Applications of Integral Transform :

Abstract :- In this project we have discussed about How Laplace transform and Fourier transform works in the field of Signal processing and Image processing.

•Introduction :- An integral transform is a linear operation that converts a function f(x), to another function F(u).

The following integral (10) $F(u) = \int_a^b F(x)\, K(x,u)\, dx$

The function K(x, u) known as the Kernel of the transform. and the limits of the integral are specified for a particular transform.

ONTENTS :-

Title of the project

Abstract

Introduction

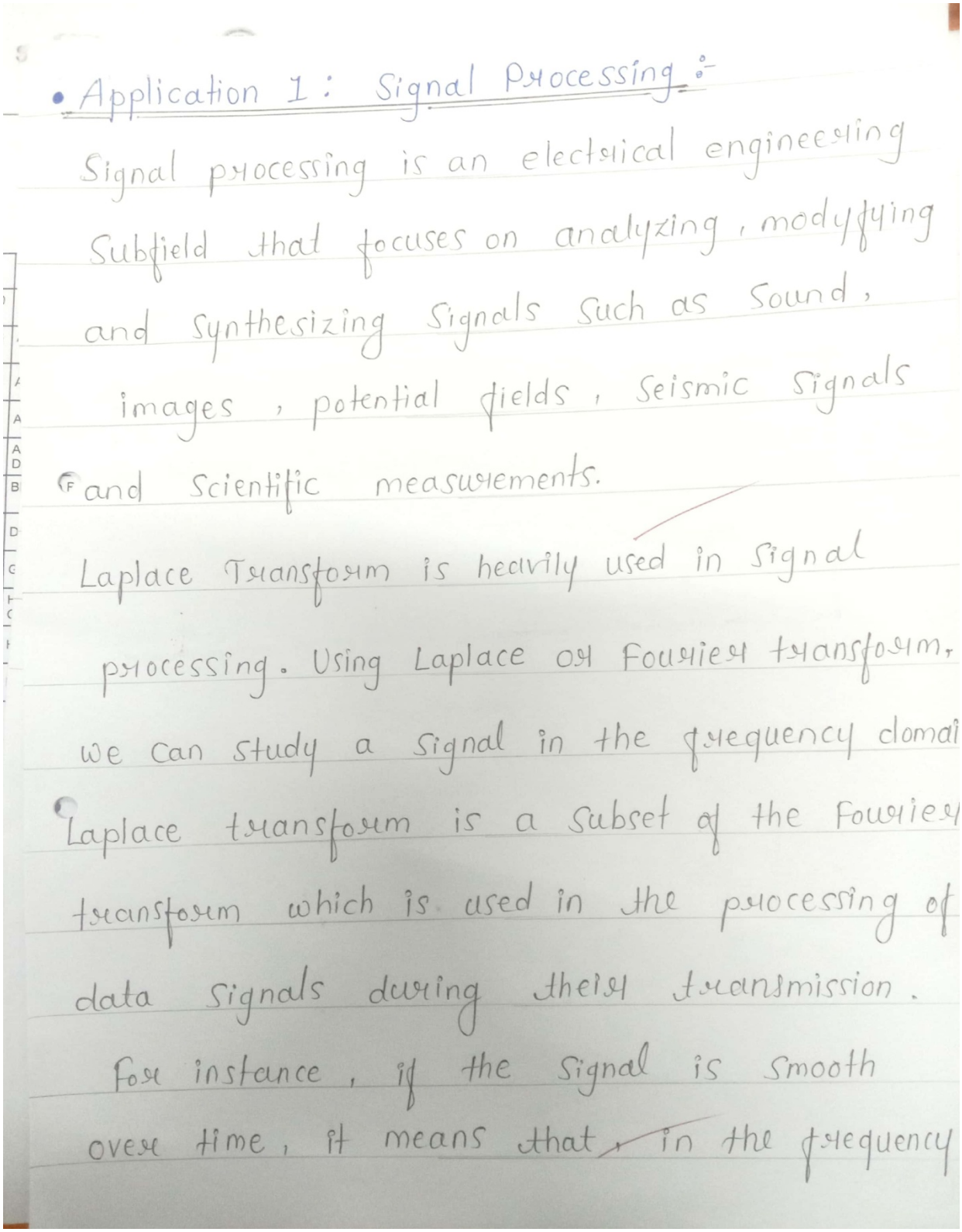
Application 1

Application 2

Conclusion

References


Digital Signal Processing(DSP)
Signal Processing



• Application 1 : Signal Processing :-

Signal processing is an electrical engineering subfield that focuses on analyzing, modyfying and synthesizing signals such as sound, images, potential fields, seismic signals and scientific measurements.

Laplace Transform is heavily used in signal processing. Using Laplace or Fourier transform, we can study a signal in the frequency domai

Laplace transform is a subset of the Fourier transform which is used in the processing of data signals during their transmission.

For instance, if the signal is smooth over time, it means that, in the frequency

domain. we are very likely to find only small frequencies. Similarly, the concept of filtering signal / data is based on a frequency domain interpretation. That is catching and cleaning of errors generated during transmission of Computer data.

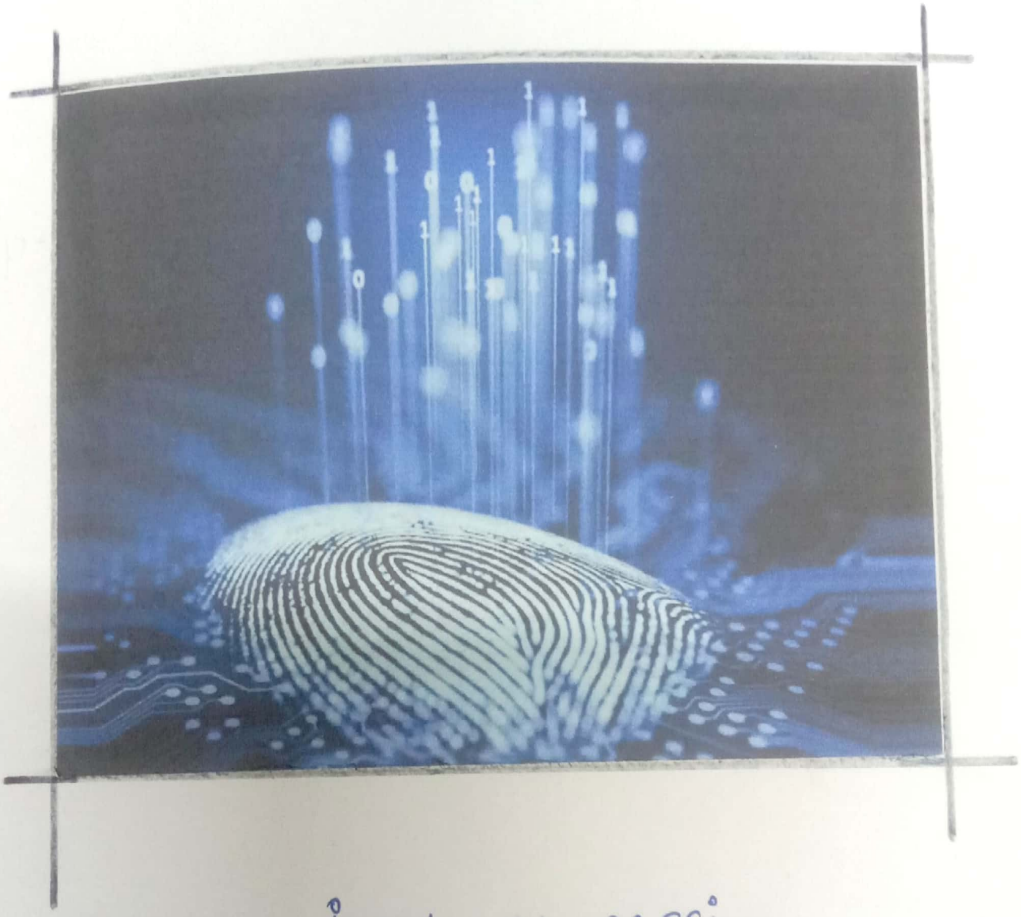
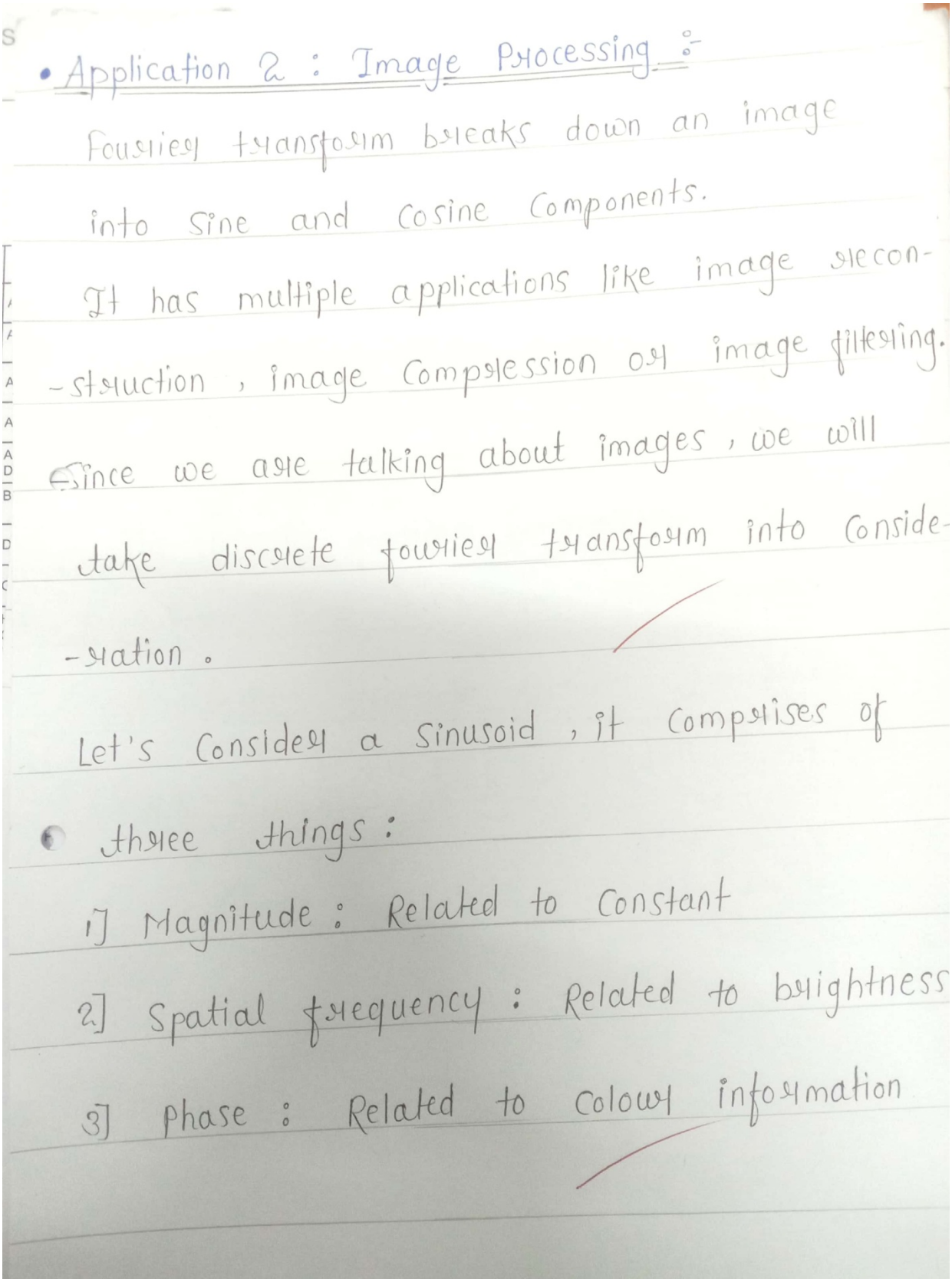


image processing



• Application 2 : Image Processing :-

Fourier transform breaks down an image into Sine and Cosine Components.

It has multiple applications like image recon-struction, image Compression or image filtering.

Since we are talking about images, we will take discrete fourier transform into Consider-ation.

Let's Consider a Sinusoid, it Comprises of three things :

1] Magnitude : Related to Constant

2] Spatial frequency : Related to brightness

3] Phase : Related to Colour information

The formula for 2D discrete fourier transform is :

$$F(u,v) = \frac{1}{MN} \sum_{x=0}^{M-1} \sum_{y=0}^{N-1} f(x,y) e^{-j2\pi \left(\frac{ux}{M} + \frac{vy}{N}\right)}$$

In the above formula, $f(x,y)$ denotes the image.

The inverse fourier transform converts the transform back to image. The formula for 2D inverse discrete fourier transform is :

$$f(x,y) = \sum_{u=0}^{M-1} \sum_{v=0}^{N-1} F(u,v) e^{j2\pi \left(\frac{ux}{M} + \frac{vy}{N}\right)}$$

• Conclusion :- The capability of integral transform to handle problems from different Scientific fields put them in the mathematicians spotlight. First integral transform (Laplace transform) studies on every aspect of integral transforms have been performed by scientists. Laplace transform and fourier transform have made signal processing and image processing much easier.

• References :-

1] G. K. Watugala " Sumudu transform : a new integral transform to Solve differential equations and Control engineering problems."

2] M. A. Asiru , " Sumudu transform and the Solution of equation of Convolution type." International Journal of Mathematical Educati in Science and Technology , Vol 32 , no. 6, pp. 906 - 910 , 2001.

Department of Chemistry

Class: B.Sc. Part III Semester V **Date: 4th October 2023**

STUDENT LIST WITH TOPICS

Sr. No.	Name of Student	Topic	Sub Topic	Signature of Student
1	Aarati Nandkishor Mokalekar	"Medicines used for the treatment of Wilkinson's Disease"	Penicillamine	
2	Adarsh Sanjayrao Pande			
3	Adeeba Anam Ikramuddin			
4	Aditya Kishor Pawar			
5	Aniket Rupraoji Chawale			
6	Aniket Sambhaji Meshram			
7	Anisha Vijay Deshmukh			
8	Ankush Maroti Jadhao		Trientine	
9	Anushri Gajanan Rohankar			
10	Ashwini Dhanraj Tirmare			
11	Ashwini Ravindra Wankhade			
12	Ayan Naim Khan			
13	Bhushan Yogeshwar Chawale			
14	Chetan Ganeshrao Vaidya			

Mr. Nilesh S. Padole
In-Charge Teacher

Mr. Nilesh S. Padole
Head of Department
Department of Chemistry
Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khandeshwar

Department of Chemistry

Class: B.Sc. Part III Semester V **Date: 4th October 2023**

STUDENT LIST WITH TOPICS

Sr. No.	Name of Student	Topic	Sub Topic	Signature of Student
1	Disha Vijay Khobragade	The different methods used in the Synthesis of "Talcum Powder".	NIVEA	
2	Hassan Ahmad R. Khan			
3	Jayshri Shamraoji Solanke			
4	Jyotsna Gajanan Laybar			
5	Komal Rajesh Narode			
6	Leena Ganesh Ghodeswar			
7	Mohini Sunil Makode			
8	Nayana Dadarao Gopnarayan		SPINZ	
9	Pallavi Vilas Khune			
10	Prajkta Pramod Inzalkar			
11	Pratik Rajendra Shendre			
12	Prince Arvind Nandagawali			
13	Reva Mahendra Gedam			
14	Rohini Jagdish Bahurupi			

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Mr. Nilesh S. Padole
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Nandgaon Khandeshwar

Department of Chemistry

Class: B.Sc. Part III Semester V **Date: 10th November 2022**

STUDENT LIST WITH TOPICS

Sr. No.	Name of Student	Topic	Sub Topics	Signature of Student
1	Sakshi Hemantrao Sonone	Nobel Laurates	George Wittig	Sonone
2	Sakshi Shyam Bavankule			Bavankule
3	Sanika Sahadev Lute			Lute
4	Sayyed Maaz Misbahuddin			S.M
5	Shraddha Rajkumar Dhage			S.R.Dhage.
6	Shyam Niranjan Kanse			Shyam Kanse
7	Sneha Manohar Satpaise		Otto Diels and Kuhn Alder	S.M.Satpaise.
8	Vaishnavi Anil More			V.A.More
9	Vaishnavi Rajendra Ghawat			V.R.Ghawat
10	Vaishnavi Ratnakar Belsare			V.R.Belsare
11	Yogini Lileshwar Mate			Y.Mate.
12	Zuberkha Gaffarkha Pathan			Pathan
13. Sameer D. Dhomane				Dhomane

Dr. Vinod M. Sherekar
In-Charge Teacher

Mr. Nilesh S. Padole
Head of Department

Department of Chemistry
Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khandeshwar

Department of Chemistry

Class: B.Sc. Part III Semester V **Date: 16th October 2023**

PROJECT SUBMISSION LIST

Sr. No.	Name of Student	Topic	Sub Topics	Signature of Student
1	Aarati Nandkishor Mokalekar	"Medicines used for the treatment of Wilkinson's Disease"	Penicillamine	
2	Adarsh Sanjayrao Pande			
3	Adeeba Anam Ikramuddin			
4	Aditya Kishor Pawar			
5	Aniket Rupraoji Chawale			
6	Aniket Sambhaji Meshram			
7	Anisha Vijay Deshmukh			
8	Ankush Maroti Jadhao		Trientine	
9	Anushri Gajanan Rohankar			
10	Ashwini Dhanraj Tirmare			
11	Ashwini Ravindra Wankhade			
12	Ayan Naim Khan			
13	Bhushan Yogeshwar Chawale			
14	Chetan Ganeshrao Vaidya			

Mr. Nilesh S. Padole
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Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khandeshwar

Department of Chemistry

Class: B.Sc. Part III Semester V **Date: 16th October 2023**

PROJECT SUBMISSION LIST

Sr. No.	Name of Student	Topic	Sub Topics	Signature of Student
1	Disha Vijay Khobragade	The different methods used in the Synthesis of "Talcum Powder".	NIVEA	D.V.khobragade
2	Hassan Ahmad R. Khan			Hasankhan
3	Jayshri Shamraoji Solanke			J.S.solanke
4	Jyotsna Gajanan Laybar			J.Laybar
5	Komal Rajesh Narode			Narode
6	Leena Ganesh Ghodeswar			Ghodeswar
7	Mohini Sunil Makode			M.Makode
8	Nayana Dadarao Gopnarayan		SPINZ	Gopnarayan
9	Pallavi Vilas Khune			P.V.Khune
10	Prajkta Pramod Inzalkar			
11	Pratik Rajendra Shendre			Shendre
12	Prince Arvind Nandagawali			
13	Reva Mahendra Gedam			
14	Rohini Jagdish Bahurupi			Bahurupi

Dr. Kavita P. Kakade
In-Charge Teacher

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Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khandeshwar

Remark:

Department of Chemistry

Class: B.Sc. Part III Semester V **Date: 16th October 2023**

PROJECT SUBMISSION LIST

Sr. No.	Name of Student	Topic	Sub Topics	Signature of Student
1	Sakshi Hemantrao Sonone	Nobel Laurates	George Wittig	Sonone
2	Sakshi Shyam Bavankule			Bavankule
3	Sanika Sahadev Lute			SLute
4	Sayyed Maaz Misbahuddin			SM
5	Shraddha Rajkumar Dhage			S.R.Dhage
6	Shyam Niranjan Kanse			Shyamkanse
7	Sneha Manohar Satpaise		Otto Diels and Kuhn Alder	S.M.Satpaise.
8	Vaishnavi Anil More			KA.more
9	Vaishnavi Rajendra Ghawat			VRGhawat.
10	Vaishnavi Ratnakar Belsare			VRBelsare
11	Yogini Lileshwar Mate			Ymate
12	Zuberkha Gaffarkha Pathan			
13. Sameer D. Dhomane				

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Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khandeshwar

Remark:

Date:4th October 2023

Department of Chemistry

Topic Detail for Class Project

Session- 2023-24 (Winter)

Class: B.Sc. Part III Semester V

PROJECT LIST OF TOPICS WITH IN-CHARGE TEACHER

Sr. No	Name of the Teacher	Topic	Sub topic	Number of Students
1	Mr. Nilesh S. Padole	"Medicines used for the treatment of Wilkinson's Disease".	A) Penicillamine B) Trientine	14
2	Dr. Kavita P. Kakade	The different methods used in the Synthesis of "Talcum Powder".	A) Nivea B) Spinz	14
3	Dr. Vinod M. Sherekar	Nobel Laurates in Chemistry	A) George Wittig B) Otto Diels and Kuhn Alder	12

Mr. Nilesh S. Padole
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Nandgaon Khandeshwar

VINAYAK VIDNYAN MAHAVIDYALAYA, NANDGAON KH.

DEPARTMENT OF CHEMISTRY

Class: B.Sc. Part III Semester VI **Date: 26th March 2024**

STUDENT LIST WITH TOPICS

Sr. No.	Name of Student	Topic	Signature of Student
1	Aarati Nandkishor Mokalekar	DETERMINATION OF PH OF SOIL SAMPLES COLLECTED FROM VARIOUS REGIONS OF NANDGAON KHANDESHWAR	A N Mokalekar
2	Adarsh Sanjayrao Pande		Apande
3	Adeeba Anam Ikramuddin		Adiba
4	Aditya Kishor Pawar		A.K. Pawar
5	Aniket Rupraoji Chawale		A R Chawale
6	Aniket Sambhaji Meshram		Meshram
7	Anisha Vijay Deshmukh		Adeshmukh
8	Ankush Maroti Jadhao	CHEMICAL CONTENTS OF FLOWERS	Jadhao
9	Anushri Gajanan Rohankar		Agrohankar
10	Ashwini Dhanraj Tirmare		S D Tirmare
11	Ashwini Ravindra Wankhade		A R Wankhade
12	Ayan Naim Khan		
13	Bhushan Yogeshwar Chawale		B Y Chawale
14	Chetan Ganeshrao Vaidya		C G Vaidya

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In-Charge Teacher

Mr. Nilesh S. Padole
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Nandgaon Khandeshwar

VINAYAK VIDNYAN MAHAVIDYALAYA, NANDGAON KH.

DEPARTMENT OF CHEMISTRY

Class: B.Sc. Part III Semester VI **Date: 26th March 2024**

STUDENT LIST WITH TOPICS

Sr. No.	Name of Student	Topic	Signature of Student
1	Disha Vijay Khobragade	CHEMICAL CONTENTS AND MEDICINAL USES OF SPICES	
2	Hassan Ahmad R. Khan		
3	Jayshri Shamraoji Solanke		
4	Jyotsna Gajanan Laybar		
5	Komal Rajesh Narode		
6	Leena Ganesh Ghodeswar		
7	Mohini Sunil Makode		
8	Nayana Dadarao Gopnarayan	SEPARATION OF KERATIN PROTEIN FROM HUMAN HAIR.	
9	Pallavi Vilas Khune		
10	Prajkta Pramod Inzalkar		
11	Pratik Rajendra Shendre		
12	Prince Arvind Nandagawali		
13	Reva Mahendra Gedam		
14	Rohini Jagdish Bahurupi		

Mr. Nilesh S. Padole
In-Charge Teacher

Mr. Nilesh S. Padole
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Department of Chemistry
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Nandgaon Khandeshwar

VINAYAK VIDNYAN MAHAVIDYALAYA, NANDGAON KH.

DEPARTMENT OF CHEMISTRY

Class: B.Sc. Part III Semester VI **Date: 26th March 2024**

STUDENT LIST WITH TOPICS

Sr. No.	Name of Student	Topic	Signature of Student
1	Sakshi Hemantrao Sonone	ROLE OF CHEMISTRY TO CONTROL VARIOUS POLLUTIONS	Sonone
2	Sakshi Shyam Bavankule		SBavankule
3	Sanika Sahadev Lute		
4	Sayyed Maaz Misbahuddin		
5	Shraddha Rajkumar Dhage		S.R.Dhage
6	Shyam Niranjan Kanse		
7	Sneha Manohar Satpaise		S.M.Satpaise.
8	Vaishnavi Anil More		Amore
9	Vaishnavi Rajendra Ghawat		
10	Vaishnavi Ratnakar Belsare		
11	Yogini Lileshwar Mate		
12	Zuberkha Gaffarkha Pathan		
13	Sameer Dhomane		

Dr. Vinod M. Sherekar
In-Charge Teacher

Mr. Nilesh S. Padole
Head of Department

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Department of Chemistry
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Nandgaon Khandeshwar

VINAYAK VIDNYAN MAHAVIDYALAYA, NANDGAON KH.

DEPARTMENT OF CHEMISTRY

Class: B.Sc. Part III Semester VI **Date: 15th April 2024**

PROJECT SUBMISSION LIST

Sr. No.	Name of Student	Topic	Signature of Student
1	Aarati Nandkishor Mokalekar	DETERMINATION OF P^H OF SOIL SAMPLES COLLECTED FROM VARIOUS REGIONS OF NANDGAON KHANDESHWAR	A.N mokalekar
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3	Adeeba Anam Ikramuddin		Adilly
4	Aditya Kishor Pawar		A.K. Pawar
5	Aniket Rupraoji Chawale		A.R.chawle
6	Aniket Sambhaji Meshram		Aniket
7	Anisha Vijay Deshmukh		Adeshmukh
8	Ankush Maroti Jadhao	CHEMICAL CONTENTS OF FLOWERS	Ajadhao
9	Anushri Gajanan Rohankar		Arohankar
10	Ashwini Dhanraj Tirmare		Atirmare
11	Ashwini Ravindra Wankhade		Awankhade
12	Ayan Naim Khan		Akhan
13	Bhushan Yogeshwar Chawale		Bychawle
14	Chetan Ganeshrao Vaidya		Cvaidya

Dr. Kavita P. Kakade
In-Charge Teacher

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Department of Chemistry
Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khandeshwar

VINAYAK VIDNYAN MAHAVIDYALAYA, NANDGAON KH.

DEPARTMENT OF CHEMISTRY

Class: B.Sc. Part III Semester VI **Date: 15th April 2024**

PROJECT SUBMISSION LIST

Sr. No.	Name of Student	Topic	Signature of Student
1	Disha Vijay Khobragade	CHEMICAL CONTENTS AND MEDICINAL USES OF SPICES	D.V. Khobragade
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3	Jayshri Shamraoji Solanke		J.S. Solanke
4	Jyotsna Gajanan Laybar		J.G. Laybar
5	Komal Rajesh Narode		Narode
6	Leena Ganesh Ghodeswar		Ghodeswar
7	Mohini Sunil Makode		M.S. Makode
8	Nayana Dadarao Gopnarayan	SEPARATION OF KERATIN PROTEIN FROM HUMAN HAIR.	Gopnarayan
9	Pallavi Vilas Khune		P.V. Khune
10	Prajkta Pramod Inzalkar		Inzalkar
11	Pratik Rajendra Shendre		Shendre
12	Prince Arvind Nandagawali		Nandagawali
13	Reva Mahendra Gedam		Gedam
14	Rohini Jagdish Bahurupi		Bahurupi

Mr. Nilesh S. Padole
In-Charge Teacher

Mr. Nilesh S. Padole
Head of Department
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Department of Chemistry
Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khandeshwar

VINAYAK VIDNYAN MAHAVIDYALAYA, NANDGAON KH.

DEPARTMENT OF CHEMISTRY

Class: B.Sc. Part III Semester VI **Date: 15th April 2024**

PROJECT SUBMISSION LIST

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5	Shraddha Rajkumar Dhage		
6	Shyam Niranjan Kanse		Satpaise.
7	Sneha Manohar Satpaise		More
8	Vaishnavi Anil More		Ghawat
9	Vaishnavi Rajendra Ghawat		Belsare
10	Vaishnavi Ratnakar Belsare		Mate.
11	Yogini Lileshwar Mate		
12	Zuberkha Gaffarkha Pathan		Dhomane
13	Sameer Dhomane		

Dr. Vinod M. Sherekar
In-Charge Teacher

Mr. Nilesh S. Padole
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Vinayak Vidnyan Mahavidyalaya,
Nandgaon Khandeshwar

PRAVIN KHODKE MEMORIAL TRUST'S,

VINAYAK VIDNYAN MAHAVIDYALAYA, NANDGAON KHANDESHWAR.

DEPARTMENT OF CHEMISTRY

ACADEMIC SESSION

2023-2024 (Summer)

Project Submission

Name of the Student: Bhushan Yogeshwar Chawale

Class: B.Sc. Part III Semester VI

Project Topic: Chemical Contents of Flowers

Name of the supervisor: Dr. Kavita P. Kakade

Supervisor remark with sign and date: 06/04/24

Date of submission of Project: 15th April 2024

Padole

Head of Department
Mr. Nilesh S. Padole
Vinayak Vidnyan Mahavidyalaya,

Chemical Contents of Flowers

Contents

1] Marigold

2] Mogra

3] Hibiscus

4] Rose

5] catharanthus roseus

6] calotropis Procera

Introduction

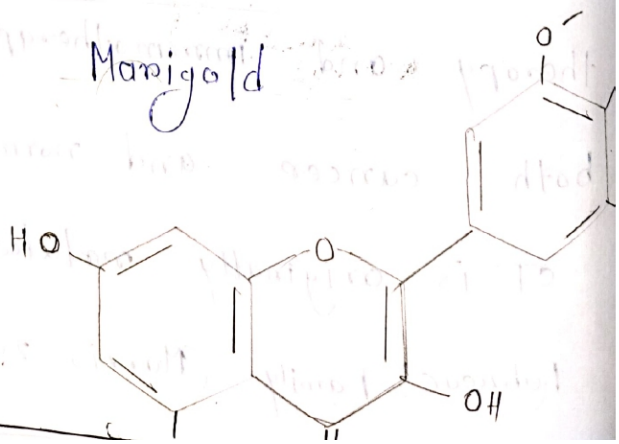
The World Health organization (WHO) has declared that total mortality due to cancer will increase to 12 millions in 2030 whereas this number was only 7.6 million in 2005

Treatment used against cancer such as chemotherapy radiation hormone therapy and immunotherapy can kill both cancer and normal cells

CT is originally related to leguminosae Fabaceae) Family (Morris 2009)

Marigold

chemical structure:-



Marigold

Tagetes patula -the french marigold is one species of flowering plant in the family Asteraceae native to Mexico and Guatemala with several naturalised populations in many countries

chemical contents :-

The Major compounds of Tagetes patula essential oil were

β-caryophyllene (24.53 %)

piperitenone (10.96 %)

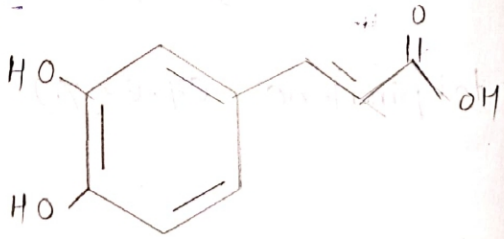
piperitone (9.66 %)

α-terpinolene (7.62 %)

Mogra

chemical structure

Jasminum sambac :-



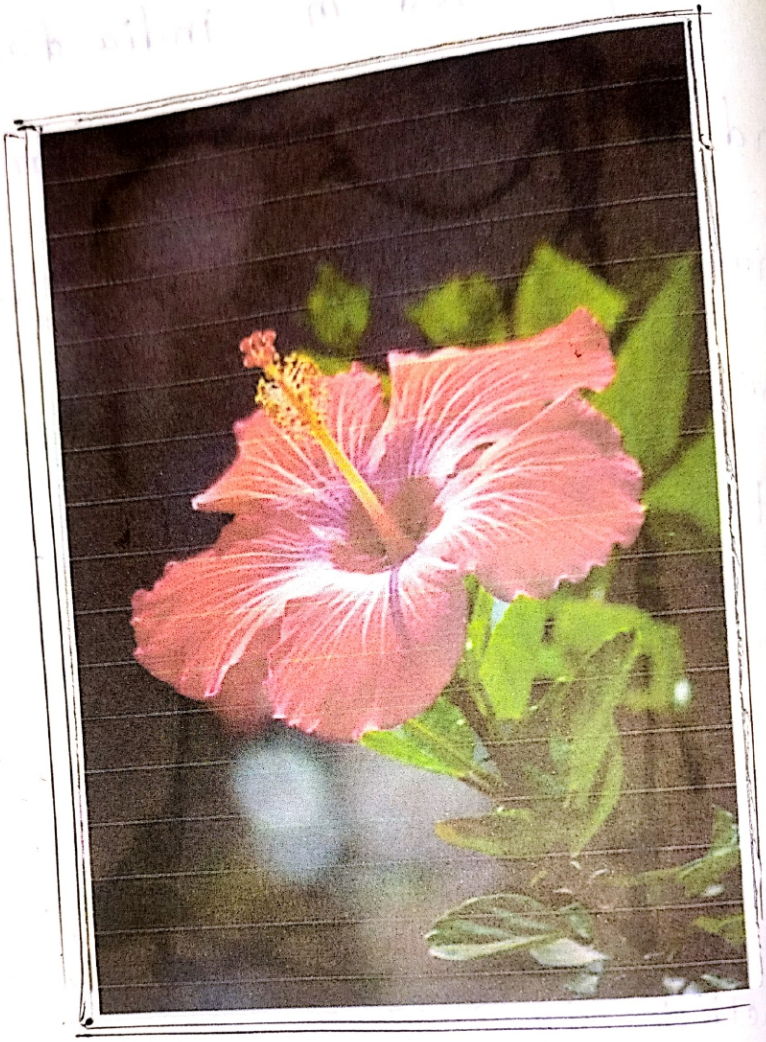
caffeic acid

Mogra

Mogra is a type of jasmine flower commonly used in india for religious and cultural ceremonies and to make perfumes and garland. The leaves are used for the treatment of tumors.

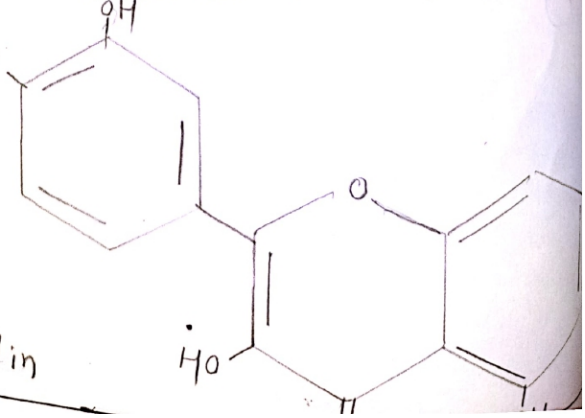
Chemical contents :-

Benzyl benzoate	0.67%
phytol	
Methyl linolenate	3.23%
Geranyl linalate	2.23%



Hibiscus

chemical structure :



Quercetin

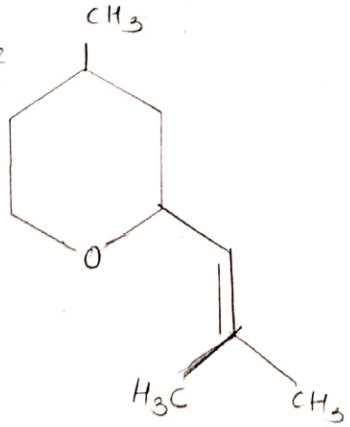
Hibiscus

The common hibicus (Hibiscus rosa-sinensis) is an evergreen shrub belonging to the cotton family Malvaceae which comprises about 300 species

Chemical contents :-

Flavonoids
anthocyanins
terpenoids
steroids
polysaccharide
alkaloids
amino acids
lipids
sesquiterpene
quinones
naphtalene

chemical structure



Rose

Rose oxide

Rose

Rosa rubiginosa is the scientific name for Rose.

There are approximately 360 known species of roses

Chemical contents:-

The composition of rose was phenyl ethyla lcohol (72.73-73.80%)

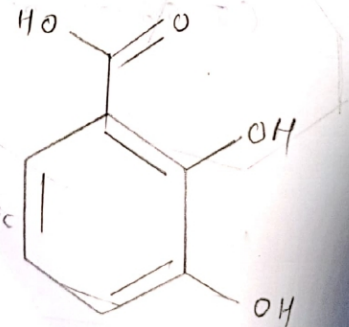
citrenellol (10.62-11.26%)

nerol (2.92-2.97%)

geranial (5.58-5.65%.

chemical structure :-

Catharanthus roseus



2,3 dihydroxybenzoic acid

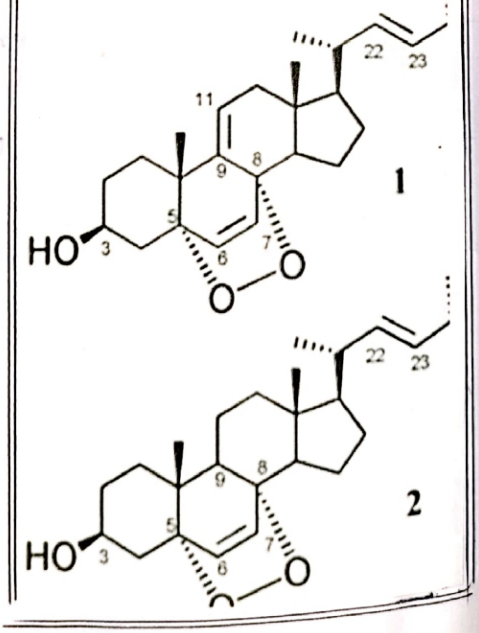
Catharanthus roseus

Madagascar periwinkle is the scientific name of catharanthus roseus It is native and endemic to Madagascar but is grown elsewhere as an ornamental and Medicinal plant

chemical contents:-

The Main constituents of the white flower C. roseus were. limonene (23.2%) dodecyl alcohol (9.8%) geraniol (7.3%) citral (7.0%

Calotropis Procera



Calotropis Procera

calotropis belongs to the Apocynaceae Family, which is commonly known as Milkweed or Ark Plants of this genus are known as milkweeds due to the exadation of white and sticky latex from different parts

Chemical contents :-

Cardenolides

Steroids

tanins

Sugars

alkaloids

glycosides

phenols

Terpenoids

Medicinal Uses of Flowers

Marigold	To treat wounds for
	inflammation of the skin and mucous membranes.
Mogra	Mogra water has soothing ingredients that can support irrita itchy dry skin and even prevent acene outbreaks.
Hibiscus	lower blood pressure. reduce levels of sugar and fats
Rose	Treatment of inflammation Diabetes, dysmenorrhea, drepession
catharanthus roseus	Treatment of Many types of cancer, diabetes. stomach disorders
calotropis Procera	Digestive disorders, touthacho, cramps, joint pain

Reference

https:// en.m.wikipedia.org

https:// www.scielo.org.co

www.ncbi.nlm.nih.gov

https:// learn.genetics.utah.edu

https:// www.sciencedirect.com

Notice:

This is to inform to the Students of **B.Sc. III SEM VI**, that the Project list is attached here. As per discussion on Saturday 24th February 2024. The students are allotted with a project that they have to complete using **Amrita Lab website**.The students are informed to Contact the supervising teacher and get the project done within due time.

Vinayak Vidnyan Mahavidyalaya, Nandgaon Khandeshwar, Dist. Amravati.

(Session III-2023-24) B.SC III year SEM VI

Project

Department of Zoology

Class: B.Sc. III

Sr.No	Name	Project Topic	Date of submission	Sign	Supervising Teacher
1	Aditya Kishor Pawar	Hot Shot Method of DNA Extraction			Dr P.S.Mahalle
2	Aarti Nandkishor Mokalekar		2/04/23		Dr. P.S.Mahalle
3	Adarsh Sanjayrao Pande				Dr. P.S.Mahalle
4	Adeeba Anam Ikramuddin .				Dr. P.S.Mahalle
5	Aniket Rupraoji Chawale				Dr. P.S.Mahalle
6	Aniket Sambhaji Meshram				Dr. P.S.Mahalle
7	Anisha Vijay Deshmukh				Dr. P.S.Mahalle
8	Ankush Maroti Jadhao				Dr. P.S.Mahalle
9	Ashwini Dhanraj Tirmare	Western Blotting	2/04/23		Dr.G.S.Pachlore
10	Ashwini Ravindra Wankhade				Dr.G.S.Pachlore
11	Ayan Naim Khan			A Khan.	Dr.G.S.Pachlore
12	Bhushan Yogeshwar Chawale				Dr.G.S.Pachlore
13	Disha Vijay Khobragade				Dr.G.S.Pachlore

14	Hassan Ahmad Rizwanullah Khan				Dr.G.S.Pachlore
15	Jayshri Shamraoji Solanke				Dr.G.S.Pachlore
16	Jyotsna Gajanan Laybar				Dr.G.S.Pachlore
17	Leena Ganesh Ghodeswar				Mr.S.N.Bansod
18	Mohini Sunil Makode				Mr.S.N.Bansod
19	Nayana Dadarao Gopanarayan	Polyacrylamide Gel Electrophoresis	4/04/23		Mr.S.N.Bansod
20	Pallavi Vilas Khune				Mr.S.N.Bansod
21	Prajakta Pramod Inzalkar				Mr.S.N.Bansod
22	Prince Arvind Nandagawali				Mr.S.N.Bansod
23	Reva Mahendra Gedam				Mr.S.N.Bansod
24	Rohini Jagdish Bahurupi				Mr.S.N.Bansod
25	Sakshi Shyam Bavankule	Extraction of DNA from Agarose gel			Dr.S.P.Tinkhede
26	Sanika Sahadev Lute		8/04/23		Dr.S.P.Tinkhede
27	Sayyed Maaz Misbahuddin .				Dr.S.P.Tinkhede
28	Shraddha Rajkumar Dhage				Dr.S.P.Tinkhede
29	Sneha Manohar Satpaise				Dr.S.P.Tinkhede
30	Vaishanvi Anil More				Dr.S.P.Tinkhede
31	Vaishnavi Rajendra Ghawat				Dr.S.P.Tinkhede
32	Yogini Lileshwar Mate				Dr.S.P.Tinkhede
33	Zuberkha Gaffarkha Pathan				Dr.S.P.Tinkhede
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Restriction Digestion

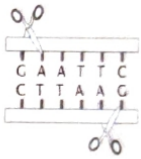
Objective:

To perform restriction digestion of DNA with EcoR I and BamHI enzymes.

Principle:

Restriction enzymes are Nucleases which can cleave the sugar-phosphate backbone of DNA, found in bacteria. As they cut within the molecule, they are commonly called restriction endonucleases. They specifically cleave the nucleic acids at specific nucleotide sequence called Restriction sites to generate a set of smaller fragments.

Restriction enzymes form part of the restriction-modification system of bacterial cells that provides protection against invasion of the cell by foreign DNA – especially bacteriophage DNA. But the cells own DNA is not cleaved by these Restriction enzymes. This self protection is achieved by the help of the specific DNA methyltransferase enzyme which will methylates the specific DNA sequence for its respective restriction enzymes by transferring methyl groups to adenine or cytosine residues to produce N6-methyladenine or 5-methylcytosine. An interesting feature of restriction endonuclease is that they commonly recognize recognition sequences that are mostly palindromes - they shows the same forward (5' to 3' on the top strand) and backward (5' to 3' on the bottom strand) sequences. In other words, they are nucleotide sequences or complimentary strands that read the same in opposite direction.



Types of restriction and modification (R-M) system:

Type I enzymes :- Type I restriction enzymes exhibit both restriction and DNA modification activities.They require the cofactors such as Mg2+ ions, S-adenosylmethionine (SAM) and ATP for their activity. The recognition sequences are quite long with no recognizable features such as symmetry. Type I restriction endo nucleases cleaves DNA at nonspecific sites and that can be 1000 base pair or more from recognition sequence. However, because the methylation reaction is performed by the same enzyme which mediates cleavage, the target DNA may be modified before it is cut. Because of these features, the type I systems are of little value for gene manipulation.

Type II enzymes :- Type II enzymes and their corresponding modification methyltransferases act as separate proteins. They have a number of advantages over type I and III systems. First, restriction and modification are mediated by separate enzymes so it is possible to cleave DNA in the absence of modification. Secondly, the restriction activities do not require cofactors such as ATP or S-adenosylmethionine, making them easier to use. They require only Mg2+ ions as cofactors. These enzymes are site-specific as they hydrolyze specific phosphodiester bonds in both DNA strands. Class II restriction endonucleases are generally used as the key material in molecular biology and recombinant DNA techniques, including genome mapping, RFLP analysis, DNA sequencing, and cloning.

Type III enzymes :- Like Class I enzymes, Type III enzymes possess both restriction and modification activities.They recognize specific sequences and cleave 25 - 27 base pairs outside of the recognition sequence, in a 3′ direction. They require Mg2+ ions for their activity.

Type IIs enzymes, have similar cofactors and macromolecular structure to those of type II systems, the fact that restriction occurs at a distance from the recognition site limits their usefulness.

Nomenclature:

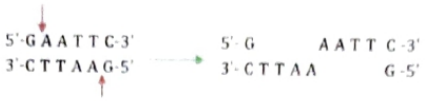
The first three letters of the restriction enzyme refer to the organism from which the restriction enzyme was originally isolated, the fourth letter (if present) refers to the strain, and the Roman numerals serve as indices if the same organism contains several different restriction enzymes.
e.g. **EcoR I** and **EcoR V** are both from Escherichia coli, strain R; I and V are the order in which they were discovered.

Restriction Enzyme Nomenclature

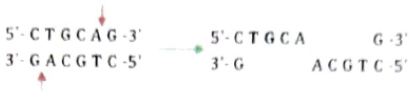
Enzyme	Enzyme Source
EcoRI	*Escherichia coli*, strain R, Ist enzyme
HindIII	*Haemophilus influenzae*, strain d, 3rd enzyme
BamHI	*Bacillus amyloliquefaciens*, strain H, Ist enzyme
SmaI	*Serratia marcescens*, Ist enzyme
HaeIII	*Haemophilus aegyptius*, 3rd enzyme

Restriction Enzyme cleavage:

Class II restriction enzymes generate three types of DNA ends, all possessing 5′-phos-phate and 3′-hydroxyl groups:
a) Cohesive 5′ ends:- For example, ends generated by *EcoR I*:



b) Cohesive 3' ends:- For example, ends generated by *Pst* I.



c) Blunt ends:- For example, ends generated by *Hae* III

Sticky ends (Blunt ends) are produced by cutting the DNA in a staggered manner within the recognition site producing single stranded DNA ends. These ends have identical nucleotide sequence and are sticky because they can bind to complementary tails of other DNA fragments cut by the same Restriction enzyme.

	Restriction Enzyme	Organism	Recognition sequence	Cut Site	Blunt or Sticky end
1	*Eco* RI	*Escherichia coli*	5'GAATTC 3'CTTAAG	5'---G AATTC---3' 3'---CTTAA G---5'	Sticky
2	*Bam*HI	*Bacillus amyloliquefaciens*	5'GGATCC 3'CCTAGG	5'---G GATCC---3' 3'---CCTAG G---5'	Sticky
3	*Bgl*II	*Bacillus globigii*	5'AGATCT 3'TCTAGA	5'---A GATCT---3' 3'---TCTAG A---5'	Sticky
4	*Pvu*II	*Proteus vulgaris*	5'CAGCTG 3'GTCGAC	5'---CAG CTG---3' 3'---GTC GAC---5'	Blunt
5	*Hind*III	*Haemophilus influenzae Rd*	5'AAGCTT 3'TTCGAA	5'---A AGCTT---3' 3'---TTCGA A---5'	Sticky
6	*Sau*3A	*Staphylococcus aureus*	5'GATC 3'CTAG	5'--- GATC---3' 3'---CTAG ---5'	Sticky
7	*Alu*I	*Arthrobacter luteus*	5'AGCT 3'TCGA	5'---AG CT---3' 3'---TC GA---5'	Blunt
8	*Taq*I	*Thermus aquaticus*	5'TCGA 3'AGCT	5'---T CGA---3' 3'---AGC T---5'	Sticky
9	*Hae*III	*Haemophilus aegyptius*	5'GGCC 3'CCGG	5'---GG CC---3' 3'---CC GG---5'	Blunt
10	*Not*I	*Nocardia otitidis-caviarum*	5'GCGGCCGC 3'CGCCGGCG	5'---GC GGCCGC---3' 3'---CGCCGG CG---5'	Sticky

Isoschizomers and neoschizomers:

Different restriction enzymes, isolated from different organisms can have identical recognition sequences, such enzymes are called isoschizomers. Neoshizomers are Isoschizomeric enzymes but it cleaves at different recognition site.

Applications:

Restriction enzymes are powerful tools of molecular genetics used to:
- Map DNA molecules
- Analyze population polymorphisms
- Rearrange DNA molecules
- Prepare molecular probes
- Create mutants

Factors affecting Restriction Enzyme Activity:

Temperature: Most digestions are carried out at 37°C. However, there are a few exceptions e.g., digestion with Sma I is carried out at lower temperatures (~25°C), while with Taq I at higher temperature i.e., 65°C.

Buffer Systems: Tris-HCl is the most commonly used buffering agent in incubation mixtures, which is temperature dependent. Most restriction enzymes are active in the pH range 7.0-8.0.

Ionic Conditions: Mg2+ is an absolute requirement for all restriction endonucleases, but the requirement of other ions (Na+/K+) varies with different enzymes.

Methylation of DNA: Methylation of specific adenine or cytidine residues within the recognition sequence of the restriction enzyme affects the digestion of DNA.

Star Activity:-

It is an alteration of the specificity of restriction enzyme mediated cleavage of DNA that can occur under some non standard conditions that differ from the optimum for the enzyme. This alteration leads to the cleavage at non specific sites.

Nonstandard conditions include:

1. High pH (>8.0).
2. Glycerol concentrations >5% (important, because enzymes are usually delivered as concentrated stock in 50% glycerol).
3. High concentration of enzyme (>100 U/µg of DNA).
4. Prolonged incubation time with enzyme.
5. Presence of organic solvents in the reaction (e.g., phenol, chloroform, ethanol,DMSO).
6. Incorrect cofactor (i.e., Mn2+,Hg2+or Co2+instead of Mg2+).

To avoid star activity, always use the optimal buffer system and enzyme amount recommended. Make sure that the DNA preparation is free of organic solvents and contaminating salts.

Note:

Please check "Procedure tab" if you have issues loading the simulator.

Restriction Digestion

Flash EOL

Animation link: https://vlab.amrita.edu/repo/BIOTECH/MOL/Restriction_digestion/index.swf
Simulation link: https://vlab.amrita.edu/repo/BIOTECH/MIC/Restriction%20Enzyme/RestrictionEnzyme.swf

Materials Required

- Microcentrifuge tubes
- Vial stand
- 10µl pipette
- Pipette tips
- Beaker
- Table top mini centrifuge
- Incubator
- Reagents

Procedure

1. Transfer the following solutions in a micro centrifuge tube.

Item	Amount
Deionized water	5 µL
10X Reaction Buffer	1 µL
Plasmid DNA	3 µL
ECoRI Enzyme	0.5 µL
BamHI Enzyme	0.5 µL
Total	**10 µL**

2. Incubate the mixture at 37 ^{o} C for 1 h to overnight. Keep the tubes in -4^{o} C freezer or in -20^{o} C freezer, after the incubation.

Precaution

- Make sure that the restriction enzyme does not exceed more than 10% of the total reaction volume, Otherwise the glycerol and the EDTA in the enzyme storage buffer may inhibit digestion process.

Differences Encountered in Real Laboratory

- After performing the experiment, confirm the Digestion of DNA by running a small amount of it in agarose gel with an undigested standard DNA.
- Some restriction enzymes require BSA. In such cases make sure that, it is added to the reaction mixture. Restriction enzymes that do not require BSA for optimal activity are not adversely affected if BSA is present in the reaction.
- Before performing the experiment, check whether the restriction enzymes have star activity or not.

Help:

Unfortunately, this Virtual Lab requires Adobe Flash player. Please see additional information if this does not work on your computer

- **For Google Chrome** - https://support.google.com/chrome/answer/6258784?co=GENIE.Platform%3DDesktop&hl=en
- **For Microsoft Edge** - https://support.microsoft.com/en-in/help/4532571/microsoft-edge-turn-on-flash
- **For Mozilla Firefox** - https://support.mozilla.org/en-US/kb/install-flash-plugin-view-videos-animations-games

On GNU/Linux machines, please see appropriate online help. For example,

- **on Ubuntu** - https://help.ubuntu.com/stable/ubuntu-help/net-install-flash.html.en
- **on Fedora** - https://docs.fedoraproject.org/en-US/quick-docs/using-adobe-flash/