

Hon.Balasaheb Jadhav

Arts, Commerce and Science College, Ale

Tal: Junnar Dist: Pune, Pin code: 412411

3.3.5 (Q_nM) Number of books and chapters in edited volumes / books published, and papers in national/international conference-proceedings per teacher during the last five years

Sl. No.	Name of the teacher	Title of the book/chapters published	Title of the paper	Title of the proceedings of the conference	Name of the conference	National / international	Year of publication	ISBN number of the proceeding	Affiliating Institute at the time of publication	Name of the publisher	Relavant link
1	Bhise R.B.	Practical in Physics	Practical in Physics for SYBSc PH 223 paper-III Nirali Prakashan				2014-15	ISBN: 935164462-6	SPPU, Pune	Nirali Publication	www.pragationline.com
2	Bhise R.B.		apparent molar volumes and viscosity b-coefficients of Naproxen sodium in different solvent systems at body temperature. P-3	international conference Presented a research paper (RTCST 2014) 20 & 22 Aug 2014	international conference Presented a research paper (RTCST 2014) 20 & 22 Aug 2014	International	2014-15		SPPU, Pune		
3	Gadekar G.H.		"Scope of Nanotechnology in Development of Agriculture in India" Pages -27-34	Proceeding of state level workshop on "Review of Progress in Nanoscience"	Proceeding of state level workshop on "Review of Progress in Nanoscience"	State	2014-15	ISBN- 978-93-84916-65-7	SPPU, Pune	Samarth Group of Institutions college of Engineering	



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4	Gulve A. R.	Animal systematics & Diversity - IV & Applied Zoology - II	Success Publications Text				2014-15	ISBN - 978-93 5158-121- 5	SPPU, Pune	Success	
5	Jadhav P.G.	Numerical Methods and Its Application	Savitribai Phule Pune University...Text Book				2014-15		SPPU, Pune	Pune University	
6	Kanvade M.S.		M Commrece & its impact on Consumer Market Page No- 18-22	National Seminar on "Role Of Brics Banking in International tred & rural Development."	National Seminar on "Role Of Brics Banking in International tred & rural Development."	National	2014-15	ISBN 978-93- 84916-89-3	SPPU, Pune	B.D. Kale College, Ghodegaon	
7	Rahangdale S.S	A Text Book of Taxonomy of Angiosperm and Plant Ecology Vision Publications, Pune. 2014					2014-15	978-93-5016-269-9	SPPU, Pune	Vision	www.visionpune.com
8	Rahangdale S.S	A Text Book of Plant Physiology					2014-15	978-93-5016-270-5	SPPU, Pune	Vision	www.visionpune.com
9	Rahangdale S.S	A Text Book of Plant Biotechnology					2014-15	978-93-5016-___-	SPPU, Pune	Vision	www.visionpune.com
10	Suryawanshi A.D.		"Study of Possibility of Determination of Medicinal and Food Values of Plants by Synchronous Luminescence Spectroscopy" of PP.113-120.	National Conference on Medical Applications of Pulse Laser and Diagnostic Techniques 27-28 Jan 2015.	National Conference on Medical Applications of Pulse Laser and Diagnostic Techniques 27-28 Jan 2015.	National	2014-15	[ISBN-978-81-930536-3-8]	SPPU, Pune	Dr. D.P. Garud & Dr. R.S. Ramshetti	
11	Suryawanshi A.D.		"Ureteroscopy With Laser Lithotripsy" PP.171-174.	National Conference on Medical Applications of Pulse Laser and Diagnostic Techniques 27-28 Jan 2015.	National Conference on Medical Applications of Pulse Laser and Diagnostic Techniques 27-28 Jan 2015.	National	2014-15	[ISBN-978-81-930536-3-8]	SPPU, Pune	Dr. D.P. Garud & Dr. R.S. Ramshetti	




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12	Suryawanshi A.D.		Basic Principles of Laser and its Applications in Defence". PP.84-91..	National Conference on Medical Applications of Pulse Laser and Diagnostic Techniques 27-28 Jan 2015.	National Conference on Medical Applications of Pulse Laser and Diagnostic Techniques 27-28 Jan 2015.	National	2014-15	[ISBN-978-81-930536-3-8]	SPPU, Pune	Dr. D.P. Garud & Dr. R.S. Ramshetti	
13	Suryawanshi A.D.		Synthesis of Ni-Cu-Zn Ferrite by Sol-Gel Autocombustion Method" on March 9-11, 2015.	International conference on Functional Materials @ Nanoscale: Concerns and Challenges (ICFMNCC-2015)	International conference on Functional Materials @ Nanoscale: Concerns and Challenges (ICFMNCC-2015)	International	2014-15	[ISBN-978-81-930740-0-8]	SPPU, Pune	L.S. Matkar	
14	Bhise R.B.	Practical Physics TYBSc (Physics)					2015-16	ISBN935164759-5	SPPU, Pune		
15	Bhise R.B.	TYBSc (Physics) PH-346(k) Nirali Prakashan					2015-16		SPPU, Pune		
16	Borkar K.N.		Speech act analysis of Kamala Das's 'That Woman' Page277-280	National seminar on Recent Trends in English Studies in India	National seminar on Recent Trends in English Studies in India	National	2015-16	ISBN:978-81-930245-7-6	SPPU, Pune		
17	Kadam S.S.		An efficient way for synthesis of 5-substituted-1,3,4-Thidiazole-2-amine from 2,3,di-benzonitrile and it's Derivatives.	National Conference on Application of Synthetic methods in drug designing.	National Conference on Application of Synthetic methods in drug designing.	National	2015-16	978-93-84659-15-8	SPPU, Pune	Samarth Group of Institutions college of Engineering	
18	Kadam S.S.		SAR:Synthesis of some novel 2-Amino-5-(2-fluro and 2,3-di fluro phenyl)1,3,4-thidiazole Derivatives as Anticancer Compound	International Conference on Herbal and Synthetic Drug Studies 07-09 Jan-2016	International Conference on Herbal and Synthetic Drug Studies 07-09 Jan-2016	International	2015-16		SPPU, Pune		
19	Kadam S.S.		Synthesis of 5-para-Tolyl-1,3,4-Thidiazole-2-Amine and Their Derivatives	National Conference on Material Advances For Better Future (16-17 Jan.16)	National Conference on Material Advances For Better Future (16-17 Jan.16)	National	2015-16		SPPU, Pune	S.N. Arts, DGM commerce and V.N.S. science college, sangam	




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20	Kadam S.S.		Antimicrobial Activity and SAR study of synthesized derivatives of 2,5-disubstituted 1,3,4-thiazole	International Conference on Recent Trends in Chemical and Environmental Sciences(12-13 Feb.2016)	International Conference on Recent Trends in Chemical and Environmental Sciences(12-13 Feb.2016)	International	2015-16		SPPU, Pune	HRM college, Khed	
21	Kadam S.S.		Synthesis, Characterisation and Antimicrobial Activity of 5-aryl-1, 3, 4-Oxadiazole-2-amine.	National Conference on Advances in Organic Chemistry	National Conference on Advances in Organic Chemistry	National	2015-16	818836053-8	SPPU, Pune	Poona College of Arts, Science and Commerce College	
22	Rahangdale S.S		Ecofriendly synthesis of silver Nanoparticles from <i>Mundulea sericea</i> (Willd.) A. Chev: Its Antifungal Activity	Proceeding of National Conference held at A.W. College, Otur	Proceeding of National Conference held at A.W. College, Otur	National	2015-16	ISBN 9/8-93-5158-581-7 --	SPPU, Pune	success publication	www.cart91.com
23	Suryawanshi A.D		"Study of Structural, Optical and Solid State Properties of In2S3 Thin Films for Solar Cell Applications." PP.167-171.	National Conference on Advanced Materials and Applications (NCAM-2016) 4-5 Mar 2016.	National Conference on Advanced Materials and Applications (NCAM-2016) 4-5 Mar 2016.	National	2015-16	[ISBN-978-93-5235-011-7]	SPPU, Pune		
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44	Kadam S.S.		Virtual Screening of Raltegravir which was first HIV-1 Integrase Inhibitor	International Conference on Advances in Functional Materials(ICAFM 2018)	International Conference on Advances in Functional Materials(ICAFM 2018)	International	2017-18	2349-7203	SPPU, Pune		
45	Kadam S.S.		Computational Methods of Drug Designing and Docking studies of Synthesized Derivatives of 5-substituted-1,3,4-Thidiazole-2-amine	National Conference on Green Approach towards Environment and Chemical Sciences	National Conference on Green Approach towards Environment and Chemical Sciences	National	2017-18	2395-6011 online 2395-602x	SPPU, Pune	S.N. Arts, DGM commerce and V.N.S. science college,	



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46	Kadam S.S.		Molecular Modeling And Docking Study of 2,5-Disubstituted-1,3,4-Thiazole Derivatives and Their Docking Interactions with Lanosterol 14 α -Demethylase	National Conference on Recent Innovation in Chemical & Environmental Sciences(RICES-2018)	National Conference on Recent Innovation in Chemical & Environmental Sciences(RICES-2018)	National	2017-18	2319-6602	SPPU, Pune		
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49	Gulve A.R.		Perspectives on Virtual Animal Dissections as Alternatives: Green Approach to Biodiversity Conservation Page No – 192-194 International Journal of Scientific Research in Science and Technology	National Conference on Green Approach towards Environment and Chemical Science	National Conference on Green Approach towards Environment and Chemical Science	National	2017-18	Print ISSN: 2395-6011 Online ISSN : 2395-602X	SPPU, Pune		



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50	Gulve A.R.		Size dependent variation in the rate of oxygen consumption, ammonia excretion and O:N ratio of freshwater bivalve, <i>Indonaia caeruleus</i> from Yedgaon Dam during monsoon season (M.S.) India.	special issue on - Recent approaches in Environmental protection and sustainable Development	special issue on - Recent approaches in Environmental protection and sustainable Development	International	2017-18	ISSN : 2322-0015	SPPU, Pune	International Journal of Science and Engineering	
51	Suryawanshi A.D.		"Synthesis and Antimicrobial Screening of Metal Complexes of Ligand having Dicarboxyl Groups"	A proceedings of International Conference on Nanotechnology for Human Welfare	A proceedings of International Conference on Nanotechnology for Human Welfare	International	2017-18	ISBN 978-93-87317-98-7	SPPU, Pune		
52	Tube B.G.		Profiling Indian Consumer based on Acceptance of Mobile marketing	Inter National conference in recent trends in commerce and management	Inter National conference in recent trends in commerce and management	International	2017-18	ISSN 2278-5655	SPPU, Pune	Aarhat Multidisciplinary International education research journal (AMIERJ)	
53	Tube B.G.		Status of Agricultural marketing in India	National conference in recent trends in commerce and management	National conference in recent trends in commerce and management	National	2017-18	ISSN 2319-9318	SPPU, Pune	Harshvardhan Publication	www.Vidyawarta.com
54	Gulve A.B.		Size specific variation in the rate of oxygen consumption, ammonia excretion and o:n ratio of freshwater bivalve, <i>Indonaia caeruleus</i> from Gajanansagar, Yedgaon (Pune) during winter season (M.S.) India.	FLORA AND FAUNA 2018 Vol.24 No.1 (Special Issue) PP 90-98	Pune University	2018-19	2018-19	ISSN 2456-9364 (Online) ISSN 0991-6920 (Print)	SPPU, Pune		




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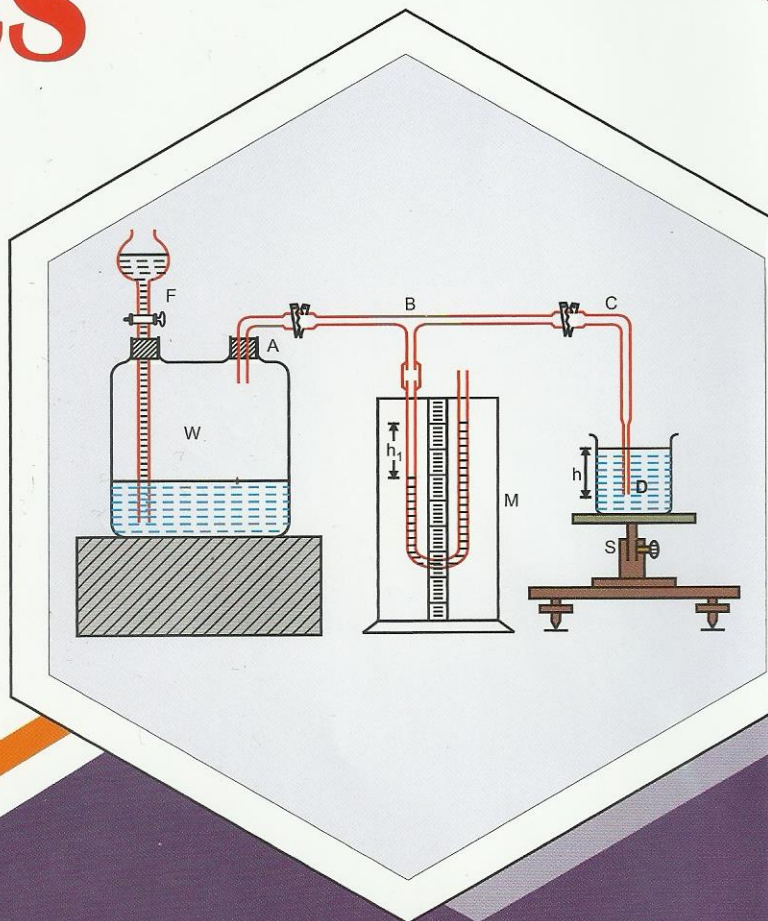
55	Rahangdale S.S.	Biodiversity of Durgawadi Plateaus Pg. 160			State	2018-19	2018-19	ISBN 978-93-5016-432-7	Department of Forest, Government of Maharashtra	Vision Publication: National	www.visionpune.com
56	Waghole A.R.		Dnyaneshwar Gramonnati Mandal: Suvarna Mahostavi Varshachi Khadtar Vatchal Page no:- 0171-0175	State level workshop on local history writing	State level workshop on local history writing	State	2018-19	ISSN-2319-9318	SPPU, Pune	Harshvardhan Publication	www.Vidyawarta.com
57	Gorde V.S.		Historical study of shri Ganesh Temple	State level workshop on local history writing	State level workshop on local history writing	State	2018-19	ISSN-2319-9318	SPPU, Pune	Harshvardhan Publication	www.Vidyawarta.com




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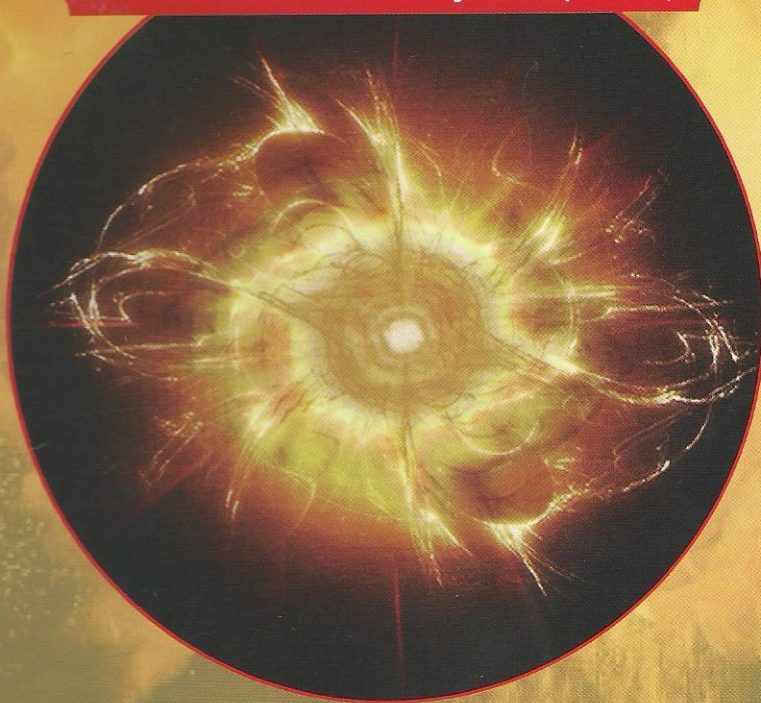
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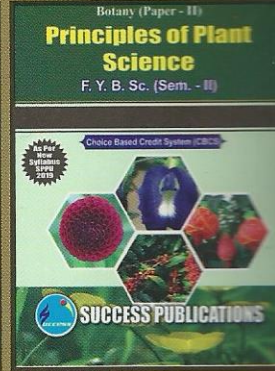
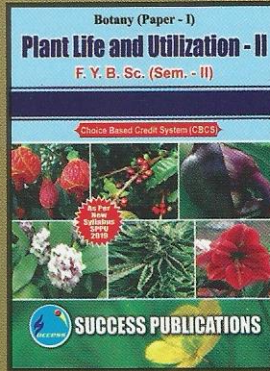
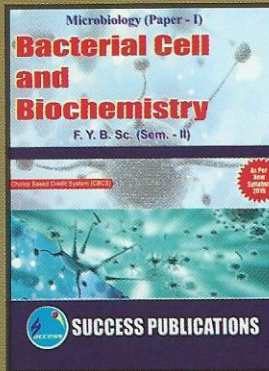
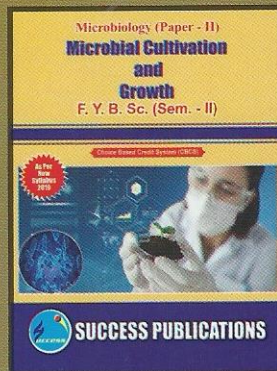
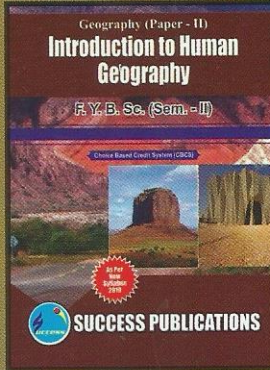
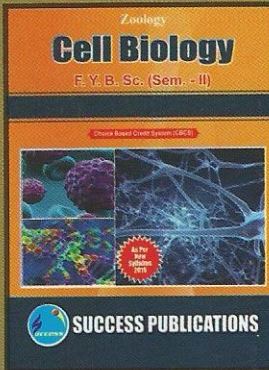
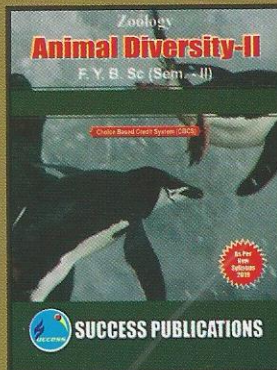
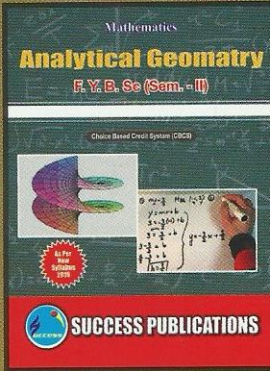
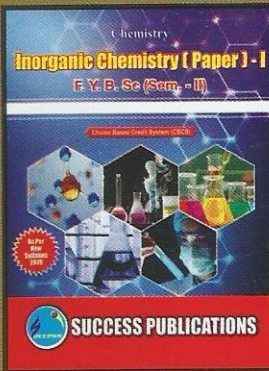
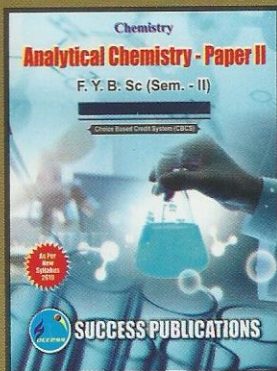


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F. Y. B. Sc. Physics Paper-I (Semester-II)**Heat and Thermodynamics****(PHY-121)**

Unit	Topic	Page No.
1	Fundamentals of Thermodynamics	1.1 to 1.27
	1.1 Concept of thermodynamic state 1.2 Equation of state 1.3 Van der Waal's equation of state 1.4 Thermal equilibrium 1.5 Zeroth law of thermodynamics 1.6 Thermodynamic processes: 1.7 Indicator diagram 1.8 Work done during isothermal change 1.9 Adiabatic relations 1.10 Work done during adiabatic change 1.11 Internal energy: Internal energy as state function 1.12 First law of thermodynamics 1.13 Reversible and Irreversible changes Problems	
2	Applied Thermodynamics	2.1 to 2.16
	2.1 Conversion of Heat into Work and its Converse 2.2 Second Law of Thermodynamics 2.3 Concept of Entropy 2.4 Temperature-Entropy Diagram 2.5 T-dS Equation 2.6 Clausius-Clapeyron Latent Heat Equations Problems	

	<p>3.1 Introduction</p> <p>3.2 Heat Engines</p> <p>3.2.1 Carnot's heat engine: cycle and efficiency</p> <p>3.2.2 Otto heat engine: cycle and efficiency</p> <p>3.2.3 Diesel heat engine: cycle and efficiency</p> <p>3.3 Refrigerators:</p> <p>3.3.1 General principle and coefficient of performance of refrigerator</p> <p>3.3.2 Simple structure of Vapour compression refrigerator</p> <p>3.4 Air Conditioning: Principle and its applications</p> <p>Problems.</p>	
4.	Thermometry	4.1to 4.19
	<p>4.1 Introduction</p> <p>4.2 Concept of heat and temperature</p> <p>4.3 Principle of thermometry</p> <p>4.4 Temperature scales and inter-conversions</p> <p>4.5 Principle, Construction and Working:</p> <p>4.5.1 Liquid Thermometers</p> <p>4.5.2 Gas Filled Thermometers</p> <p>4.5.3 Bimetallic Thermometers</p> <p>4.5.4 Platinum resistance Thermometers</p> <p>4.5.5 Thermocouple</p> <p>Problems</p>	



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Physics (Paper - II)

Electricity and Magnetism

F. Y. B. Sc. (Sem. - II)

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- ◆ Dr. S. V. Dhanwate
- ◆ Dr. V. D. Kulkarni

- ◆ Dr. P. N. Shelke
- ◆ Dr. R. A. Pawar
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1. Electrostatics**(08-Lectures)**

1.1 Revision of Coulomb's law:

1.1.1 Statement

1.1.2 Variation of forces with distances

1.2 Superposition principle:

1.2.1 Statement

1.2.2 Explanation with illustration

1.3 Energy of system of charges

1.4 Concept of electric field

1.4.1 Due to point charge

1.4.2 Due to group charges

1.5 Concept of electric flux

1.6 Gauss's law in electrostatics

Problems

2. Dielectrics**(08-Lectures)**

2.1 Introduction to dielectric materials

2.2 Electric Dipole

2.2.1 Electric dipole

2.2.2 Dipole moment

2.3 Electric potential and intensity at any point due to dipole

2.4 Torque on a dipole placed in an electric field

2.5 Polar and non-polar molecules

2.6 Electric polarization of dielectric material

2.7 Gauss' law in dielectric

2.8 Electric vectors and its relation

Problems

3. Magnetization**(07-Lectures)**

3.1 Introduction to Magnetization

3.2 Magnetic materials

3.3 Types of Magnetic Materials

3.3.1 Diamagnetic materials

3.3.2 Paramagnetic materials

3.3.3 Ferromagnetic materials

3.3.4 Antiferromagnetic materials

4. Magnetostatics (07-Lectures)

4.1 Introduction to magnetization,

4.2 Magnetic Induction and Intensity of magnetization

4.3 Biot-Savart's law:

4.3.1 Statement

4.3.2 Long straight conductor

4.3.3 Circular Coil

4.4 Ampere's circuital law:

4.4.1 Statement

4.4.2 Field of Solenoid

4.4.3 Field of Toroid

4.5 Gauss law for magnetism

Problems

5. Magnetic Properties of Materials (06-Lectures)

5.1 Definition

5.1.1 Magnetization (M),

5.1.2 Magnetic Intensity (H),

5.1.3 Magnetic Induction (B),

5.1.4 Magnetic Susceptibility

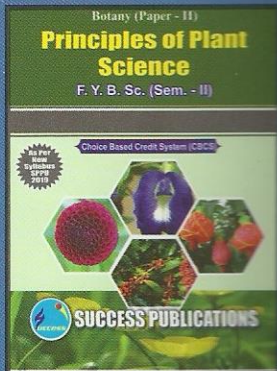
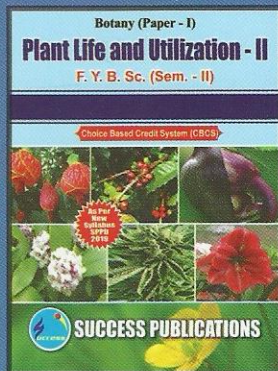
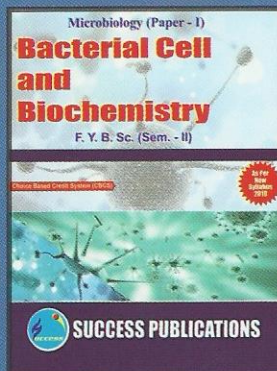
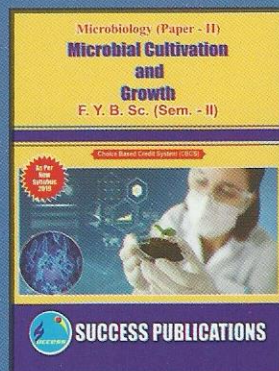
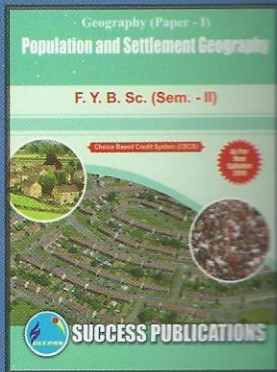
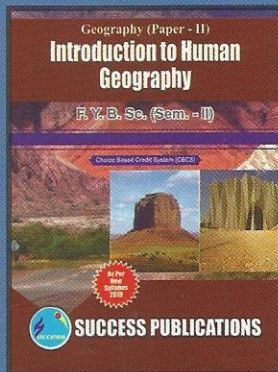
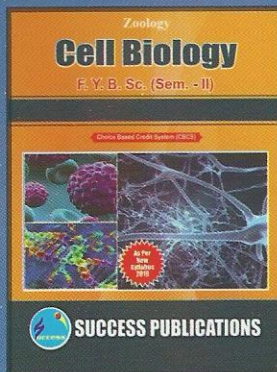
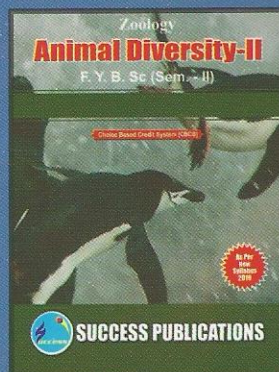
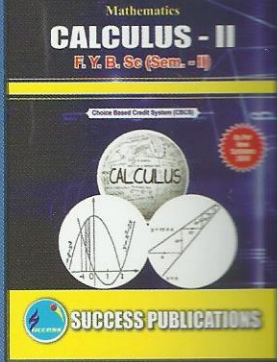
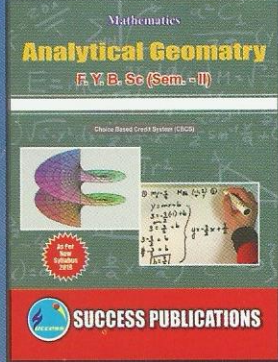
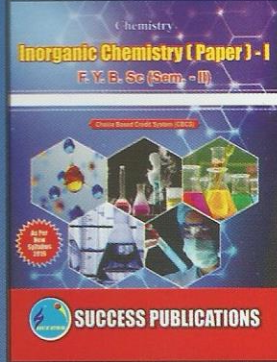
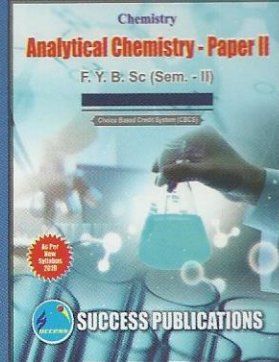
5.1.5 Magnetic Permeability

5.2 Relation between B, M and H

5.3 Hysteresis and Hysteresis Curve

5.4 Ferrite materials and its Applications

Problems



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Mechanics and Properties of Matter

F. Y. B. Sc. (Sem. - I)

- ◆ Dr. R. B. Bhise
- ◆ Dr. S. V. Dhanwate
- ◆ Dr. V. D. Kulkarni

- ◆ Dr. R. A. Pawar
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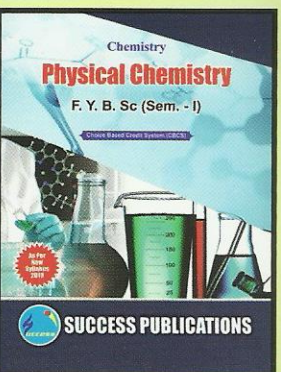
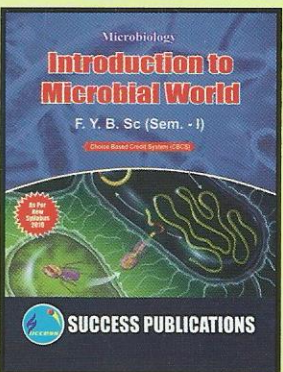
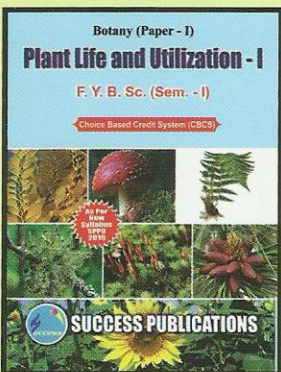
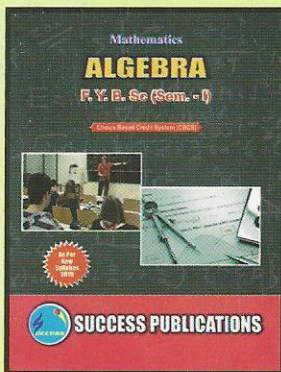
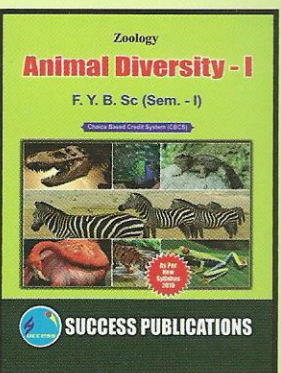
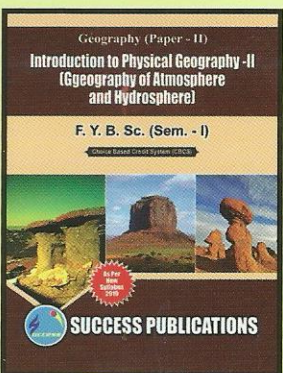
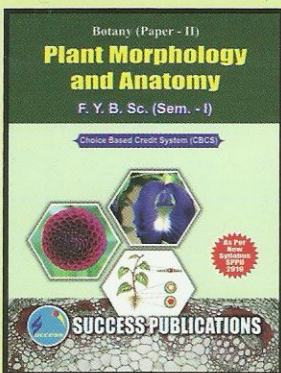
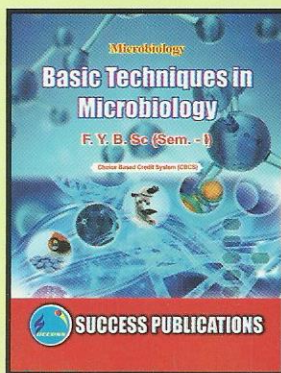
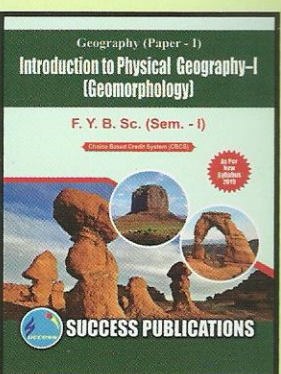
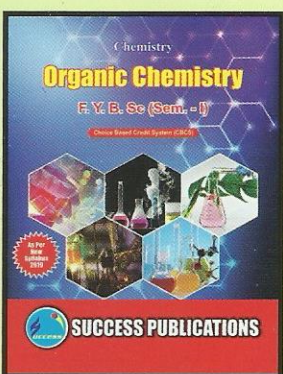
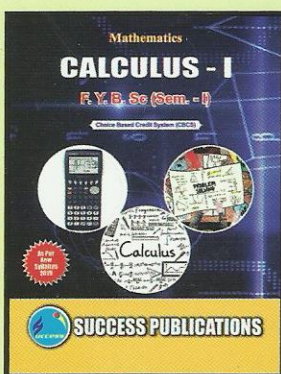
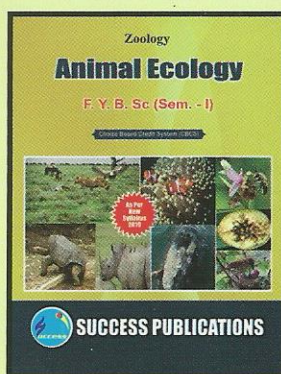
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Syllabus

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Physics Paper-I (Semester-I) Mechanics and Properties of Matter

Chap. No.	Name	Lecture No.
1	Motion Introduction to motion, Types of motion, Displacement, Velocity, Acceleration, Inertia, Newton's laws of motion with their explanations, Various types of forces in nature, Frames of reference (Inertial and Non inertial), Laws of motion and it's real life applications, Problems.	09
2	Work and Energy: Kinetic energy, Work Energy Theorem, Work done with constant force, Work done with varying force (spring force), Conservative and Non conservative forces, Potential energy, Law of energy conservation, Gravitational potential energy, Problems	07
3	Fluid Mechanics Concept of viscous force and viscosity, Coefficient of viscosity, Steady and Turbulent flow, Reynolds number, Equation of continuity, Bernoulli's Principle, Applications of Bernoulli's Principle (Ventury Meter, PitotTube), Applications of viscous fluids, Problems.	08
4	Properties of Matter Surface tension, Angle of contact, Factors affecting surface tension, Jaeger's method for determination of surface tension, Applications of surface tension. Stress and Strain, Hook's law and Coefficient of elasticity, Young's modulus, Bulk modulus, Modulus of rigidity, Work done during longitudinal strain, Volume strain, Shearing strain, Poisson's ratio, Relation between three elastic moduli, (Y , η , K), Applications of elasticity, Problems.	12



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Physics (Paper - II)

Physics Principles and Applications

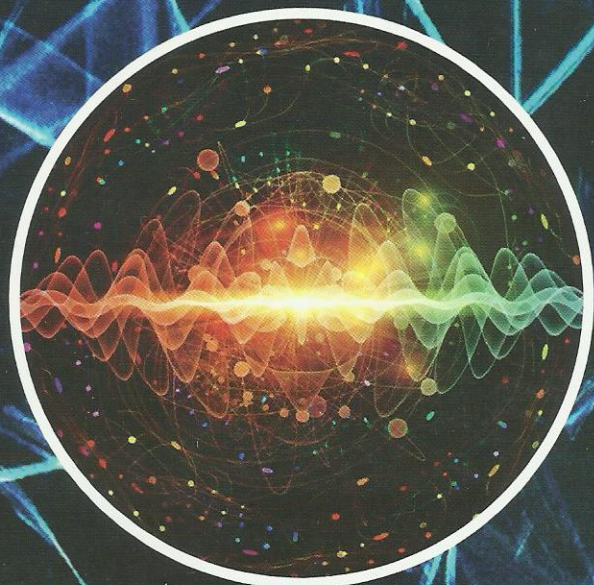
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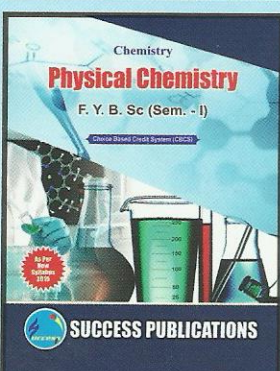
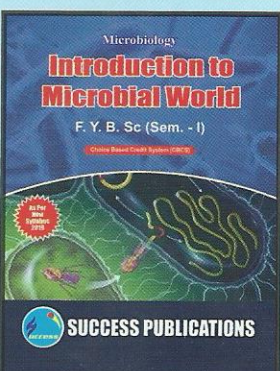
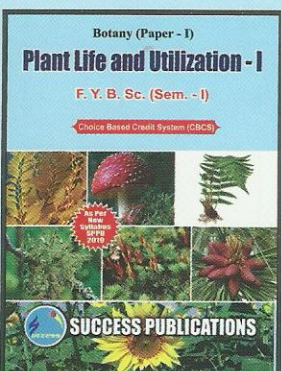
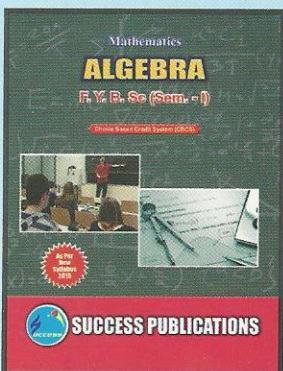
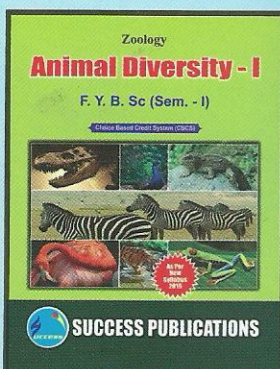
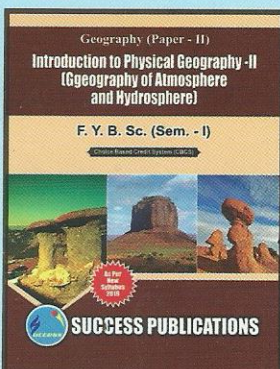
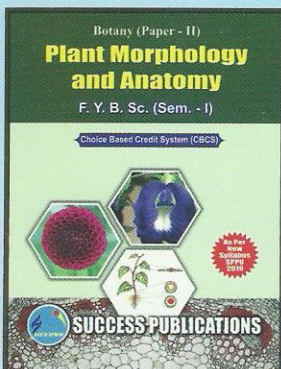
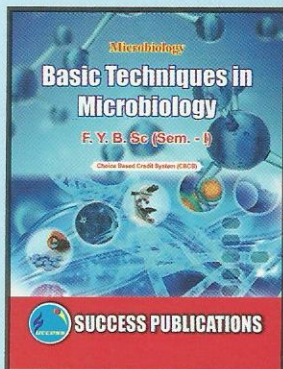
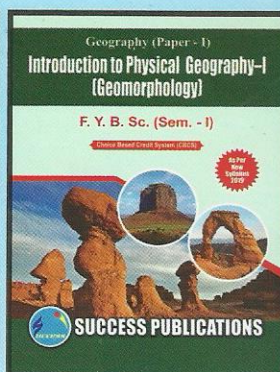
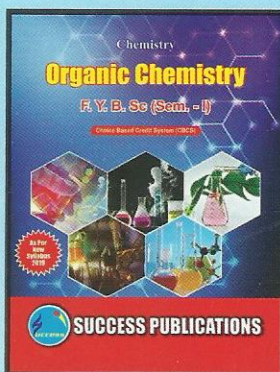
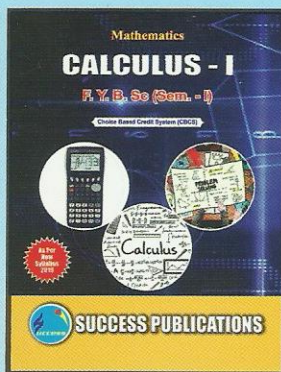
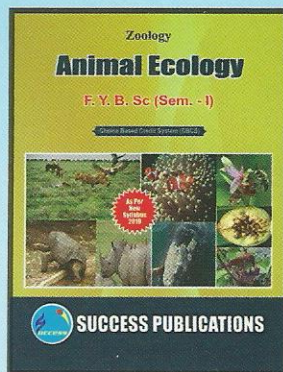
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Physics Paper-II (Semester-I)

Physics Principles and Applications

Chap. No.	Name	Lecture No.
1	Physics of Atoms 1.1 Introduction to Atom 1.2 Atomic Models: 1.2.1 Thomson's Atomic Model 1.2.2 Rutherford's Atomic Model 1.2.3 Bohr's Atomic Model 1.3 Atomic Spectra: 1.3.1 Emission line Spectrum 1.3.2 Absorption line spectrum 1.3.3 Uses of Atomic Spectra 1.4 Classical planetary model of Hydrogen Atom 1.5 The Bohr Theory of the Hydrogen Atom 1.6 The Hydrogen Spectrum 1.7 Frank-Hertz experiment Problems	08
2	LASERS and Its Applications: 2.1 Introduction to LASERS 2.2 Basic Principle of Lasers: Three Processes 2.3 Characteristics of Lasers: brief explanation 2.4 Boltzmann Distribution Law 2.5 Population Inversion and Pumping 2.6 Types of Lasers: 2.6.1 He-Ne Laser 2.6.2 Ruby Laser 2.7 Applications of Lasers Problems	07

3	Physics of Molecules 3.1 Introduction to Bonding Mechanisms 3.2 Forces between Atoms 3.3 Types of Bonding: 3.3.1 Ionic Bonds 3.3.2 Covalent Bonds 3.3.3 van der Waal's Bonds 3.3.4 Hydrogen Bond 3.3.5 Metallic Bond 3.4 Rotation energy levels of a diatomic molecule 3.5 Vibration energy levels of a diatomic molecule Problems	08
4	Sources of Electromagnetic Waves 4.1 Introduction to Electromagnetic Waves: Historical Perspective 4.2 General properties of Electromagnetic radiations 4.3 Electromagnetic spectrums and its sources 4.4 Production of electromagnetic waves: Hertz experiment 4.5 Plank's hypothesis of Photons 4.6 Applications of various waves in electromagnetic spectrum Problems	06
5	Applications of Electromagnetic Waves 5.1 Introduction 5.2 Microwave oven 5.3 RADAR 5.4 Pyroelectric thermometer 5.5 X-ray radiography 5.6 CT Scan 5.7 Solar cell and its types Problems	07



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Physics Practical

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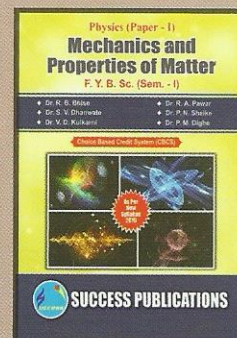
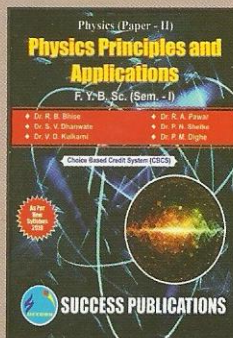
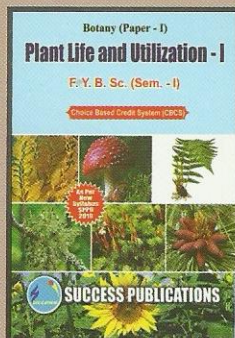
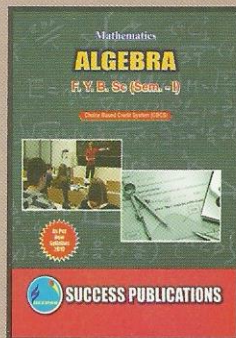
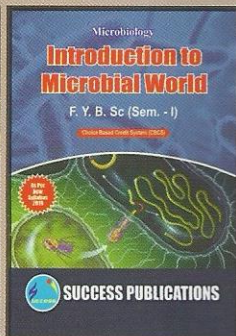
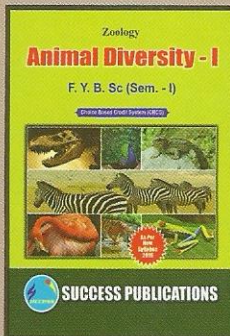
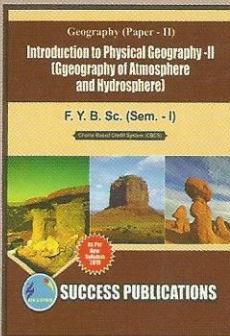
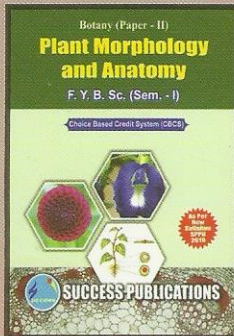
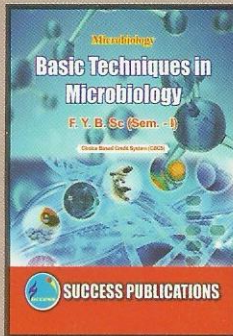
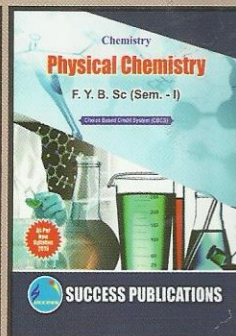
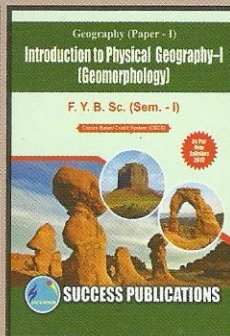
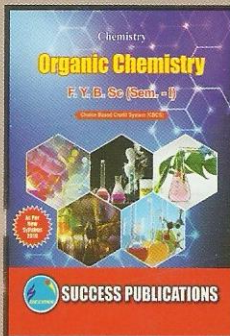
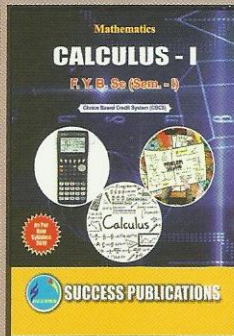
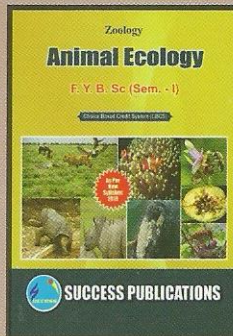
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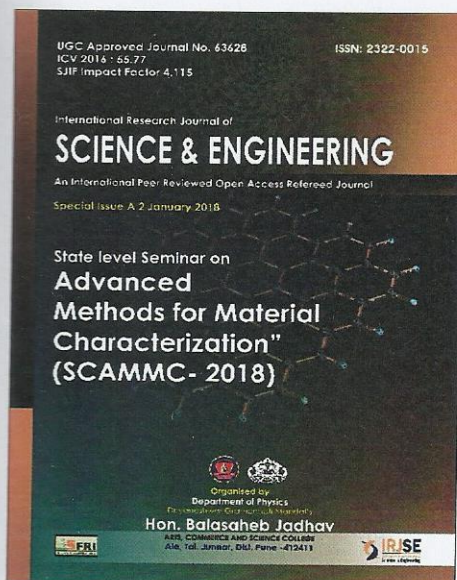


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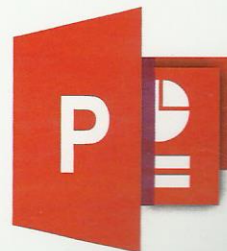
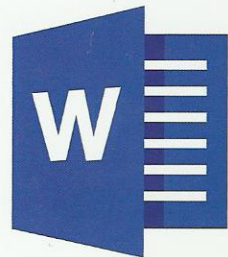
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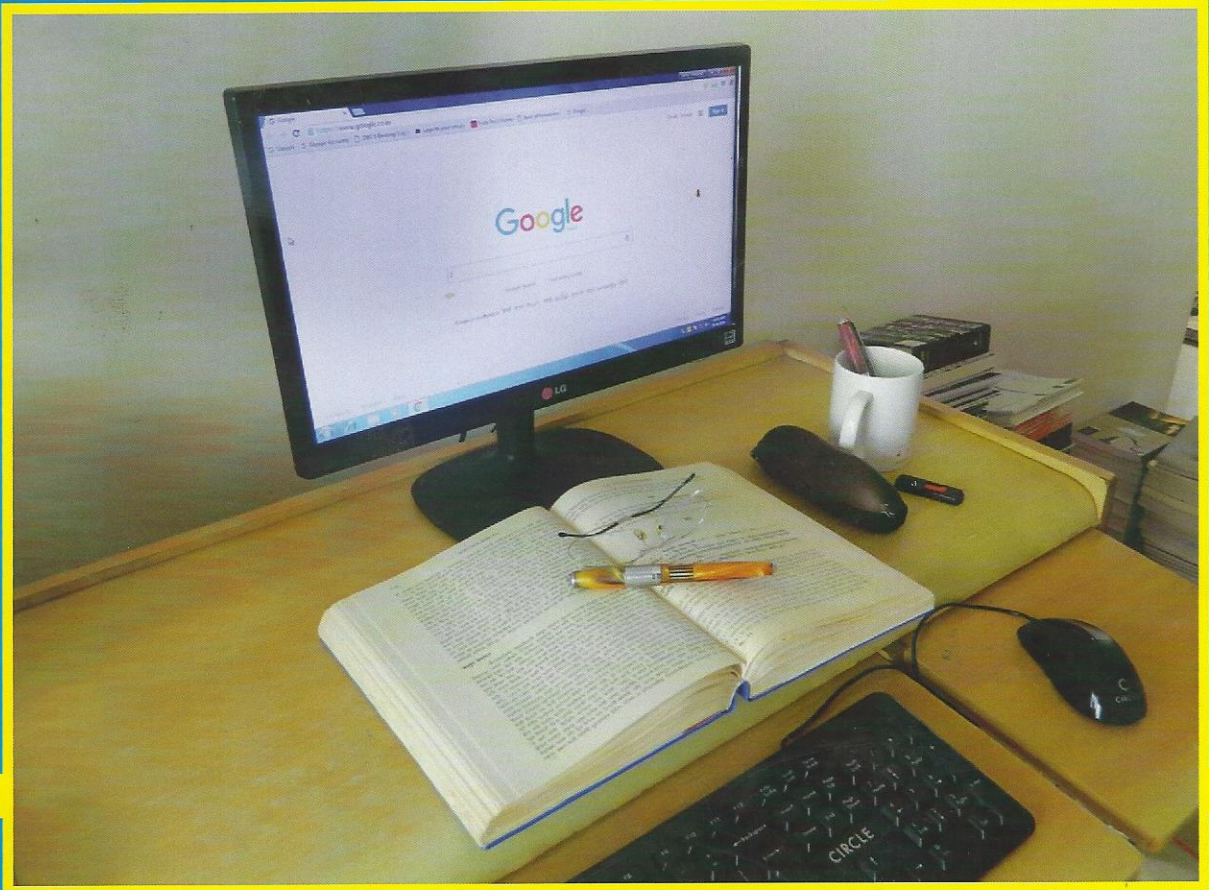
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Introduction to Research Methodology

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- Characteristics of methods and their implications in research area

Chap-III Development of research proposal

- Research proposal and its elements
- Formulation of research problem-criteria of sources and definition
- Development of objectives and characteristics of objectivities
- Development hypotheses and applications

Chap-IV Methods of data collection

- Concept of sampling and other concepts related to sampling
- Probability and non-probability samples, their characteristics and implications
- Tools of data collections, their types, attributes and uses
- Redesigning, research tools-like questionnaire, opinnaere, observation, interviews, scales and tests etc

Chap-V Methods of data analysis

- Analysis of qualitative data based on various tools
- Analysis of quantitative data and it presentation with tables, graphs etc
- Statistical tools and techniques of data analysis-measures of central tendency, dispersion
- Decision making with hypothesis testing through parametric and non parametric tests
- Validity and delimitations of research findings

Chap-VI Report writing and evaluations

- Principles of report writing and guide lines according to style manuals
- Writing and presentation of preliminary, main body and reference section of report
- Evaluation of research report



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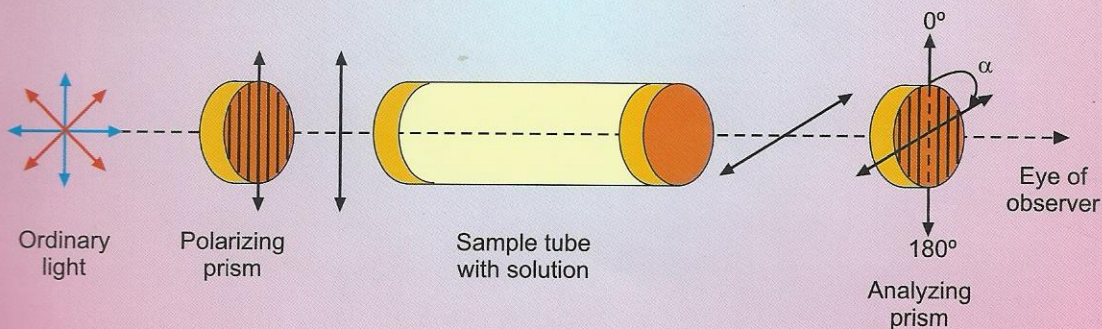
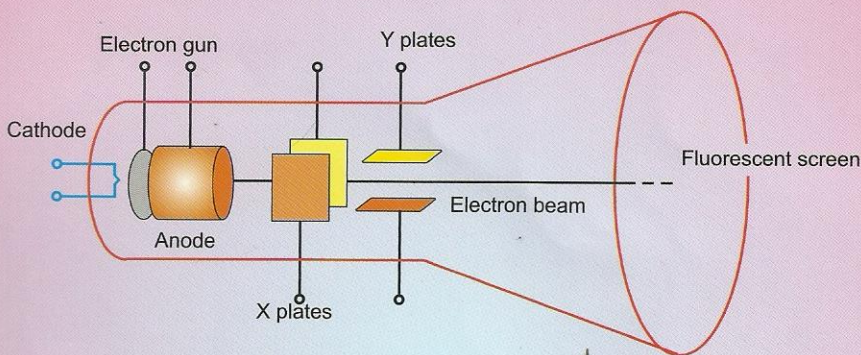
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OTHER ACTIVITY

L. Computer Demo





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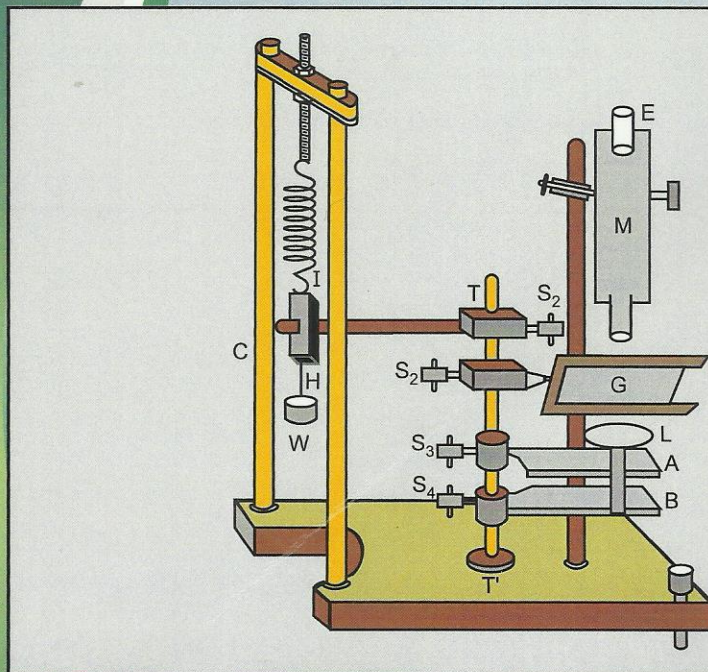
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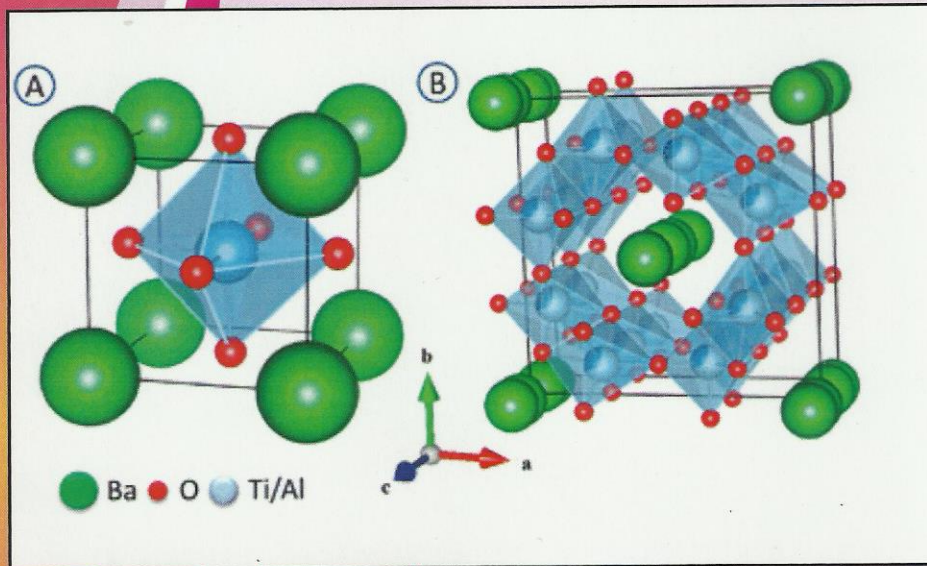
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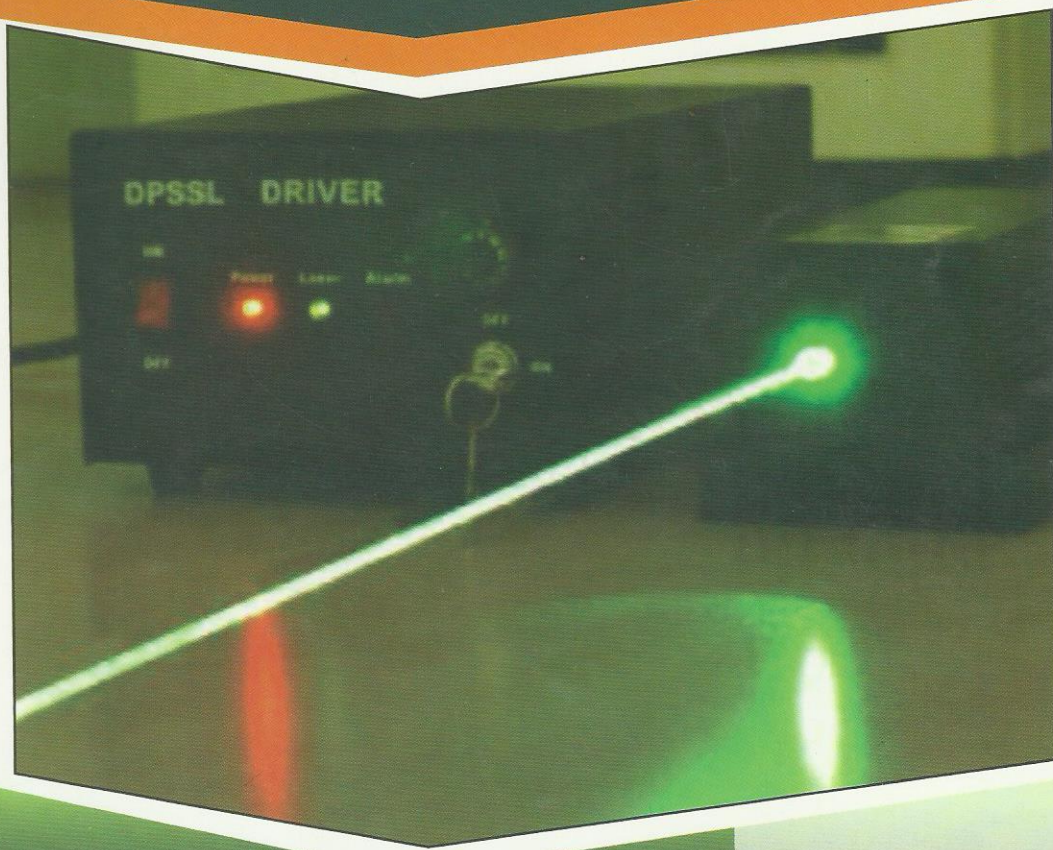
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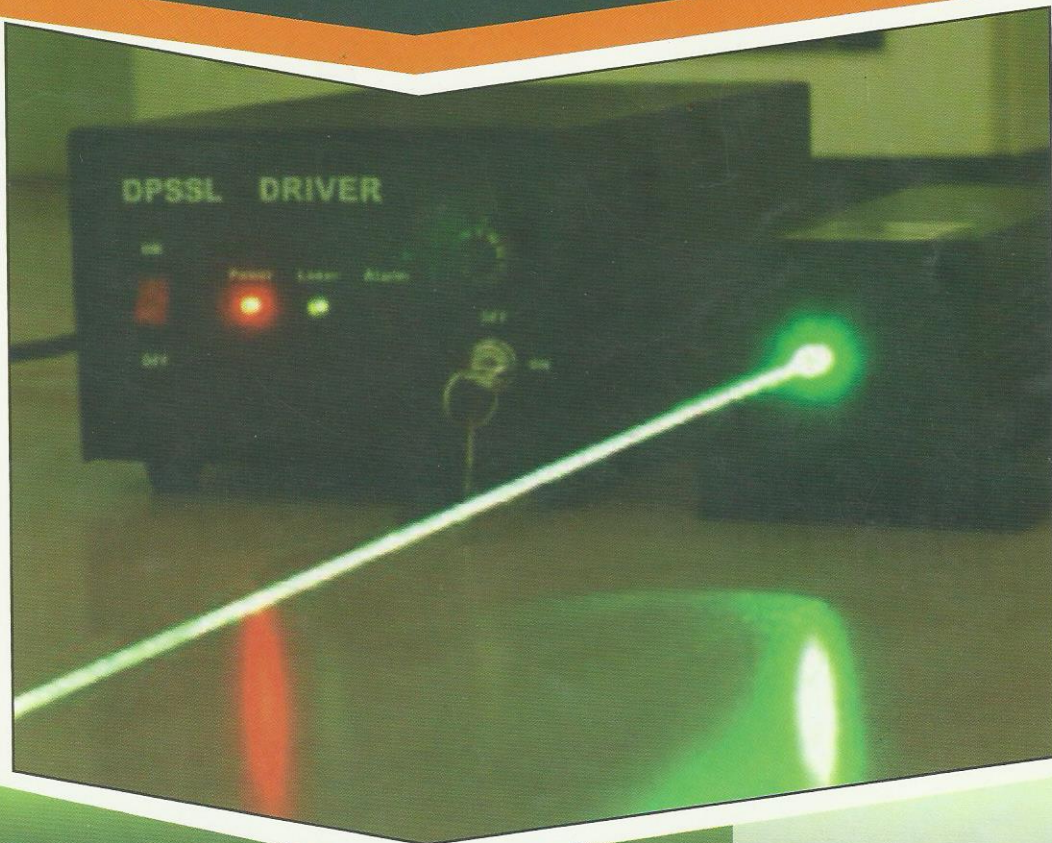
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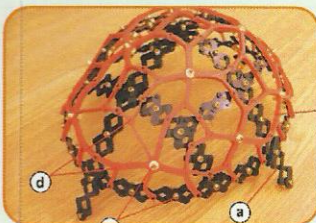
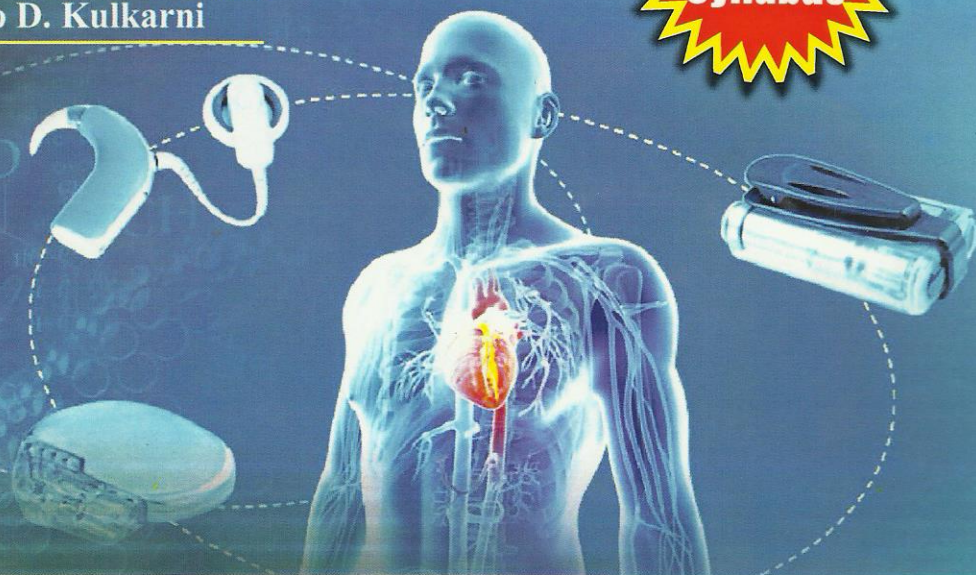
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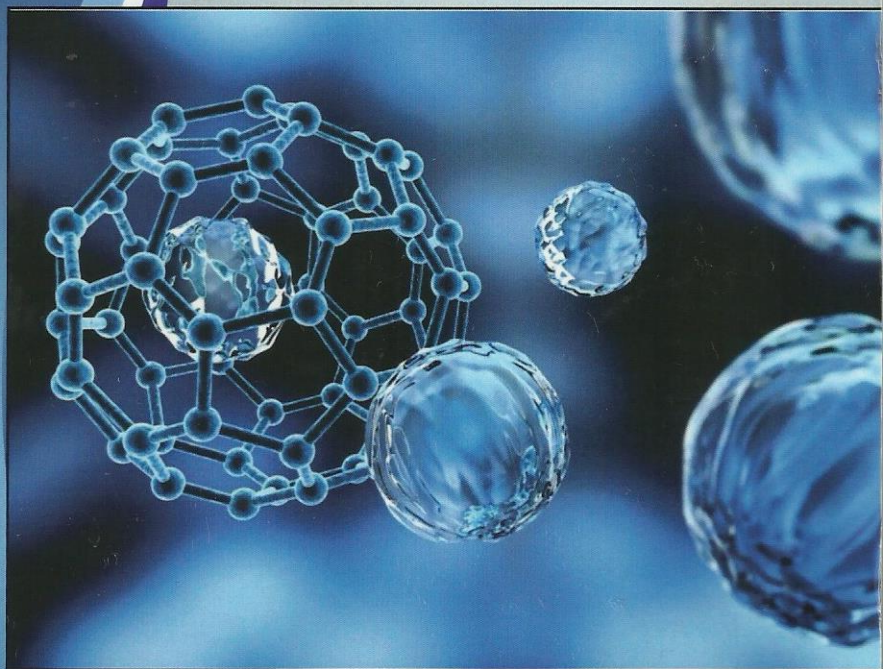
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- (a) Introduction to nanosize materials and its structures
- (b) Brief history of nanomaterials
- (c) Challenges in nanotechnology
- (d) Significance of nanosizematerials and its properties
- (e) Classification of nanostructured materials

2. Methods of Synthesis of Nanomaterials: (12 L)

- (a) Bottom-up and Top-down approaches
- (b) Physical methods: High energy ball milling, Physical vapour deposition, Ionizedcluster beam deposition, Sputter deposition, Ultrasonic spray pyrolysis etc.
- (c) Chemical methods: Colloidal method, Co-precipitation and sol-gel method
- (d) Hybrid method: Electrochemical and chemical vapour deposition.

3. Characterization Techniques: (11 L)

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4. Properties of Nanomaterials: (05 L)

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- (b) Electricalproperty,
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- (e) Optical property,
- (f) Solubility and Melting point.

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6. Applications: (04 L)

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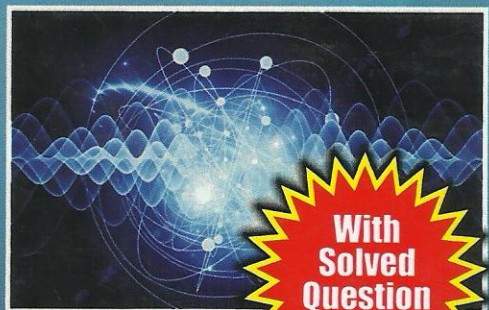
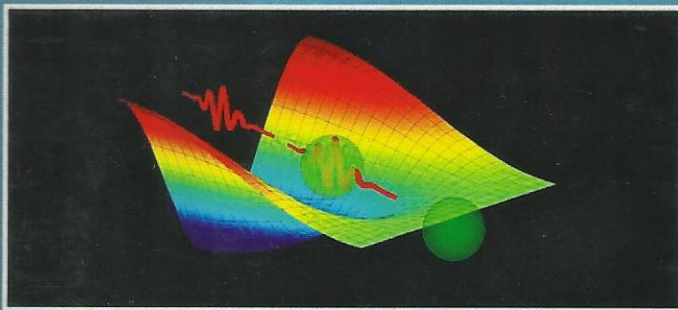
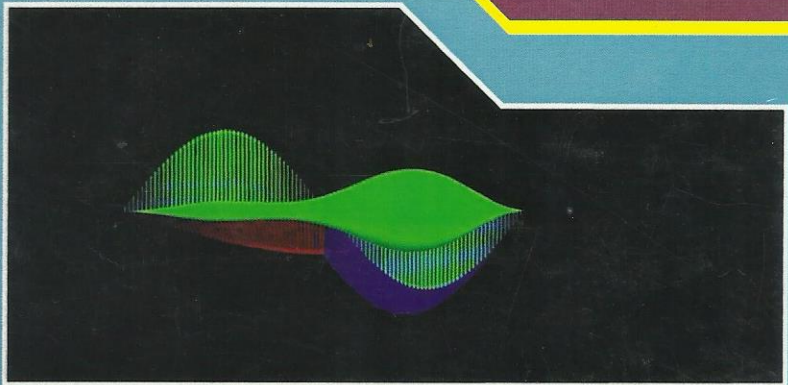
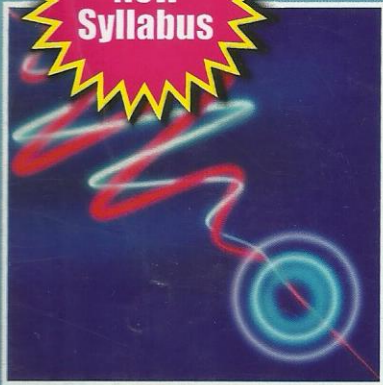
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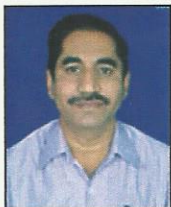
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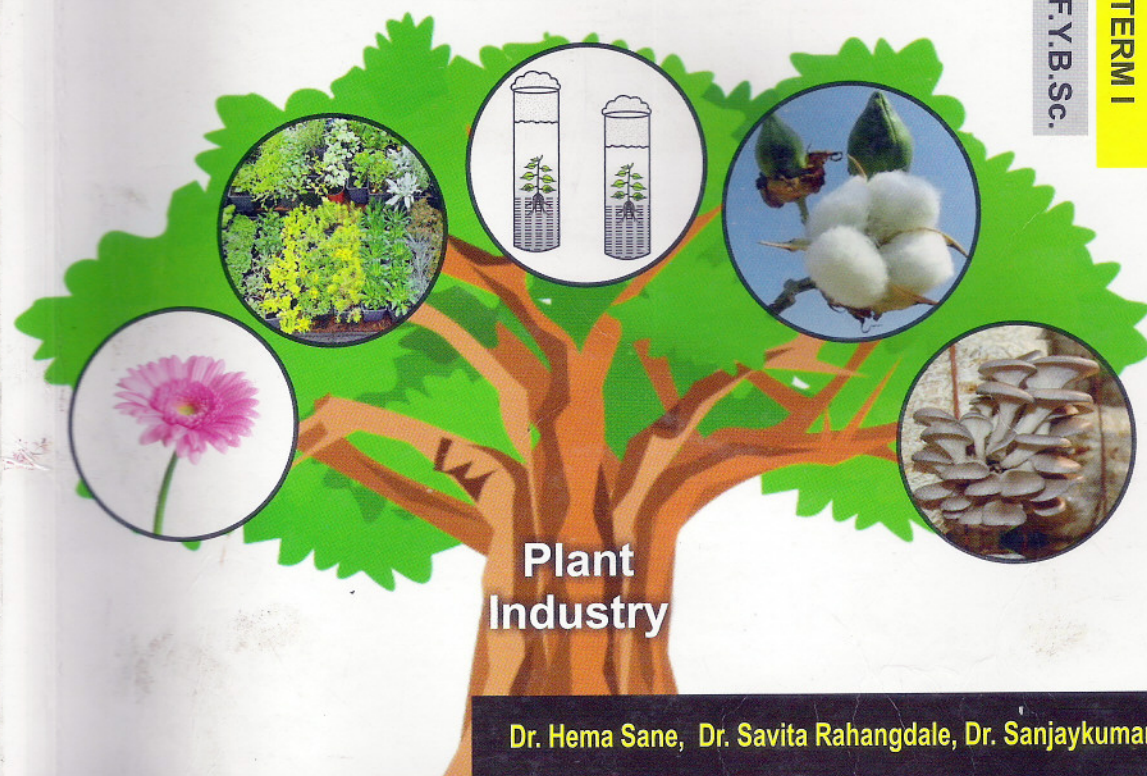
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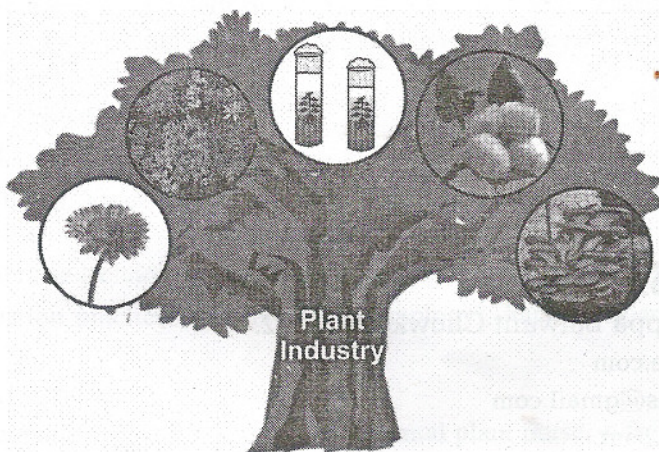
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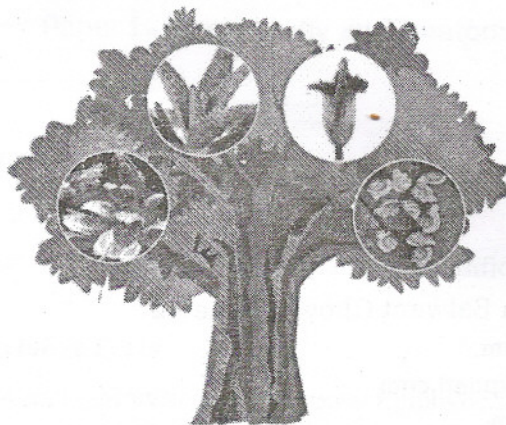
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F.Y.B.Sc. (Botany), Paper I - Term I

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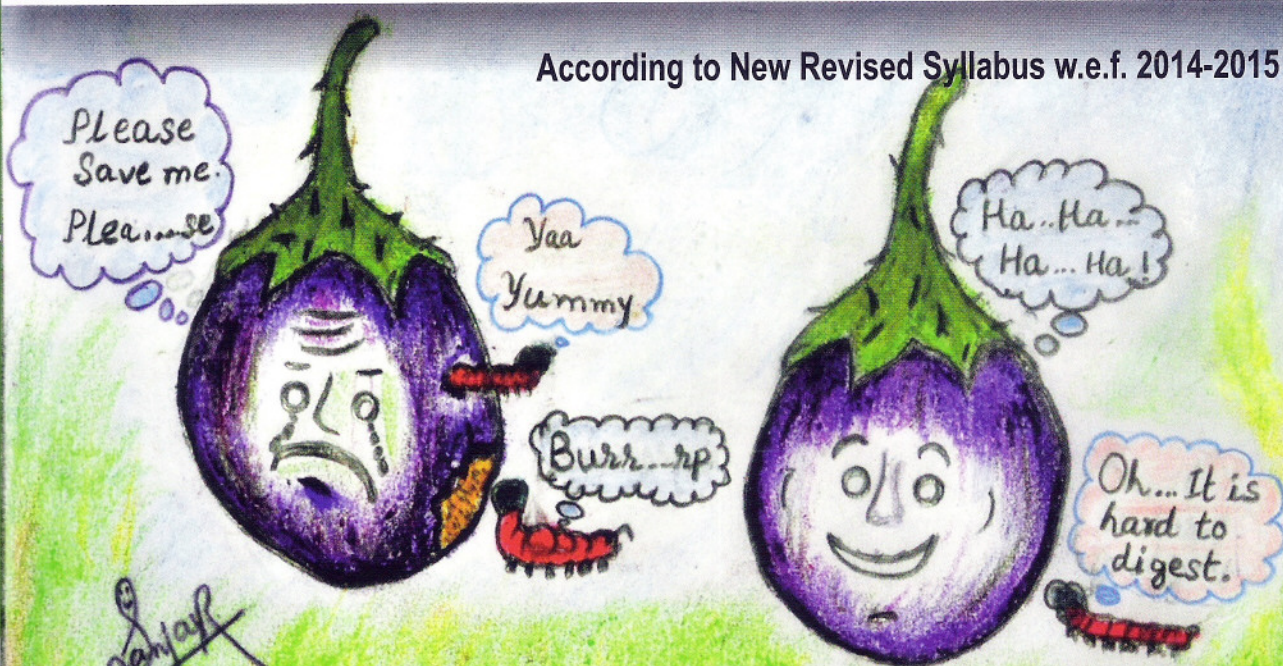
S.Y. B.Sc. Botany Paper II Sem II

A Text Book of

Plant Biotechnology

Dr. Savita Rahangdale, Dr. Sanjaykumar Rahangdale

According to New Revised Syllabus w.e.f. 2014-2015



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S.Y.B.Sc. Botany

Paper II - Sem II

A Text Book of

Plant Biotechnology

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Cover story

The cover cartoon depicts advantage of genetically modified crops.
Cartoon by Sanjaykumar Rahangdale

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A Text Book of

Taxonomy of Angiosperms & Plant Ecology

Dr. Hema Sane, Dr. Savita Rahangdale, Dr. Sanjaykumar Rahangdale

Dr. S. R. Rahangdale

According to New Revised Syllabus w.e.f. 2014-2015

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Taxonomy of Angiosperms & Plant Ecology

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International Biodiversity Decade 2011-2020
International Year of Forestry 2011



***Biodiversity of Critically Endangered
Taxon CEROPEGIA L. in
Junnar Forest Division***



Wildlife Week 2011

**Junnar Forest Division, Junnar (Pune)
Government of Maharashtra**

Biodiversity Series - I

This decade 2011 to 2020 has been declared as International Biodiversity Decade by the UNESCO after the celebrations of International Biodiversity Year 2010 and International Year of Forestry in 2011, for the conservation of the global biodiversity by various means, through all the related organizations and individuals. In this perspective, it is our sincere effort to publish this information booklet about the Diversity of critically endangered taxon, *Ceropegia* L. -Authors

The Junnar Forest Division has been one of the favourite areas for the tourists and Researchers since last three decades. The vertical rocky slopes and the floral and faunal diversity blooming and flourishing among the rough terrain have always attracted people.

When a Botanist travels in this area he always looks for one of the most beautiful and amazing plant species, the *Ceropegia mahabalei* Hemadri et. Ansari., locally known as 'Gavati Kharpudi'.

This area is a treasure house of the species of *Ceropegia*. Some of the species have developed and evolved in this area and still this process of evolution is going on. The evidences of the same could be seen if studied critically.

According to, the International Union for Conservation of Nature and Natural Resources (IUCN), species of this entire Genus are categorized as Endangered and Critically endangered. This genus belongs to the Family Asclepiadaceae Medikus ex. Borkh. (Calotropis family). In the local language different species are known by different names such as, 'Kharpudi', 'Gavati Kharpudi', 'Tanachi Kharpudi', 'Hirvi Kharpudi', 'Pandhari Kharpudi', 'Hanumanachi Gada', 'Menache Karanje', 'Kandil Pushpa', etc.

Diversity in the Genus *Ceropegia* L.

World	:	170 Species
India	:	47 Species
Maharashtra State	:	21 Species
Junnar Forest Division	:	13 species, 4 varieties.

It is noteworthy that, almost 50% species reported from Maharashtra are found in the Junnar Forest Division and therefore, it is our duty to protect and conserve this diversity; for which contribution from all is necessary. Let's take an oath, 'To protect this invaluable resource and beauty for our forthcoming generations.'

Botanical Name:

Ceropegia mahabalei Hemadri *et. Ansari* var. **mahabalei**

Local Name : Gavati Kharpudi

Locality : Ralegan, Dhak, Sitewadi

Habitat : Grassy slopes

Features : Erect, upto 3 ft, hairy, Leaves sessile, linear, flowers long upto 9 cm, beaked, greenish brown coloured.

Fls. & Fruits : July to Sept.

Status : Critically endangered, Endemic to MS



Botanical Name:

Ceropegia mahabalei Hemadri *et. Ansari* var. **hemalatae** Rahangdale *et. Rahangdale*

Local Name: Gavati Kharpudi

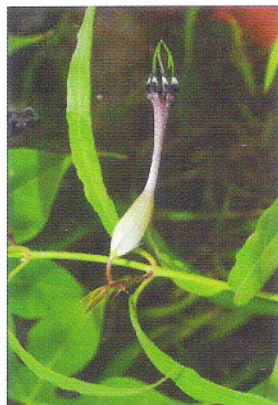
Locality: Ralegan, Ghangaldare

Habitat: Grassy slopes

Features: Same as above species with difference in having weak stem, leaves petiolate, linear lanceolate, flowers short, upto 6 cm long, beak short, corolla mouth hairy.

Fls. & Fruits: July to Sept.

Status: Critically endangered, Endemic to Junnar



Botanical Name:

Ceropegia attenuata Hook.

Local Name: Kharpudi

Locality: Khubi-Malshej Ghat, Junnar hill

Habitat : Grassy slopes

Features: Erect, upto 1.6 ft, nearly glabrous, Leaves linear, flowers long upto 6 cm, greenish yellow, beak brown coloured.

Fls. & Fruits : Jun to Sept.

Status: Vulnerable



Botanical Name:

Ceropegia rollae Hemadri

Locality: Vandre, Sitewadi, Kolhewadi, Durgawadi

Local Name: Dhavali Kharpudi

Habitat : Grassy slopes/ rock crevices

Features: Erect, upto 3 ft, nearly glabrous, strong, Leaves ovate, flowers white, upto 5 cm long, corolla lobes widely open.

Fls. & Fruits: Aug. to Sept.

Status: Critically Endangered, Endemic to MS



Botanical Name:

Ceropegia lawii Hook. f.

Local Name: Dhavali Kharpudi

Locality: Vandre, Kolhewadi

Habitat : Grassy slopes/ rock crevices

Features: Erect, 2-3 ft, Leaves sessile, ovate, flowers in clusters, white, corolla lobes short.

Fls. & Fruits: July to Sept.

Status: Endangered, Endemic to MS



Botanical Name:

Ceropegia sahyadrica Ansari *et.* Kulkarni

Local Name: Dhavali Kharpudi

Locality: Kondhaval

Habitat : Open plateaus and Grassy slopes

Features: Erect, upto 2 ft, nearly glabrous, strong, Leaves ovate, flowers creamy white, upto 5 cm long, corolla opening cream-yellow.

Fls. & Fruits: Aug. to Sept.

Status: Vulnerable, Endemic to MS

Botanical Name:

Ceropegia panchganiensis Blatt. *et.* McC.

Local Name: Hadsandhi kharpudi

Locality: Vandre, Sitewadi, Kolhewadi, Amboli

Habitat : Grassy slopes/ rock crevices

Features: Erect, upto 3 ft, nearly glabrous, Leaves ovate, flowers white, 3 cm long, slender, green inside, corolla lobes open.

Fls. & Fruits: Aug. to Sept.

Status: Critically Endangered, Endemic to MS



Botanical Name:

Ceropegia media (Huber) Ansari

Local Name: Gavati-tanachi Kharpudi

Locality: Taleghar, Sitewadi, Kolhewadi, Durgawadi

Habitat: Hill tops, near forest margins

Features: Twining, glabrous, Leaves petiolate, linear- lanceolate, flowers creamy-purple, upto 4 cm long, corolla tube angled, lobes widely open.

Fls. & Fruits: Aug. to Sept.

Status: Vulnerable, Endemic to MS

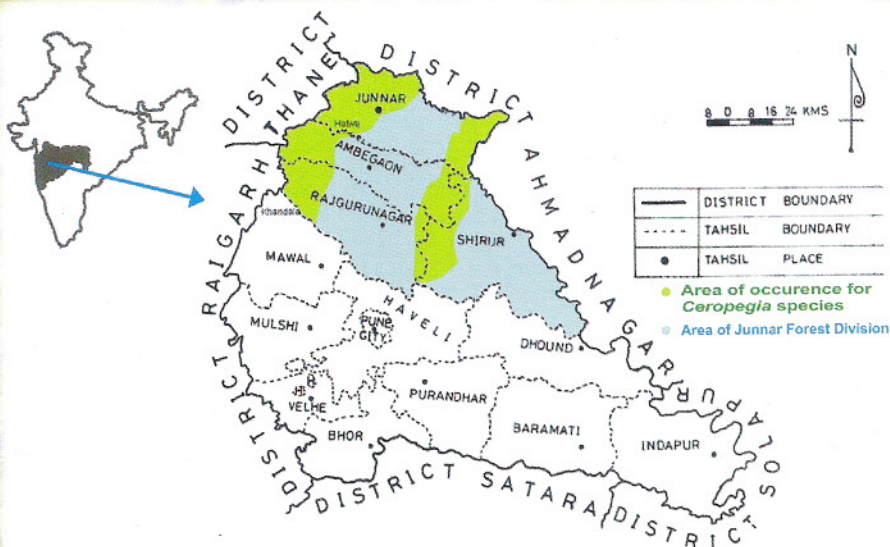
Durga Killa and surrounding, the type locality of *Ceropegia rollae* Hemadri



How to Conserve the Ceropegias?

1. Do not destroy the habitat and plants.
2. Do not pluck the flowers/leaves/fruits.
3. Do not eat the tubers.
4. Do not uproot the plants for plantation in your garden because they do not grow under cultivation.
5. Ceropegia require specific pollinators, which are present only in their natural habitats.
6. Stop grazing in the specific areas of occurrence.
7. Do not trade for financial gains as it is an offence.





Junnar Forest Division :An Overview

Total Forest Area	:	62522.455 Ha.
Geographical Position	:	E 73° 31' to E 74° 30' Longitude N 18° 20' to N 19° 31' Latitude
Height from MSL	:	630m to 1350m
Temperature	:	7° C to 40° C
Rainfall	:	500mm to 3000mm per annum
Forest Ranges	:	Junnar, Otur, Narayangaon, Ghodegaon, Khed, Chakan and Shirur

Distribution of Forest area in Four Taluks :

Taluka	Forest Area (Ha.)	Taluka	Forest Area (Ha.)
Junnar	19,607.169	Ambegaon	23,129.677
Khed	17,081.968	Shirur	2,703.641

Forest Types:

1. Tropical Dry Deciduous
2. Tropical Moist Deciduous
3. Tropical Scrub Forests
4. Subtropical Montane Broadleaf Forests

Important places of occurrence: Shivneri fort, Ralegan, Shinde, Durgawadi, Ambe, Dhak killa, Sitewadi, Naneghat, Tambe, Kolhewadi, Pimpalgaon joga, Ahupe, Bhimashankar, Wafgaon, Belha, Khubi, Awasari, Pait, Amboli, Harishchandragarh, Khireswar, Taleran, Manjarmal, Talmachi, etc.

Botanical Name:

Ceropegia odorata Nimmo ex. Hook. f.

Locality: Ralegan

Habitat: Hill slopes/ rock crevices / Bushes

Features: Twining herb, Leaves sub-sessile, linear-lanceolate, flowers in clusters, yellow, fragrant, corolla lobes long.

Fls. & Fruits: July to Sept.

Status: Critically Endangered



Botanical Name:

Ceropegia evansii McC.

Locality: Pait (Very restricted)

Habitat: Grassy slopes, rock crevices

Features: Twining herb, nearly glabrous, Leaves petiolate, ovate, flowers creamy, upto 4 cm long, corolla lobes widely open, yellow.

Fls. & Fruits: Aug. to Sept.

Status: Critically Endangered, Endemic to MS

Botanical Name:

Ceropegia hirsuta Wight et. Arn.

Local Name: Hamid

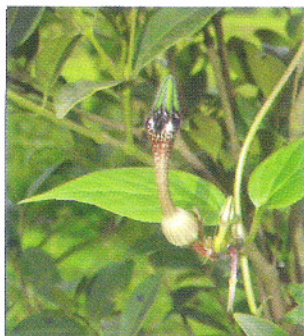
Locality: Tambe, Wafgaon, Shivneri, Kanhoba hill

Habitat: Gravely slopes, rock crevices, bushes

Features: Twining herb, hairy, Leaves sub-sessile, ovate, flowers upto 4 cm long, yellow-yellowish green, corolla tube spotted with purple, lobes widely open, hairy.

Fls. & Fruits: Aug. to Sept.

Status: Common



Botanical Name:

Ceropegia oculata Hook.

Local Name: Tanachi Kharpudi

Locality: Sitewadi, Kolhewadi

Ecological requirements: Grassy slopes, in bushes

Features: Twining herb, glabrous, Leaves petiolate, ovate, flowers brown, upto 6 cm long, corolla lobes beaked, darker, densely hairy.

Fls. & Fruits: Aug. to Sept.

Status: Low risk

Botanical Name:

Ceropegia bulbosa Roxb. var. **bulbosa**

Local Name: Hamid

Locality: Wafgaon, Awasari, Belha, Shivneri

Habitat: Grassy slopes, rock crevices

Features: Twinning herb, glabrous, Leaves petiolate, orbicular-ovate, fleshy, flowers small, purplish brown, 2 cm long, corolla lobes hairy.

Fls. & Fruits: Aug. to Sept.

Status: Common



Botanical Name:

Ceropegia bulbosa Roxb. var. **lushii** (Grah.) Hook. f.

Local Name: Haman

Locality: Wafgaon, Awasari, Belha, Shivneri

Habitat: Grassy slopes, rock crevices

Features: Twinning herb, glabrous, Leaves long, linear-lanceolate, fleshy, flowers small, Purplish brown, 2 cm long, corolla lobes hairy.

Fls. & Fruits: Aug. to Sept.

Status: Common

Botanical Name:

Ceropegia vincaefolia Hook.

Local Name: Tanachi Kharpudi

Locality: Ralegan, Aptale, Kolhewadi

Habitat : Among bushes and forest margins

Features: Twining herb, nearly glabrous, Leaves petiolate, ovate, flowers yellowish brown, dotted with purple-brown spots, upto 5 cm long, corolla lobes widely open, hairy.

Fls. & Fruits: Aug. to Sept.

Status: Endangered, Endemic to MS



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Junnar, Government of Maharashtra

email : ghodprojectdivision@yahoo.co.in

junnarforestdn@gmail.com

DATE : Wildlife Week 2011, 1st October, 2011.

आंतरराष्ट्रीय जैवविविधता दशक २०११-२०२०

आंतरराष्ट्रीय वन वर्ष २०११



जुन्नर वन विभागातील सिरोपेजिया प्रजातीमधील जैवविविधता



वन्यजीव सप्ताह २०११

जुन्नर वनविभाग, जुन्नर (पुणे)

महाराष्ट्र शासन

जैवविविधता मालिका - १

युनेस्को ने जैवविविधता संरक्षणासाठी २०११ ते २०२० हे आंतरराष्ट्रीय जैवविविधता दशक घोषित केले आहे. तसेच २०१० हे आंतरराष्ट्रीय जैवविविधता वर्ष व २०११ आंतरराष्ट्रीय वन वर्ष साजरे करण्यात आले. त्या अनुषंगाने सिरोंजेच्या ह्या अत्यंत दुर्मिळ प्रजातीच्या विविधतेबद्दल सदर माहितीपुस्तीका प्रसारीत करण्यात येत आहे.

जुन्नर वनविभाग हा गेली अनेक वर्षे पर्यटकांच्या आकर्षणाचा केंद्रबिंदू ठरतोय. येथील राकट सहाद्रीच्या रांगा आणि या पर्वतांच्या कुशीत खुलणारी, फुलणारी जैवविविधता डोळ्यांना भूरळ घालणार नाही तरच नवल!

पर्यटकांबरोबरच जैवविविधता अभ्यासकांना आपल्या जादूई सौंदर्याने आकर्षित करून घेणारा प्रदेश अशी जुन्नर वनविभागाची ख्याती सर्वमान्य आहे. ज्यावेळी एखादा वनस्पतीशास्त्र अभ्यासक या विभागात भ्रमंती करतो तेव्हा त्याचे उत्सुक डोळे धुंडाळत असतात एका सुंदर आणि वैशिष्ट्यपूर्ण वनस्पतीला, या वनस्पतीचे नाव आहे सिरोंजेच्या महाबली, म्हणजेच गवती खरपुडी.

खरे पहाता, संपूर्ण जुन्नर वनविभाग हा सिरोंजेच्या या प्रजातिमधील वनस्पतीचे आगर आहे. लाखो वर्षांपूर्वी ही वनस्पती येथेच वाढली आणि उल्कांत झाली. आजतागायत ही उल्कांतीची प्रक्रिया चालूच आहे.

सिरोंजेच्या ही अत्यंत दुर्मिळ वानस प्रजाति समजली जाते. आय.यु.सी.एन (International Union for Conservation of Nature & Natural Resources) तथा आंतरराष्ट्रीय निसर्ग आणि नैसर्गिक संपत्ती संवर्धन मंडळ, यांच्या वर्गीकरणानुसार या प्रजाति मधील जाती व उपजाती अतिभयग्रस्त आणि भयग्रस्त (Critically Endangered & Endangered) या प्रकारात येतात. सिरोंजेच्या ही वनस्पती एस्कोलेपियाडेसी (Asclepiadaceae Medikus ex. Borkh.) रुईकुळ/अर्ककुळ/चिक असलेली या कुळाची सदस्य आहे. या प्रजातिमधील सर्व वनस्पती खरपुडी, गवती खरपुडी, तानाची खरपुडी, हिरवी खरपुडी, पांढरी खरपुडी, हनुमानाची गदा, मेणाचे कारंजे, कंदिल पुष्प इ. नावांनी प्रचलित आहेत.

सिरोंजेच्या प्रजातीची विविधता एक दृष्टीक्षेप

जग	१७० जाती
भारत	४७ जाती
महाराष्ट्र	२१ जाती
जुन्नर वनविभाग	१३ जाती व ४ उपजाती

महाराष्ट्रातून नोंद केलेल्या जातींपैकी ५०% पेक्षा जास्त जाती जुन्नर वनविभागात मिळतात. त्यामुळे, जुन्नर वनविभागासाठी सिरोंजेच्या वनस्पती ही प्रतिष्ठेची आणि अभिमानाची गोष्ट आहे. सदर वनस्पतीचे जतन आणि संवर्धन करणे ही आपणा सर्वांची जबाबदारी आहे. त्यासाठी आपल्या प्रयत्नांची जोड आवश्यक आहे. चला तर, आपण सर्वजण आपले हे वैभव जोपासण्याची प्रतिज्ञा करूयात.

शास्त्रीय नांव : सिरोंपेजिया महाबली उपजाती महाबली
Ceropegia mahabalei Hemari et. Ansari var.
mahabalei

सामान्य नांव : गवती खरपुडी

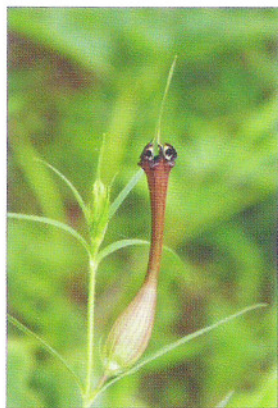
स्थान : राळेगण, ढाक, सितेवाडी, डिंगोरे

आढळ : गवताळ, डोंगराळ, उताराचा प्रदेश

वैशिष्ट्ये : कंद असलेले, उभे वाढणारे, नाजूक क्षुप, पाने समोरासमोर, गवतासारखी लव, केस असलेली, फुले ९ सेमी पर्यंत लांब, मोठी, चोचीच्या आकाराची, रंग हिरवट-तपकिरी

फुलांचा हंगाम : ऑगस्ट ते सप्टेंबर

सद्यस्थिती : अतिभयग्रस्त, फक्त महाराष्ट्रात आढळते.



शास्त्रीय नांव : सिरोंपेजिया महाबली उपजाति हेमलती **Ceropegia mahabalei** Hemari et. Ansari var **hemalatae**
Rahangdale et. Rahangdale

सामान्य नांव : गवती खरपुडी

स्थान : राळेगण, घंगाळदरे

आढळ : गवताळ, डोंगराळ उताराचे प्रदेश

वैशिष्ट्ये : बुंधा कमकुवत, पाने समोरासमोर, उपजाती महाबली पेक्षा थोडी रुंद व जास्त केसाळ, फुले आखुड व लवयुक्त

फुलांचा हंगाम : जुलै ते सप्टेंबर

सद्यस्थिती : अतिभयग्रस्त, फक्त जुन्नर तालुक्यात आढळते.



शास्त्रीय नाव : सिरोंपेजिया अटेन्युअटा
Ceropegia attenuata Hook.

सामान्य नाव : खरपुडी

स्थान : खुबी- माळशेज घाट, जुन्नर जवळील टेकड्या.

आढळ : गवताळ डोंगर, उताराची जमीन

वैशिष्ट्ये : सरळ वाढणारी वनस्पती, उंची १.६ फुटापर्यंत, केशरहित, पाने सरळ, फुले ६ सेमीपर्यंत लांब, हिरवट पिवळी, चोचीच्या आकाराची, चोच तपकिरी रंगाची असते.

फुले आणि फळे : जुन ते सप्टेंबर

सद्यस्थिती : दुर्मीळ, नष्ट होण्याच्या मार्गावर



शास्त्रीय नाव : सिरोंपेजिया रोलै
Ceropegia rollae Hemadri

सामान्य नाव : ढवळी खरपुडी

स्थान : वांद्रे, सीतेवाडी, दुर्गावाडी, कोल्हेवाडी

आढळ : गवताळ उताराचा प्रदेश, खडकांमधील फटी

वैशिष्ट्ये : सरळ वाढणारे, केसविरहित क्षुप, उंची ३ फुट, बुंधा जाड, पाने अंडाकृती समोरासमोर, फुले पांढऱ्या रंगाची, ५ सेमी लांब, पाकळ्या जास्त उघडलेल्या.

फुलांचा हंगाम : ऑगस्ट - सप्टेंबर

सद्यस्थिती : अतिभयग्रस्त, महाराष्ट्रात मर्यादित

शास्त्रीय नाव : सिरोंपेजिया लावी

Ceropegia lawii Hook. f.

सामान्य नाव : ढवळी खरपुडी

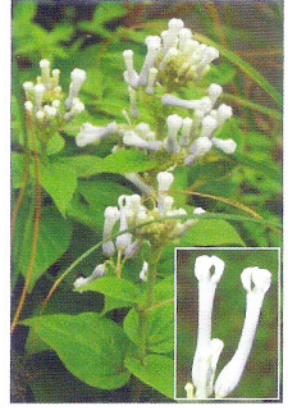
स्थान : वांद्रे, कोल्हेवाडी, ढाक

आढळ : गवताळ डोंगरउताराची जमीन/खडकांमधील फटी

वैशिष्ट्ये : सरळ वाढणारे क्षुप, उंची २-३ फुट, पाने देठरहित अंडाकृती, गुच्छांमध्ये येतात, पांढऱ्या रंगाची, पाकळ्या आखुड

फुले आणि फळे हंगाम : जुलै ते सप्टेंबर

सद्यस्थिती : भयग्रस्त, महाराष्ट्रात मर्यादित



शास्त्रीय नाव : सिरोंपेजिया सह्याद्रिका

Ceropegia sahyadrica Ansari et. Kulkarni

सामान्य नाव : ढवळी खरपुडी

स्थान : कोंढवळ

आढळ : गवताळ डोंगर, उताराची जमीन आणि मुक्त पठारी प्रदेश

वैशिष्ट्ये : सरळ वाढणारे क्षुप, उंची २ फुटापर्यंत, केशरहित, खोड जाड, पाने अंडाकृती, फुले दुधी रंगाची किंवा पिवळी झाक असलेली

फुले आणि फळे हंगाम : सप्टेंबर-ऑक्टोबर

सद्यस्थिती : दुर्मिळ, नष्ट होण्याचा मार्गावर, महाराष्ट्रात मर्यादित.

शास्त्रीय नाव : सिरोंपेजिया पांचगनीएँसीस

Ceropegia panchganiensis Blatt. et. McC.

सामान्य नाव : हाडसांधी खरपुडी

स्थान : वांद्रे, सीतेवाडी, कोल्हेवाडी, ढाक

आढळ : गवताळ, डोंगर उताराची जमीन, खडकांतील भेगा

वैशिष्ट्ये : सरळ वाढणारे क्षुप, उंची ३ फुट, जवळपास केशरहित, पाने अंडाकृती, फुले पांढरी, ३ सेमी लांब, सडपातळ, आतुन हिरवी, पाकळ्या उघडलेल्या

फुले आणि फळे हंगाम : ऑगस्ट ते सप्टेंबर

सद्यस्थिती : अतिभयग्रस्त, महाराष्ट्रात मर्यादित



शास्त्रीय नाव : सिरोंपेजिया मेडिया

Ceropegia media (Huber) Ansari

सामान्य नाव : गवती तानाची खरपुडी

स्थान : तळेघर, सीतेवाडी, कोल्हेवाडी, दुर्गावाडी

आढळ : डोंगरमाथा, जंगलांच्या सीमा क्षेत्रात

वैशिष्ट्ये : वेलवर्गीय केशरहित, पाने देठयुक्त, लांबट, फुले गुच्छांमध्ये, दुधी-जांभळी, ४ सेमीपर्यंत लांब, पाकळ्या वक्र, उघडलेल्या

फुले आणि फळे हंगाम : ऑगस्ट ते सप्टेंबर

सद्यस्थिती : नष्ट होण्याच्या मार्गावर, महाराष्ट्रात मर्यादित

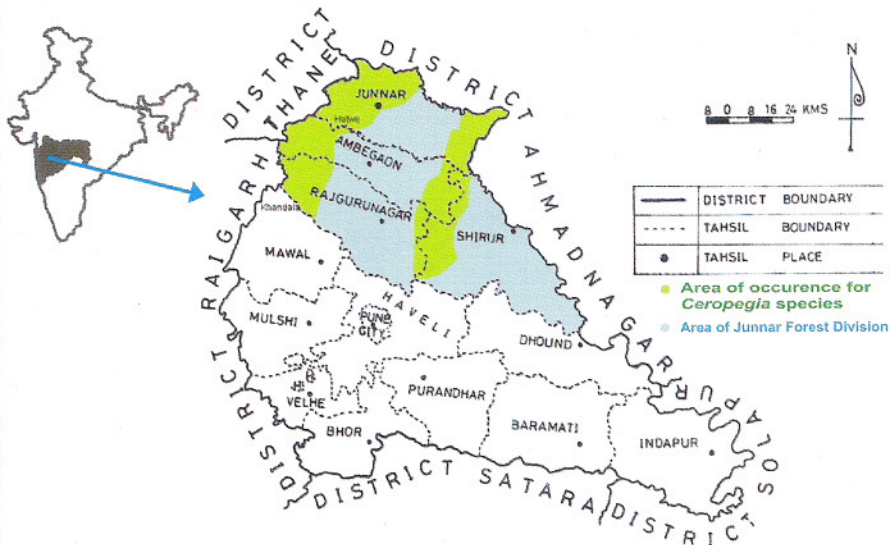
दुर्गा किल्ला व परिसर, सिरापेजीया रेली चे मुळ स्थान.
अशा ठिकाणांचे संवर्धन करण्याची अत्यंत निकडीची आवश्यकता आहे.



सिरापेजीयाचे संवर्धन कसे करावे?

- १) खरपुड्यांची पाने/फुले/शेंगा तोडू नये.
- २) कंद खाऊ नये, औषधी गुणधर्म असतात हा गैरसमज आहे.
- ३) झाडं उपटून घेऊन जाऊ नका, कारण आपल्या बागेत ही वनस्पती जगणारी नाही.
- ४) ह्यांचे परागीभवन विशिष्ट किटकांद्वारे होते जे फक्त नैसर्गिक अधिवासातच आढळतात.
- ५) अधिवासांमध्ये गुरे चराई थांबवावी.
- ६) पैशासाठी ह्या झाडांचा व्यवहार / देवाणघेवाण करू नये. हा कायद्याने गुन्हा आहे.
- ७) निसर्गसौंदर्य अनुभवण्यासाठी असतं, कुस्करून विध्वंस करण्यासाठी नाही, याची जाणीव ठेवली तरच आपल्या पुढील पिढ्यांना त्याचा अनुभव करता येईल.





जुन्नर वन विभाग, पुणे : एक दृष्टिक्षेप

वन विभागाचे क्षेत्र	: ६२५२२.४५५ हेक्टर
भौगोलिक स्थान	: अक्षांश - उत्तर १८° २' - १९° ३१' रेखांश - पूर्व ७३° ३१' - ७४° ३०'
समुद्र सपाटीपासूनची उंची	: ६३० मीटर ते १३३० मीटर
तापमान	: ७° सेल्सीयस ते ४०° सेल्सीयस
पर्जन्यमान	: ५०० मी.मी. ते ३००० मी.मी.
वनपरिक्षेत्रे	: जुन्नर, ओतूर, नारायणगाव, घोडेगाव, खेड, चाकण, शिरूर
विभागाचे कार्यक्षेत्र विभाग	: चार तालुके
विभाग	: चार तालुके

तालुका	वनक्षेत्र	तालुका	वनक्षेत्र
जुन्नर	१९,६०७.१६९ हेक्टर	आंबेगांव	२३,१२९.६७७ हेक्टर
खेड	१७,०८१.९६८ हेक्टर	शिरूर	२,७०३.६४१ हेक्टर

वनप्रकार :

- १) उष्णकटिबंधीय शुष्क पानगळीची वने
- २) उष्णकटिबंधीय आर्द्र पानगळीची वने
- ३) उष्णकटिबंधीय शुष्क काटेरी वने
- ४) उपउष्णकटिबंधीय रुंदपर्णी डोंगराळ वने

महत्वाची आढळस्थाने : शिवनेरी किल्ला, राळेगण, शिंदे, दुर्गावाडी, आंबे, ढाक, सितेवाडी, नानेघाट, तांबे, कोल्हेवाडी, पिंपळगाव जोगा, आहुपे, भिमाशंकर, वाफगाव, बेल्ला, खुबी, अवसरी, पाईट, आंबोली, हरिश्चंद्रगड, खिरेश्वर, तळेरान, मांजरमाळ, तळमाची, इ.

शास्त्रीय नाव : सिरिपेजिया ओडोरॅटा
Ceropegia odorata Nimmo ex. Hook. f.
 सामान्य नाव : पिवळी खरपुडी

स्थान : राळेगण

आढळ : डोंगरउताराची गवताळ जमीन / खडकांतील भेगा
 वैशिष्ट्ये : वेल वर्गीय, पाने छोट्या देठांची, लांब, सरळ,
 निमुळती, फुले गुच्छांमध्ये, पिवळ्या रंगाची, सुवासिक
 फुले आणि फळे हंगाम : जुलै ते सप्टेंबर
 सदास्थिती : अतिभयग्रस्त



शास्त्रीय नाव : सिरिपेजिया इव्हान्सि
Ceropegia evansii MoC.

सामान्य नाव : खरपुडी

स्थान : पाईट

आढळ : गवताळ डोंगर उतार, खडकातील फटी
 वैशिष्ट्ये : वेलवर्गीय, केशरहित, पाने देठयुक्त, अंडाकृती, फुले दुधी
 ४ सेमी लांब, पाकळ्या उघडलेले, टोकाला पिवळट
 फुले आणि फळे हंगाम : ऑगस्ट ते सप्टेंबर
 सदास्थिती : अतिभयग्रस्त, महाराष्ट्रात मर्यादित

शास्त्रीय नाव : सिरिपेजिया हिर्सुटा
Ceropegia hirsuta Wight et. Arn.

सामान्य नाव : खरपुडी

स्थान : तांबे, वाफगांव, शिवनेरी, कोंढवळ, अवसरी
 आढळ : घळीचे उतार, खडकांमधील भेगा, झुडूपे
 वैशिष्ट्ये : वेलवर्गीय, केसाळ, पाने छोट्या देठांची,
 अंडाकृती, फुले ५ सेमीपर्यंत लांब, पिवळी किंवा हिरवट
 पिवळ्या रंगाची आणि नलीकेवर जांभळे ठिपके, पाकळ्या
 रुंद उघडलेल्या, केसाळ.

फुले आणि फळे हंगाम : ऑगस्ट ते सप्टेंबर

सदास्थिती : सामान्य



शास्त्रीय नाव : सिरिपेजिया ऑकुलॅटा

Ceropegia oculata Hook.

सामान्य नाव : तानाची खरपुडी

स्थान : सीतेवाडी, कोल्हेवाडी

आढळ : गवताळ, डोंगर उतार, झुडूपे, खडकांमधील जागा
 वैशिष्ट्ये : वेलवर्गीय, केशरहित, पाने देठयुक्त, अंडाकृती, फुले
 तपकिरी, लांबी ६ सेमीपर्यंत, टोकाला चावीच्या आकाराची,
 गडद रंगाची, केसाळ

फुले आणि फळे हंगाम : ऑगस्ट ते सप्टेंबर

सदास्थिती : कमी भयग्रस्त



शास्त्रीय नाव : सिरोंपेजिया बल्बोसा उपजाती बल्बोसा

Ceropegia bulbosa Roxb. var. **bulbosa**

सामान्य नाव : हमीद

स्थान : वाफगांव, अवसरी, बेल्ला, शिवनेरी

आढळ : गवताळ, डोंगरउतार, खडकांतील फटी

वैशिष्ट्ये : वेलवर्गीय, केशरहित, पाने देठयुक्त, अंडाकृती, मांसल,

फुले लहान, जांभळट-तपकिरी, लांबी २ सेमी, पाकळ्या केसाळ

फुले आणि फळे हंगाम : ऑगस्ट ते सप्टेंबर

सद्यस्थिती : सामान्य



शास्त्रीय नाव : सिरोंपेजिया बल्बोसा उपजाती लुशी **Ceropegia bulbosa** Roxb. var. **lushii** (Grah.) Hook.

सामान्य नाव : हमन

स्थान : वाफगांव, अवसरी, बेल्ला, शिवनेरी

आढळ : गवताळ, डोंगरउतार, खडकांतील भेगा

वैशिष्ट्ये : वेलवर्गीय, केशरहित, पाने लांब, सरळ, भाल्याच्या टोकासारखी, मांसल, फुले लहान, जांभळट-तपकिरी, लांबी २ सेमी, पाकळ्या केसाळ

फुले आणि फळे हंगाम : ऑगस्ट ते सप्टेंबर

सद्यस्थिती : सामान्य



शास्त्रीय नाव : सिरोंपेजिया व्हिन्सीफोलीया

Ceropegia vincaefolia Hook.

सामान्य नाव : तानाची खरपुडी

स्थान : राळेगण, आपटाळे, कोल्हेवाडी

आढळ : झुडुपांच्या सभोवती, जंगलांच्या सीमाक्षेत्रात

वैशिष्ट्ये : वेलवर्गीय, जवळपास केशरहित, पाने

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Biodiversity of
Dungawadi
Plateaus

S. R. Rahangdale, S. S. Rahangdale

**Department of Forests,
Government of Maharashtra**

BIODIVERSITY OF DURGAWADI PLATEAUS



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[M.Sc., NET, Ph.D.]

PDEA's Annasaheb Waghire College, Otur

Savita Sanjaykumar Rahangdale

[M.Sc., Ph.D.]

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Department of Forests,
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March 2018

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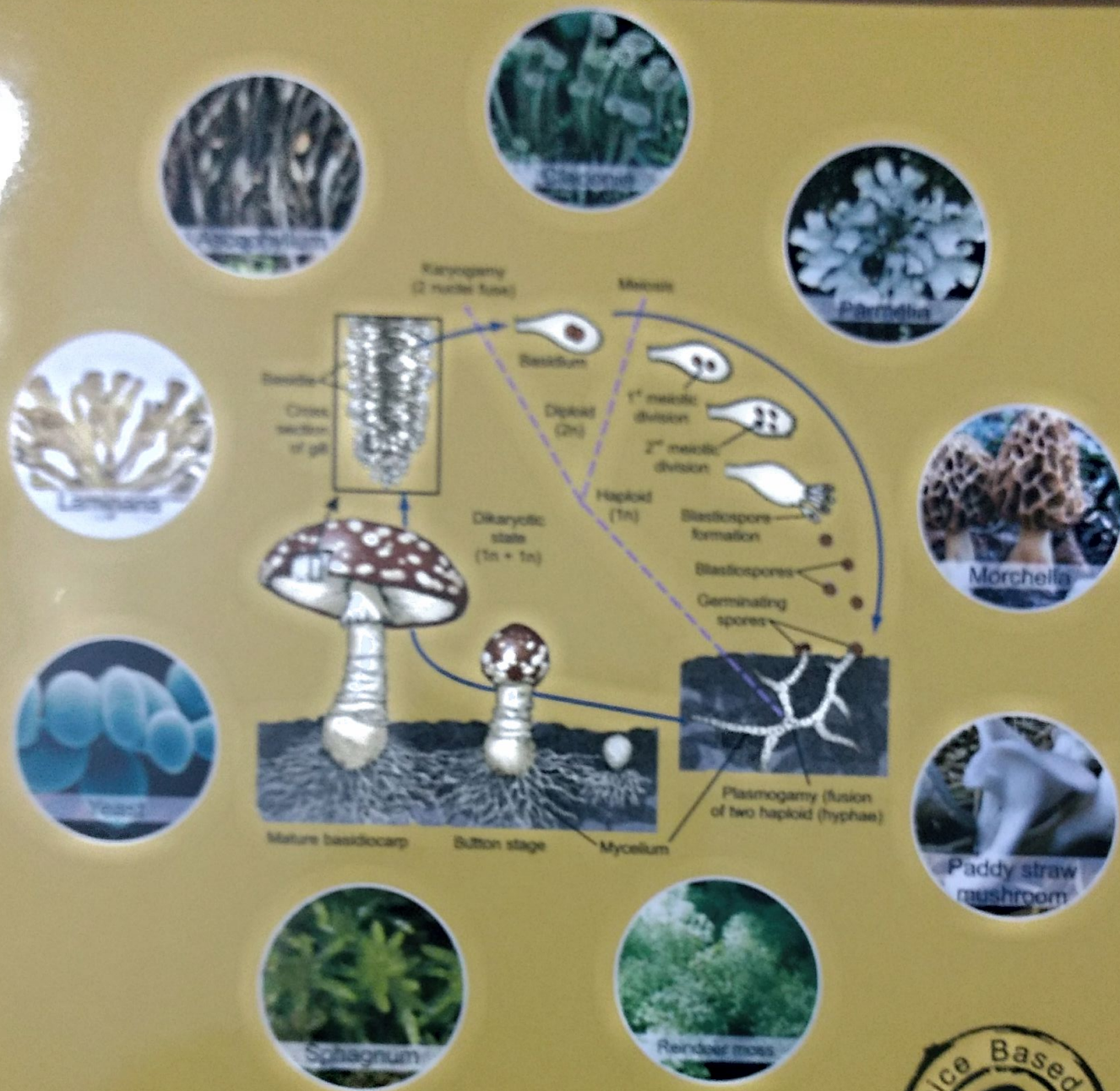
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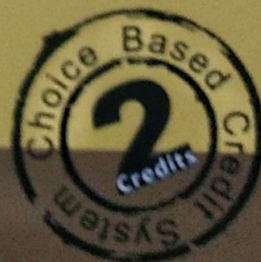


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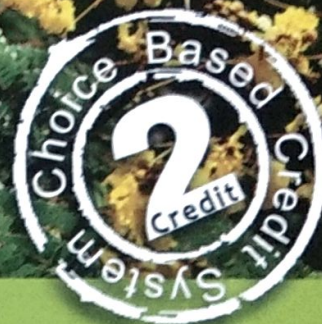
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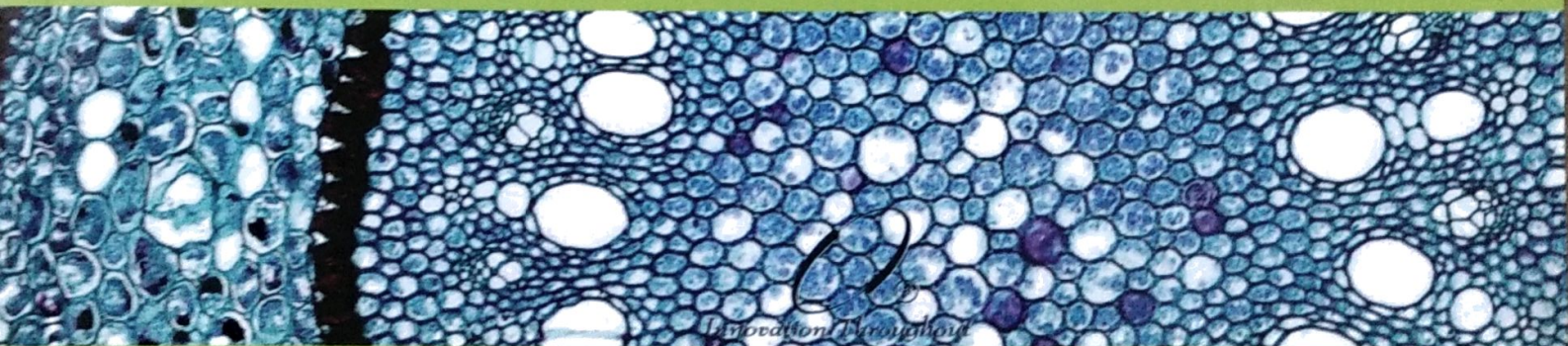


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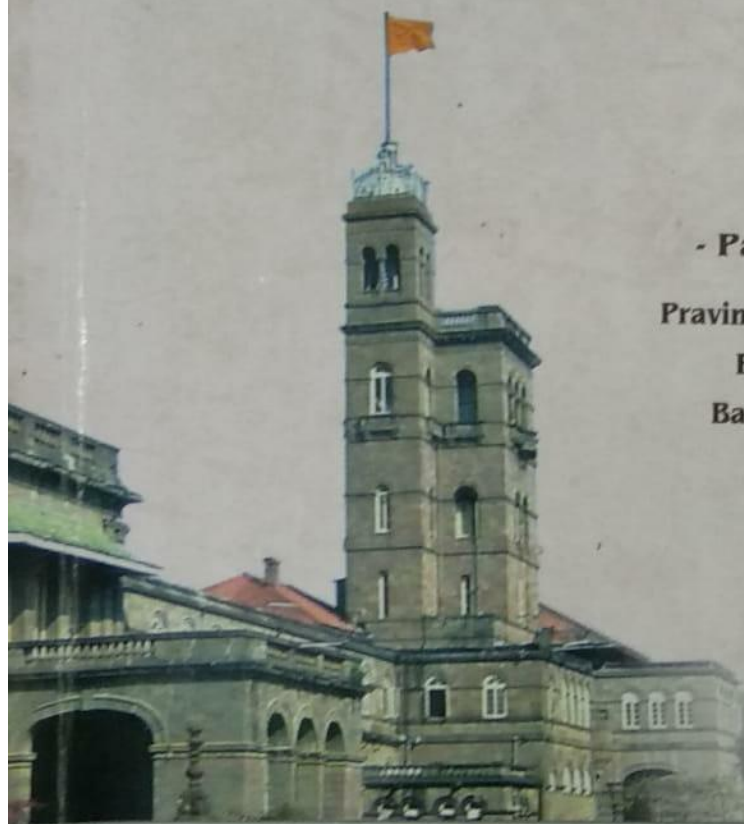
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