OFFICE OF PRINCIPAL LATE SHRI JAIDEV SATPATHI GOVT. COLLEGE BASNA,
DIST.- MAHASAMUND (C.G.)

Email- govecollege.basana@gmail.com, Phone – 07724 246722

Key Indicator - 1.3 Curriculum Enrichment (30)

Year 2015-16

1.3.2 Average percentage of courses that include experiential learning through project work/field

Program name	Program code	Name of the Course that include experiential learning through project work/field work/internship	Course code	Year of offering	Name of the student studied course on experiential learning through project work/field work/internship	Link to the relevant document
Bachelor of Art	B.A I	Enviromental studies and Human Rights	828	2003-04	239	
Bachelor of Science	Bsc I	Enviromental studies and Human Rights	828		60	
		Botany				
		Bacferia,Viruses, Fungi,Tichems and Algae and Bryophytes, pteridophytes, Eymnosperms and PalaeoBotany (Practical)	811 and 812			
		Zoology				
		Cell Biology and Non Chordata and Chordata and Embryology (Practical)	813 and 814			
		Chemistry				
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	795 , 796 and 797			
Bachelor of Science	Bsc II	**Botany**		2012-13	57	
		Plant Taxonomy,Economic Botany, Plant Anatomy and Embryology and Ecology and Plant Physiology (Practical)	861 and 862			
		Zoology				
		Plant Taxonomy,Economic Botany, Plant Anatomy and Embryology and Ecology and Plant Physiology (Practical)	883 and 884			
		Chemistry				
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	1845 , 1846 and 1847			
Bachelor of Science	Bsc III	**Botany**			60	
		Plant Biochemistry and Biotechnology and Ecology and Utilization of Plants (Practical)	915 and 916			
		Zoology				
		Ecology,Environmental-biology, Taxicology, Microbiology and medical zoology and Genetics, cell physiology, Biochemistry, Biotechnology and Biotechniques (Practical)	917 and 918			

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		Chemistry				
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	895 , 896 and 897			
Bachelor of Commerce	Bcom I	Enviromental studies and Human Rights	828	2012-13	50	
Year 2016-17						
Bachelor of Art	B.A I	Enviromental studies and Human Rights	828	2003-04	240	
Bachelor of Science	Bsc I	Enviromental studies and Human Rights	828	2012-13	80	
		Botany				
		Bacferia,Viruses, Fungi,Tichems and Algae and Bryophytes, pteridophytes, Eymnosperms and PalaeoBotany (Practical)	811 and 812			
		Zoology				
		Cell Biology and Non Chordata and Chordata and Embryology (Practical)	813 and 814			
		Chemistry				
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	795 , 796 and 797			
Bachelor of Science	Bsc II	**Botany**				
		Plant Taxonomy,Economic Botany, Plant Anatomy and Embryology and Ecology and Plant Physiology (Practical)	861 and 862			
		Zoology				
		Plant Taxonomy,Economic Botany, Plant Anatomy and Embryology and Ecology and Plant Physiology (Practical)	883 and 884			
		Chemistry				
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	1845 , 1846 and 1847			
Bachelor of Science	Bsc III	**Botany**				
		Plant Biochemistry and Biotechnology and Ecology and Utilization of Plants (Practical)	915 and 916			
		Zoology				
		Ecology,Environmental-biology, Taxicology, Microbiology and medical zoology and Genetics, cell physiology, Biochemistry, Biotechnology and Biotechniques (Practical)	917 and 918		60	
		Chemistry				
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	895 , 896 and 897			
Bachelor of Commerce	Bcom I	Enviromental studies and Human Rights	828	2012-13	50	
Year 2017-18						

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Bachelor of Art	B.A I	Enviromental studies and Human Rights	828	2023-04	239	
Bachelor of Science	Bsc I	Enviromental studies and Human Rights	828		81	
		Botany				
		Bacferia,Viruses, Fungi,Tichems and Algae and Bryophytes, pteridophytes, Eymnosperms and PalaeoBotany (Practical)	811 and 812			
		Zoology				
		Cell Biology and Non Chordata and Chordata and Embryology (Practical)	813 and 814			
		Chemistry				
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	795 , 796 and 797			
Bachelor of Science	Bsc II	**Botany**		2012-13	82	
		Plant Taxonomy,Economic Botany, Plant Anatomy and Embryology and Ecology and Plant Physiology (Practical)	861 and 862			
		Zoology				
		Plant Taxonomy,Economic Botany, Plant Anatomy and Embryology and Ecology and Plant Physiology (Practical)	883 and 884			
		Chemistry				
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	1845 , 1846 and 1847			
Bachelor of Science	Bsc III	**Botany**			60	
		Plant Biochemistry and Biotechnology and Ecology and Utilization of Plants (Practical)	915 and 916			
		Zoology				
		Ecology,Environmental-biology, Taxicology, Microbiology and medical zoology and Genetics, cell physiology, Biochemistry, Biotechnology and Biotechniques (Practical)	917 and 918			
		Chemistry				
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	895 , 896 and 897			
Bachelor of Commerce	Bcom I	Enviromental studies and Human Rights	828	2012	50	
Year 2018-19						
Bachelor of Art	B.A I	Enviromental studies and Human Rights	828	2023-04	240	
		Enviromental studies and Human Rights	828			
		Botany				

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Bachelor of Science	Bsc I	Bacferia,Viruses, Fungi,Tichems and Algae and Bryophytes, pteridophytes, Eymnosperms and PalaeoBotany (Practical)	811 and 812		100
		Zoology			
		Cell Biology and Non Chordata and Chordata and Embryology (Practical)	813 and 814		
		Chemistry			
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	795 , 796 and 797		
Bachelor of Science	Bsc II	**Botany**			74
		Plant Taxonomy,Economic Botany, Plant Anatomy and Embryology and Ecology and Plant Physiology (Practical)	861 and 862		
		Zoology			
		Plant Taxonomy,Economic Botany, Plant Anatomy and Embryology and Ecology and Plant Physiology (Practical)	883 and 884	2012-13	
		Chemistry			
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	1845 , 1846 and 1847		
Bachelor of Science	Bsc III	**Botany**			80
		Plant Biochemistry and Biotechnology and Ecology and Utilization of Plants (Practical)	915 and 916		
		Zoology			
		Ecology,Environmental-biology, Taxicology, Microbiology and medical zoology and Genetics, cell physiology, Biochemistry, Biotechnology and Biotechniques (Practical)	917 and 918		
		Chemistry			
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	895 , 896 and 897		
Bachelor of Commerce	Bcom I	Enviromental studies and Human Rights	828	2012-13	53
Year 2019-20					
Bachelor of Art	B.A I	Enviromental studies and Human Rights	828	2003-04	240
Bachelor of Science	Bsc I	Enviromental studies and Human Rights	828		100
		Botany			
		Bacferia,Viruses, Fungi,Tichems and Algae and Bryophytes, pteridophytes, Eymnosperms and PalaeoBotany (Practical)	811 and 812		
		Zoology			
		Cell Biology and Non Chordata and Chordata and Embryology (Practical)	813 and 814		

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		Chemistry			
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	795 , 796 and 797		
Bachelor of Science	Bsc II	**Botany**		2012-13	97
		Plant Taxonomy,Economic Botany, Plant Anatomy and Embryology and Ecology and Plant Physiology (Practical)	861 and 862		
		Zoology			
		Plant Taxonomy,Economic Botany, Plant Anatomy and Embryology and Ecology and Plant Physiology (Practical)	883 and 884		
		Chemistry			
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	1845 , 1846 and 1847		
Bachelor of Science	Bsc III	**Botany**			96
		Plant Biochemistry and Biotechnology and Ecology and Utilization of Plants (Practical)	915 and 916		
		Zoology			
		Ecology,Environmental-biology, Taxicology, Microbiology and medical zoology and Genetics, cell physiology, Biochemistry, Biotechnology and Biotechniques (Practical)	917 and 918		
		Chemistry			
		Inorganic Chemistry and Organic Chemistry and Physical chemistry (Practical)	895 , 896 and 897		
Bachelor of Commerce	Bcom I	Enviromental studies and Human Rights	828	2012-13	55

Principal
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Part - I

SYLLABUS FOR ENVIRONMENTAL STUDIES AND HUMAN RIGHTS

(Paper code-0828)

MM. 75

इन्वारमेंटल साईंसेस के पाठ्यक्रम को स्नातक स्तर भाग–एक की कक्षाओं में विश्वविद्यालय अनुदान आयोग के निर्देशानुसार अनिवार्य रूप से शिक्षा सत्र 2003–2004 (परीक्षा 2004) से प्रभावशील किया गया है। स्वशासी महाविद्यालयों द्वारा भी अनिवार्य रूप से अंगीकृत किया जाएगा।

भाग 1, 2 एवं 3 में से किसी भी वर्ष में पर्यावरण प्रश्न–पत्र उत्तीर्ण करना अनिवार्य है। तभी उपाधि प्रदाय योग्य होगी।

पाठ्यक्रम 100 अंकों का होगा, जिसमें से 75 अंक सैद्धांतिक प्रश्नों पर होंगे एवं 25 अंक क्षेत्रीय कार्य (Field Work) पर्यावरण पर होंगे।

सैद्धांतिक प्रश्नों पर अंक – 75 (सभी प्रश्न इकाई आधार पर रहेंगे जिसमें विकल्प रहेगा)

(अ) लघु प्रश्नोंत्तर – 25 अंक

(ब) निबंधात्मक – 50 अंक

Field Work – 25 अंकों का मूल्यांकन आंतरिक मूल्यांकन पद्धति से कर विश्वविद्यालय को प्रेषित किया जावेगा। अभिलेखों की प्रायोगिक उत्तर पुस्तिकाओं के समान संबंधित महाविद्यालयों द्वारा सुरक्षित रखेंगे।

उपरोक्त पाठ्यक्रम से संबंधित परीक्षा का आयोजन वार्षिक परीक्षा के साथ किया जाएगा।

पर्यावरण विज्ञान विषय अनिवार्य विषय है, जिसमें अनुत्तीर्ण होने पर स्नातक स्तर भाग–एक के छात्र/छात्राओं को एक अन्य विषय के साथ पूरक की पात्रता होगी। पर्यावरण विज्ञान के

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सैद्धांतिक एवं फील्ड वर्क के संयुक्त रूप से 33% (तैंतीस प्रतिशत) अंक उत्तीर्ण होने के लिए अनिवार्य होंगे।

स्नातक स्तर भाग–एक के समस्त नियमित/भूतपूर्व/अमहाविद्यालयीन छात्र/छात्राओं को अपना फील्ड वर्क सैद्धांतिक परीक्षा की समाप्ति के पश्चात् 10 (दस) दिनों के भीतर संबंधित महाविद्यालय/परीक्षा केन्द्र में जमा करेंगे एवं महाविद्यालय के प्राचार्य/केन्द्र अधिक्षक, परीक्षकों की नियुक्ति के लिए अधिकृत रहेंगे तथा फील्ड वर्क जमा होने के सात दिनों के भीतर प्राप्त अंक विश्वविद्यालय को भेजेंगे।

UNIT-I THE MULTI DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, Scope and Importance

Natural Resources:

Renewable and Nonrenewable Resources

(a) Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people and relevant forest Act.

(b) Water resources: Use and over-utilization of surface and ground water, floods drought, conflicts over water, dams benefits and problems and relevant Act.

(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.

(d) food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging , salinity.

(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.

(f) Land resources: Land as a resource, land degradation, man induced landslides soil erosion and desertification.

(12 Lecture)

UNIT-II ECOSYSTEM

(a) Concept, Structure and Function of and ecosystem

- Producers, consumers and decomposers.
- Energy flow in the ecosystem

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PAPER - IV
LABOBATORY COURSE

INORGANIC CHEMISTRY

A. Semi-micro qualitative analysis (using H_2S or other methods) of mixtures - not more than four ionic species (two anions and two cations, excluding interfering, insoluble salts) out of the following:
Cations : NH_4^+, Pb^{2+}, Bi^{3+}, Cu^{2+}, Cd^{2+}, Fe^{3+}, Al^{3+}, Co^{2+}, Ni^{2+}, Mn^{2+}, Zn^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Na^+
Anions : CO_3^{2-}, S^{2-}, SO_3^{2-}, $S_2O_3^{2-}$, NO_2^-, CH_3COO^-, Cl^-, Br^-, I^-, NO_3^-, SO_4^{2-}

(Spot tests may be carried out wherever feasible)

B. Acid-Base Titrations

- Standardization of sodium hydroxide by oxalic acid solution.
- Determination of strength of HCl solution using sodium hydroxide as intermediate.
- Estimation of carbonate and hydroxide present together in mixture.
- Estimation of carbonate and bicarbonate present together in a mixture.
- Estimation of free alkali present in different soaps/detergents

C. Redox Titrations

- Standardization of $KMnO_4$ by oxalic acid solution.
- Estimation of Fe(II) using standardized $KMnO_4$ solution.
- Estimation of oxalic acid and sodium oxalate in a given mixture.
- Estimation of Fe(II) with $K_2Cr_2O_7$ using internal (diphenylamine, anthranilic acid) and external indicator.

D. Iodo / Iodimetric Titrations

- Estimation of Cu(II) and $K_2Cr_2O_7$ using sodium thiosulphate solution iodimetrically.
- Estimation of (a) arsenite and (b) antimony iodimetrically.

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- Estimation of available chlorine in bleaching powder iodometrically.
- Estimation of Copper and Iron in mixture by standard solution of $K_2Cr_2O_7$ using sodium thiosulphate solution as titrants.

ORGANIC CHEMISTRY

1. Demonstration of laboratory Glasswares and Equipments.
2. Calibration of the thermometer. 80°–82° (Naphthalene), 113.5°–114° (Acetanilide), 132.5°-133° (Urea), 100° (Distilled Water).)
3. Purification of organic compounds by crystallization using different solvents.
   - Phthalic acid from hot water (using fluted filter paper and stemless funnel).
   - Acetanilide from boiling water.
   - Naphthalene from ethanol.
   - Benzoic acid from water.
4. Determination of the melting points of organic compounds.

   Naphthalene 80°–82°, Benzoic acid 121.5°–122°, Urea 132.5°–133° Succinic acid 184.5°–185°, Cinnamic acid 132.5°–133°, Salicylic acid 157.5°–158°, Acetanilide 113.5°–114°, m-Dinitrobenzene 90°, p-Dichlorobenzene 52°, Aspirin 135°.
5. Effect of impurities on the melting point – mixed melting point of two unknown organic compounds.
   - Urea – Cinnamic acid mixture of various compositions (1:4, 1:1, 4:1).
6. Determination of boiling point of liquid compounds. (boiling point lower than and more than 100 °C by distillation and capillary method).
   - Ethanol 78°, Cyclohexane 81.4°, Toluene 110.6°, Benzene 80°.

i. Distillation (Demonstration)
   - Simple distillation of ethanol-water mixture using water condenser.
   - Distillation of nitrobenzene and aniline using air condenser.

ii. Sublimation
   - Camphor, Naphthalene, Phthalic acid and Succinic acid.

iii. Decolorisation and crystallization using charcoal.
   - Decolorisation of brown sugar with animal charcoal using gravity filtrations crystallization and decolorisation of impure naphthalene (100 g of naphthalene mixed with 0.3 g of Congo red using 1 g of decolorizing carbon) from ethanol.

7. Qualitative Analysis

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Detection of elements (N, S and halogens) and functional groups (Phenolic, Carboxylic, Carbonyl, Esters, Carbohydrates, Amines, Amides, Nitro and Anilide) in simple organic compounds.

PHYSICAL CHEMISTRY

1. Surface tension measurements.
    - Determine the surface tension by (i) drop number (ii) drop weight method.
    - Surface tension composition curve for a binary liquid mixture.
2. Viscosity measurement using Ostwald's viscometer.
    - Determination of viscosity of aqueous solutions of (i) sugar (ii) ethanol at room temperature.
    - Study of the variation of viscosity of sucrose solution with the concentration of solute.
    - Viscosity Composition curve for a binary liquid mixture.
3. Chemical Kinetics
    - To determine the specific rate of hydrolysis of methyl/ethyl acetate catalysed by hydrogen ions at room temperature.
    - To study the effect of acid strength on the hydrolysis of an ester.
    - To compare the strengths of HCl & H_2SO_4 by studying the kinetics of hydrolysis of ethyl acetate.
4. Colloids
    - To prepare colloidal solution of silver nanoparticles (reduction method) and other metal nanoparticles using capping agents.

Note: Experiments may be added/ deleted subject to availability of time and facilities

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PRACTICAL EXAMINATION

05 Hrs.
M.M. 50

Three experiments are to be performed

1. Inorganic Mixture Analysis, four radicals two basic & two acid (excluding insoluble. Interfering & combination of acid radicals) OR Two Titrations (Acid-Bases,Redox and Iodo/Iodimetry)

12 marks

2. Detection of functional group in the given organic compound and determine its MPt/BPt.

8 marks

O R

Crystallization of any one compound as given in the prospectus along with the determination of mixed MPt.

O R

Decolorisation of brown sugar along with sublimation of camphor/ Naphthlene.

3. Any one physical experiment that can be completed in two hours including calculations.

14 marks

4. Viva **10 marks**
5. Sessionals **06 marks**

In case of Ex-Students two marks will be added to each of the experiments

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Meeting of Central Board of Studies(Chemistry): 18th June, 2018

Subject/ Faculty/ Name of Question Paper .....Chemistry/ Science.....

Existing Syllabus	New Modified Syllabus	Justification of New Modified Syllabus
B.Sc. PART-I **PAPER I (Inorganic Chem)**		
Unit-I (A: Atomic Structure) (B: Periodic Properties)	Fundamental particles removed. Atomic and ionic radii added. (Remaining part is same as existing)	Already there in Hr. Secondary syllabus To re-appropriate and updating. Unit-I, Part-B re-appropriated
Unit-II (Chemical Bonding)	No major changes compared to existing syllabus	
Unit-III (Chemical Bonding)	No major changes compared to existing syllabus	
Unit-IV (A: s-Block Elements) (B: Chemistry of Noble Gases)	Changed to- (A: s-Block Elements) (B: p-Block Elements)	'Oxidation Reduction' part moved to BSc-II. 'Acid and Bases' part moved to B.Sc-II in Part-A of Unit-V Changes have been made to maintain continuity in the topics
Unit-V (A. p-Block Elements) (B. Inorganic Chemical Analysis)	Changed into two parts as Part A- Chemistry of Noble Metals & Part B- Theoretical principles in Qualitative analysis	Reappropriation needed to strengthen the topic. Included because students do not practice much in Hr. Sec. level. **(Graphene like hot topic is introduced)**
Laboratory Course **(Semimicro Analysis)**	Splitted in 4 sections • Semimicro analysis • Acid-Base Titrations • Redox Titrations • Iodo/ Iodimetric Titrations	For developing enhanced experimental skills

(Signature of members of Central Board of Studies)

18.6.18

18/6/18

18.6.18

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Zoology
B.Sc. Part I 2018-19
Practical

The practical work will, in general be based on the syllabus prescribed in theory and the candidates will be required to show knowledge of the following:-

- Dissection of Earthworm, Cockroach, Palaemon and Pila
- Minor dissection---appendages of Prawn & hastate plate, mouth parts of insects, radulla of Pila.

(Alternative methods: By Clay/Thermacol/drawing/Model etc.)

- Adaptive characters of Aquatic, terrestrial, aerial and desert animals.
- Museum specimen invertebrate
- Slides- Invertebrates, frog embryology, Chick embryology and cytology,

Scheme of Practical Exam	**Time: 3hrs**
1. Major Dissection	10 Marks
2. Minor Dissection	05 Marks
3. Comments on Excersice based on Adaptation	04 Marks
4. Cytological Preparation	05 Marks
5. Spots-8 (Slides-4, Specimens-4)	16 Marks
6. Sessional	10 Marks

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B.Sc. I (BOTANY)

PRACTICAL

Study of external (Morphorgical) and internal (microscopic/anatomical) features of representative gerera given in the theory.

1. Algae: Gloeocapsa, Scytonema, Gloeotrichia, Volvox, Oedogonium, Vaucheria, Chara, Ectocarpus, Sargassum, Batrachosperrmum
2. Gram staining
3. Fungi: Albugo, Aspergillus, Peziza, Agaricus, Puccinia, Alternaria and Cercospora
4. Bryophyta: Riccia, Marchantia, Pellia, Anthoceros, Sphagnum, Funaria
5. Pteridophyta: Lycopodium, Selaginella, Equsetum, Marsilea.
6. Gymnosperm: Cycas, Pinus, Epherda.

PRACTICAL SCHEME

TIME: 4 Hrs. **M.M. : 50**

1.	Algae/Fungi/Gram Staining	10
2.	Bryophyta/Pteridophyta	10
3.	Gymnosperm	10
4.	Spotting	10
5.	Viva-Voce	05
6.	Sessional	05

(Dr. J.N. Verma)	(Dr. Rekha Pimpalgaonkar)	(Dr.Ranjana Shristava)
Proff. & Head	Proff. & Head	Proff. & Head
Govt. D.B. Girls PG College	Govt. N PG Science College	Govt. VYTPG Science College
Raipur, (C.G.)	Raipur, (C.G.)	Raipur, (C.G.)

(Mrs. Sanchal Moghe)	(Mr. Shivakant Mishra)	(Mr Sudheer Tiwari)

Govt. Bilasa Girls College, Bilaspur

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B.Sc. II (BOTANY)

Practical

1. Taxonomy: Detailed description and identification of locally available plants of the families as prescribed in the theory paper.
2. Economic Botany: Identification and comment on the plants and plant products belonging to different economic use categories
3. Preparation of Herbarium of local wild plants.
4. Quantitative vegetation analysis of a grassland ecosystem.
5. Anatomical characteristics of hydrophytes and xerophytes.
6. Demonstration of root pressure.
7. Demonstration of transpiration.
8. Demonstration of evolution of O_2 in photosynthesis, factors affecting of photosynthesis.
9. Comparison of R.Q. of different respiratory substrates.
10. Demonstration of fermentation.
11. Determination of BOD of a water body.
12. Demonstration of mitosis.

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PRACTICAL SCHEME

TIME: 4 Hrs. **M.M. : 50**

1.	Anatomy	08
2.	Economic Botany	04
3.	Physiology	08
4.	Ecology	10
5.	Spotting	10
6.	Viva-Voce	05
7.	Project Work/ Field Study	10

(Dr. J.N. Verma
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Raipur, (C.G.)

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Govt. N PG Science College
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Zoology
B.Sc. Part II 2018-19
Practical

The practical work in general shall be based on the syllabus prescribed and the students will be required to show the knowledge of the following:

- Study of the representative examples of the different chordates (Classified characters).
- Dissection of various systems of scoliodon-Afferent and Efferent branchial cranial nerves, internal ear.

Alternative methods: By Clay/Thermacol/ Drawing/ Model etc.)

- Simple microscopic technique through unstained or stained permanent mount.
- Study of prepared slides histological, as per theory papers.
- Study of limb girdles and vertebrae of Frog, Varanus, Fowl and Rabbit.
- Identification of species and individual of honey bee.
- Life cycle of honey bee and silkworm.
- Exercise based on Evolution and Animal behavior.

Scheme of Practical Exam **Time: 3:30hrs**

• Major dissection (Cranial nerves/efferent branchial vessel)	10
• Exercise based on evolution	05
• Exercise based on applied zoology	05
• Exercise based on animal behavior	04
• Spotting-8 (slides-4,bones-2,specimen-2)	16
• Viva	05
• Sessional marks.	05

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Jablonski diagram depicting various process occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), photosensitized reactions, energy transfer processes {simple examples), photostationary states, Chemiluminescence.

REFERENCE BOOKS

1. Physical Chemistry, G. M. Barrow, International student edition, McGraw Hill.
2. University General Chemistry, C. N. R. Rao, Macmillan.
3. Physical Chemistry, R. A. Alberty, Wiley Eastern.
4. The elements of physical chemistry, Wiley Eastern.
5. Physical Chemistry through problems, S. K. Dogra & S. Dogra, Wiley Eastern.
6. Physical Chemistry, B. D. Khosla,.
7. Physical Chemistry, Puri & Sharma.
8. Bhautik Rasayan, Puri, Sharma and Pathania, Vishal Publishing Company.
9. Bhautik Rasayan, P. L. Soni.
10. Bhautik Rasayan, Bahl and Tuli.
11. Physical Chemistry, R. L. Kapoor, Vol I-IV .
12. Chemical kinetics, K. J. Laidler, Pearson Educations, New Delhi (2004).

Paper –IV

LABORATORY COURSE

INORGANIC CHEMISTRY

Qualitative semimicro analysis of mixtures containing 5 radicals. Emphasis should be given to the understanding of the chemistry of different reactions. The following radicals are suggested:

CO_3^{2-}, NO_2^-, S^{2-}, SO_3^{2-},$S_2O_3^{2-}$, CH_3COO^-, F^- ,Cl^- , Br^- , I^- , NO_3^- , BO_3^{3-}, $C_2O_4^{2-}$, PO_4^{3-}, NH_4^+ , K^+, Pb^{2+}, Cu^{2+}, Cd^{2+}, Bi^{3+}, Sn^{2+}, Sb^{3+}, Fe^{3+}, Al^{3+}, Cr^{3+}, Zn^{2+}, Mn^{2+}, Co^{2+}, Ni^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Mg^{2+}.

Mixtures should preferably contain one interfering anion, or insoluble component ($BaSO_4$, $SrSO_4$, $PbSO_4$, CaF_2 or Al_2O_3) or combination of anions e.g. CO_3^{2-} and SO_3^{2-}, NO_2^- and NO_3^-, Cl^-, Br^-, and I^-.

Volumetric analysis

(a) Determination of acetic acid in commercial vinegar using NaOH.

(b) Determination of alkali content-antacid tablet using HCl.

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(c) Estimation of calcium content in chalk as calcium oxalate by permanganometry.

(d) Estimation of hardness of water by EDTA.

(e) Estimation of ferrous & ferric by dichromate method.

(f) Estimation of copper using thiosulphate.

- Principles involved in chromatographic separations. Paper chromatographic separation of following metal ions: i. Ni (II) and Co (II) ii. Fe (III) and Al (III)

ORGANIC CHEMISTRY

- Detection of elements (X, N, S).
- Qualitative analysis of unknown organic compounds containing simple functional groups (alcohols, carboxylic acids, phenols, nitro, amine, amide, and carbonyl compounds, carbohydrates)
- Preparation of Organic Compounds:
  (i) m-dinitrobenzene, (ii) Acetanilide, (iii) Bromo/Nitro-acetanilide, (iv) Oxidation of primary alcohols-Benzoic acid from benzylacohol, (v) azo dye.

PHYSICAL CHEMISTRY

Transition Temperature

- Determination of the transition temperature of the given substance by thermometric/ dialometric method (e.g. $MnCl_2.4H_2O/SrBr_2.2H_2O$).

Thermochemistry

- Determination of heat capacity of a calorimeter for different volumes using change of enthalpy data of a known system (method of back calculation of heat capacity of calorimeter from known enthalpy of solution or enthalpy of neutralization).
- Determination of heat capacity of the calorimeter and enthalpy of neutralization of hydrochloric acid with sodium hydroxide.
- To determine the solubility of benzoic acid at different temperature and to determine ΔH of the dissolution process.
- To determine the enthalpy of neutralization of a weak acid/ weak base versus strong base/ strong acid and determine the enthalpy of ionization of the weak acid/ weak base.
- To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy of calcium chloride from its enthalpy data using Born Haber cycle.

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Phase Equilibrium

- To study the effect of a solute (e.g. NaCl, Succinic acid) on the critical solution temperature of two partially miscible liquids (e.g. phenol-water system) and to determine the concentration of that solute in the given phenol-water system.
- To construct the phase diagram of two component system (e.g. diphenylamine–benzophenone) by cooling curve method.
- Distribution of acetic/ benzoic acid between water and cyclohexane.
- Study the equilibrium of at least one of the following reactions by the distribution method:

  (i) $I_2(aq) + I^- \rightarrow I_3(aq)^{2+}$

  (ii) $Cu^{2+}(aq) + nNH_3 \rightarrow Cu(NH_3)n$

Molecular Weight Determination

Determination of molecular weight by Rast Camphor and Landsburger method.

Note: **Experiments may be added/ deleted subject to availability of time and facilities.**

Reference Books

1. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
2. Furniss, B.S., Hannaford, A.J., Smith, P.W.G. & Tatchell, A.R. Practical Organic Chemistry, 5th Ed. Pearson (2012)
3. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000). 22
4. Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000).
5. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011). Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).
6. Halpern, A. M. & McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York

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7. Physical Chemistry through problems, S.K. Dogra & S. Dogra, Wiley Eastern
8. Physical Chemistry, B.D. Khosla
9. Physical Chemistry, Puri & Sharma
10. Bhoutic Rasayan, Puri & Sharma
11. Bhoutic Rasayan, P.L. Soni
12. Bhoutic Rasayan, Bahl & Tuli

PAPER-IV
LABORATORY COURSE

180 Hrs.

Inorganic Chemistry

Synthesis Analysis

(a) Preparation of Sodium trioxalato ferrate (III), $Na_3[Fe(C_2O_4)_3]$ and determination of its composition by permanganometry.
(b) Preparation of Ni-DMG complex, $[Ni(DMG)_2]$
(c) Preparation of copper tetraammine complex, $[Cu(NH_3)_4]SO_4$.
(d) Preparation of cis-and trans-bioxalato diaqua chromate (III) ion.

Gravimetric Analysis

Analysis of Cu as CuSCN or CuO, Ni as $Ni(DMG)_2$, Ba as $BaSO_4$ and Fe as Fe_2O_3

Organic Chemistry

Laboratory Techniques

A Steam Distillation
Napthalene from its suspension in water
Clove oil from cloves
Separation of ortho and para-nitrophenols.

B Column Chromatography
Separation of fluorescein and methylene blue
Separation of leaf pigments from spinach leaves
Resolution of recemic mixture of (+,-) mandelic acid.

Qualitative Analysis

Analysis of an organic mixture containing two solid components using water, $NaHCO_3$, NaOH for separation and preparation of suitable derivatives.

Synthesis of Organic Compounds

(a) Acetylation of salicylic acid, aniline, glucose and hydroquinone. Benzoylation of aniline and phenol.
(b) Aliphatic electrophilic substitution- Preparation of iodoform form ethanol and acetone.
(c) Aromatic electrophilic substitution-
Nitration-Preparation of m-dinitrobenzene, p-nitroacetanilide
Halogenation- Preparation of p-bromoacetanilide, 2,4,6 tribromophenol
(d) Diazotization/Coupling- Preparation of methyl orange and methyl red
(e) Oxidation- Preparation of benzoic acid from toluene
(f) Reduction- Preparation of aniline from nitrobenzene, m-nitroaniline from m-dinitrobenzene.

Physical Chemistry

Electrochemistry

(a) To determine strength of given acid conductometrically using standard alkali solution.
(b) To determine solubility and solubility product of a sparingly soluble electrolyte conductometrically.

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(g) To study saponification of ethyl acetate conductometrically.

(h) Determine the ionization constant of a weak acid conductometrically.

(i) To titrate potentiometrically the given ferrous ammonium sulphate using $KMnO_4/K_2Cr_2O_7$ as titrant and calculate the redox potential of Fe^{2+}/Fe^{3+} system on the hydrogen scale.

Refractometry and Polarimetry

(a) To verify law of refraction of mixtures (e.g. of glycerol and water) using Abbe's refractometer.

(b) To determine the specific rotation of a given optically active compound.

Molecular Weight Determination

(a) Determination of molecular weight of a non-volatile solute by Rast method/Beckmann freezing point method.

(b) Determination of the apparent degree of dissociation of an electrolyte (e.g., NaCl) in aqueous solution at different concentrations by ebullioscopy.

Colorimetry

To verify Beer-Lambert law for $KMnO_4/K_2Cr_2O_7$ and determine the concentration of the given solution of the substance.

REFERENCE BOOKS :

1. Vogel's qualitative Analysis, revised, Svehla, Orient Longman
2. Standard methods of chemical analysis, W.W. Scott, The Technical Press
3. Experimental Organic Chemistry, Vol. I & II, P.R. Singh, D.S. Gupta and K.S. Bajpai, tata McGraw Hill.
4. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern
5. Vogel's Text Book of Practical Organic Chemistry, B.S. Furnis, A.J. Hannaford, V. Rogers, P.W.G. Smith and A.R. Tatchel, ELBS
6. Experiments in general chemistry, C.N.R. Rao & U.C. Agrawal
7. Experiments in Physical Chemistry, R.C. Das & Behra, Tata McGraw Hill
8. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House.

8 Hrs. **PRACTICAL EXAMINATION** M.M.50.

Five experiments are to be performed.

1. Inorganic - Two experiments to be performed.
   Gravimetric estimation compulsory carrying 08 marks. (Manipulation 3 marks).
   Anyone experiment from synthesis and analysis carrying 04 marks.
2. Organic-Two experiments to be performed.
   Qualitative analysis of organic mixture containing two solid components.
   compulsory carrying 08 marks (03 marks for each compound and two marks for separation).
   One experiment from synthesis of organic compound (Single step) carrying 04 marks.
3. Physical-One physical experiment carrying 12 marks.
4. Sessional 04 marks.
5. Viva Voce 10 marks.

In case of Ex-Students one mark each will be added to Gravimetric analysis and Qualitative analysis of organic mixture and two marks in Physical experiment.

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PRACTICAL WORK

The Practical work in general shall be based on syllabus prescribed in theory.

The candidates will be required to show knowledge of the following :

1. Estimation of population density, Percentage frequency, Relative density.
2. Analysis of Producers and consumers in grassland.
3. Detection of gram-negative and gram-positive bacteria.
4. Blood group detection (A,B, AB & O).
6. R.B.C., W.B.C. count.
6. Blood coagulation time.
7. Preparation of Hematin crystals from blood of rat.
8. Observation of Drosophila, wild and mutant.
9. Chromatography-Paper or gel.
10. Colorimetric estimation of hemoglobin.
11. Mitosis in onion root tip.
12. Biochemical detection of Carbohydrate, Protein and Lipid.
13. Study of Permanent slides of Parasites, based on theory paper.
14. Working Principles of pH meter, Colorimeter, centrifuge and microscopes.

SCHEDULE FOR PRACTICAL EXAMINATION

Duration : 4 Hrs. **Max Marks : 50**

1. Haematological Experiment : 08 marks
   (R.B.Cs./W.B.Cs. Counting/Blood group detection)
2. Ecological Experiment : 06 marks
   (Estimation of Population Density/Frequency/relative Density)
3. Staining of Gram +ve and Gram -ve Bacteria/cytological 05 marks
   experiment : Mitosis in onion root tip
4. Biochemical Experiment : 06 marks
   (biochemical detection of carbohydrate/protein lipid)
5. Chromatography 05 marks
6. Spotting : 10 marks
   Study of permanent slides of Parasites : 3
   Comments on working Principles of pH meter /
   Calorimeter / centrifuge and Microscope :
7. Viva Voce 05 marks
8. Sessional : 05 marks

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PRACTICAL SCHEME

M.M. 50

01. Physiology	08
02. Ecology	08
03. Utilization of Plants	05
04. Biochemistry / Biotechnology	05
05. Spotting (1-5 spots)	10
06. Project work	04
07. Viva V.	05
08. Sessional	05
	50

Suggested Laboratory Exercises

1. To study the permeability of plasma membrance using different concentrations of organicsolvents.
2. To study the effect of temperature on permeability of plasma membrane.
3. To prepare the standard curve of protein and determine the protein content in unknown samples.
4. To study the enzyme activity of catalase and peroxidase as inflenced by pH and temperature.
5. Comparison of the rate of respiration of various plant parts.
6. Separation of chloroplast pigment by solvents method.
7. Determinig the osmotic potential of vacuolar sap by plsmolytic method.
8. Determining the water potental of any tuber.
9. Separation of amino acids in a mixtue by paper chromatography and their identification by comparison with standards.
10. Bioassay of auxin, cytokinin, GA. ABA and ethylene using appropriate plant material.
11. Demonstration of the technique of micropropagation by using different explants, e.g. axillary buds, shoot meristems.
12. Demonstration of the technique of anther culture.
13. Isolation of protoplasts from different tissues using commercially available enzymes.
14. Demonstration of root and shoot formation from the apical and basal portion of stem segments in liquid medium containing different hormones.

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Suggested Laboratory Expercises (Ecology)

1. To determine minimum number of quadrats required for reliable estimate of biomass in grasslands.
2. To study the frequency of herbaceous species in grassland and to compare the frequency distribution with Raunkair's Standard Frequency Diagram.
3. To estimate importance Value Index for grassland species on the basis of relative frequency, relative density and relative biomass in protected and grazed grassland.
4. To measure the vegetation cover of grassland through point frame method.
5. To measure the aboveground plant biomass in a grassland.
6. To determine Kemp's constant for dicot and monocot leaves and to estimate the leaf area index of a grassland community.
7. To determine diversity indices (richness, Simpson, Shannon-Wiener) in grazed and protected grassland.
8. To estimate bulk density and porosity of grassland and woodland soils.
9. To determine moisture content and water holding capacity of grassland and woodland soil.
10. To study the vegetation structure through profile diagram.
11. To estimate transparency, pH and temperature of different water bodies.
12. To measure dissolved oxygen content in polluted and unpolluted water samples.
13. To estimate salinity of different water samples.
14. To determine the percent leaf area injury of different leaf samples collected around polluted sites.
15. To estimate dust holding capacity of the leaves of different plant species.

PRACTICAL

Suggested Laboratory Exercises (for Utilization of Plants)

1. Food Plants : Study of the morphology, structure and simple microchemical tests of the food storing tissues in rice, wheat, maize, potato and sugarcane, Microscopic examination of starch in these plants (excepting sugarcane)
2. Fibres : Study of cotton flowers, sectioning of the cotton ovules/developing seeds to trace the origin and development of cotton fibres. Microscopic study of cotton and test for cellulose, Sectioning and staining of jute stem to show the location and development of fibres. Microscopic structure. Test for lignocellulose.
3. Vegetable oils : Study of hand sections of groundnut, mustard and coconut and staining of oil droplets by Sudan III and Sudan Black.
4. Field visits : To study sources of firewood (10 plants), timber-yielding trees (10 trees) and bamboos. A list to be prepared mentioning special features.
5. Spices : Examine black pepper, cloves, cinnamon (hand sections) and opened fruits of cardamom and describe them briefly.
6. Preparation of an illustrated inventory of 10 medicinal plants used in indigenous systems of medicine or allopathy : Write their botanical and common names, parts used and disease/disorders for which they are prescribed.
7. Beverages : Cut Sections of boiled coffee beans and tea leaves to study the characterstic structural features.
8. Rubber : Collect illustrative materials of Hevea brasillensis ; morphology of the plant and tapping practices, history of rubber. List the many uses of rubber.

- - - - - - -

CERTIFICATE

This is to certify that Mr./Ms. .....

.....Tasmin khan (B.Com I)

Roll No. .....49.....is a student

of Shri Jaydev Satpati Saskiya Mahavidyalay, Basna has completed a

project title / assignment on .....Environmental.....

.....Studies project..... under my guidance.

Subject Teacher

Principal

Certificate

Roll No - 2035515030

This is to certify that Mr./Miss. .....

.....Khushboo Das.....

Roll No. ..2035515030.... is a student

of ..B.Sc-I..... has completed a

Project Tittle / Assignment on ..Green...

..House Effect. Under my guidance.

Subject Teacher

Principal

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महाविद्यालय बसना, जि. महासमुन्द (छ.ग.)

CERTIFICATE

Roll No -2035510032

This is to certify that Mr./Ms. ..DILESHWARI SIDAR..

.....

Roll No. ..2035510032..... is a student

of .....B.A.- 1st YEAR..... has completed a

project title / Assignment on ENVIRONMENTAL.....

...STUDIES..... under my guidance.

Subject Teacher

Principal

for प्राचार्य
स्व.श्री जयदेव कश्यप शासकीय
महाविद्यालय बसना, जि.महासमुन्द(छ.ग.)

Certificate

Roll No - 2035515021

School : Late. Jaydev Satpathi Govt. College Basna.

Name : Dulaurin Ajay

Class : B.Sc. [I]

This is certified to be the bonafide work of the student in the Zoology Laboratory during the academic year 2019 / 2020

No. of practicals certified 06 out of 06 in the subject of .....

Teacher In-charge

Examiner's Signature

Principal

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Date : 14.01.2020

Certificate

Roll No. 2035525011

College ~~School~~ : Late Shri Jaidev Govt. College Basna.

Name : Ku. Astha Purohit

Class : B.Sc II

This is certified to be the bonafide work of the student in the Zoology Laboratory during the academic year 2019 /2020

No. of practicals certified 09 out of 09 in the subject of Zoology

Teacher In-charge

Examiner's Signature

Principal

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School Rubber Stamp

Date : 19/12/19

Certificate

Name: Poonam Sahu Class: B.Sc. 'III' Year

Roll No: 732035535069 Exam No:

Institution Late Shri Jaidev Satpathi Govt. College Basna

This is certified to be the bonafide work of the student in the Zoology *Laboratory during the academic year 2019 / 20-20*

No of practicals certified 13 *out of* 13 *in the subject of* Zoology

.....

Teacher In-charge

.....

Examiner's Signature

.....

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महाविद्यालय बसना जि. महासमुन्द (छ.ग.)

Principal

Date: 31/12/19.....

Institution Rubber Stamp

(N.B: The candidate is expected to retain his/her journal till he/she passes in the subject.)

Certificate

Roll NO – 2025515061

School : Lat. Shri Jayadev Satpathi Govt. College Basna

Name : Priya Deep

Class : BSc. I Year

This is certified to be the bonafide work of the student in the Botany Laboratory during the academic year 2019 / 2020

No. of practicals certified 07 out of 07 in the subject of .....

Teacher In-charge

.....

Principal

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शासकीय उत्कृष्ट महाविद्यालय
महाविद्यालय बसना, जि. महासमुन्द (छ.ग.)

.....

Examiner's Signature

Date : 03/01/2020

Certificate

Roll No - 2035525051

School / college : Late Shri Jaidev Satpathi Govt. College Besan.

Name : Minakshi Sao

Class : B.Sc II

This is certified to be the bonafide work of the student in the Botany Laboratory during the academic year 2019 / 2020

No. of practicals certified 08 out of 08 in the subject of .....

Teacher In-charge

Examiner's Signature

Principal
स्व.श्री जयदेव सतपथी शासकीय महाविद्यालय बसना, जि.महासमुन्द (छ.ग.)

Date : 20/12/19

School Rubber Stamp

Certificate

Name: Parmeshwari Patel Class: BSC.- III

Roll No: 2035535068 Exam No:

Institution Late Shri Jaidev Sastpathi Govt. College Basna

This is certified to be the bonafide work of the student in the Botany *Laboratory during the academic year 2020 / 2021.*

No. of practicals certified 07 *out of* 07 *in the subject of* Botany Practical

Teacher In-charge

Examiner's Signature

For Principal
स्व.श्री जयदेव सतपथी शासकीय
महाविद्यालय बसना,जि.महासमुन्द(छ.ग.)

Date: ...15/01/20.....

Institution Rubber Stamp

(N.B: The candidate is expected to retain his/her journal till he/she passes in the subject.)

Certificate

Name: Nikita Bhoi Class: B.Sc. 1st Year

Roll No: 2035515049 Exam No:

Institution Late Shri Jaidev Satpathi Govt. College Basna

This is certified to be the bonafide work of the student in the Chemistry *Laboratory during the academic year 2019 / 2020 .*

No. of practicals certified 10 *out of* 10 *in the subject of* Chemistry

09/01/2020

Teacher In-charge

.....

Examiner's Signature

.....

Principal

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Date: 09/01/2020

Institution Rubber Stamp

(N.B: The candidate is expected to retain his/her journal till he/she passes in the subject.)

Laboratory Certificate

Name of the Institute Govt. College Basna

Name of the Candidate ASTHA PUROHIT

~~Registration~~ No. Roll No - 2035525011

Examination Centre Govt. College Basna

Date of practical Examination 06/01/2020

This is to Certify that Master /Miss Astha Purohit

has satisfactorily completed the required number of Experiments in Physics / Chemistry / Biology ..as per syllabus of Std. B.Sc. IInd *in the laboratory of this School / College in the year of* 2019/2020

Date 06/01/2020

06/01/2020
Science Teacher

For प्राचार्य
स्व. श्री जयदेव पतवथी शासकीय महाविद्यालय बसना जिला महासमुन्द (छ.ग.)
Head of Dept.

Examiner's Signature

Certificate

Name: Jay shree sao Class: BSC - III year

Roll No: 2035535040 Exam No:

Institution _____

This is certified to be the bonafide work of the student in the _____ *Laboratory during the academic year 2019 / 2020.*

No of practicals certified 11 *out of* 13 *in the subject of* Chemistry

07/01/2020

Teacher In-charge

.....

Examiner's Signature

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Date: 07/01/20.....

Institution Rubber Stamp

(N.B: The candidate is expected to retain his/her journal till he/she passes in the subject.)

CERTIFICATE

This is to certify that Mr./Ms. .....

.....Tasmin Khan (B.Com I)

Roll No. .....49.....is a student

of..Shri Jaydev Satpati Saskiya..has completed a
Mahavidyalay, Basna

project title / assignment on .....Environmental....

.....Studies project..... under my guidance.

Subject Teacher

Principal

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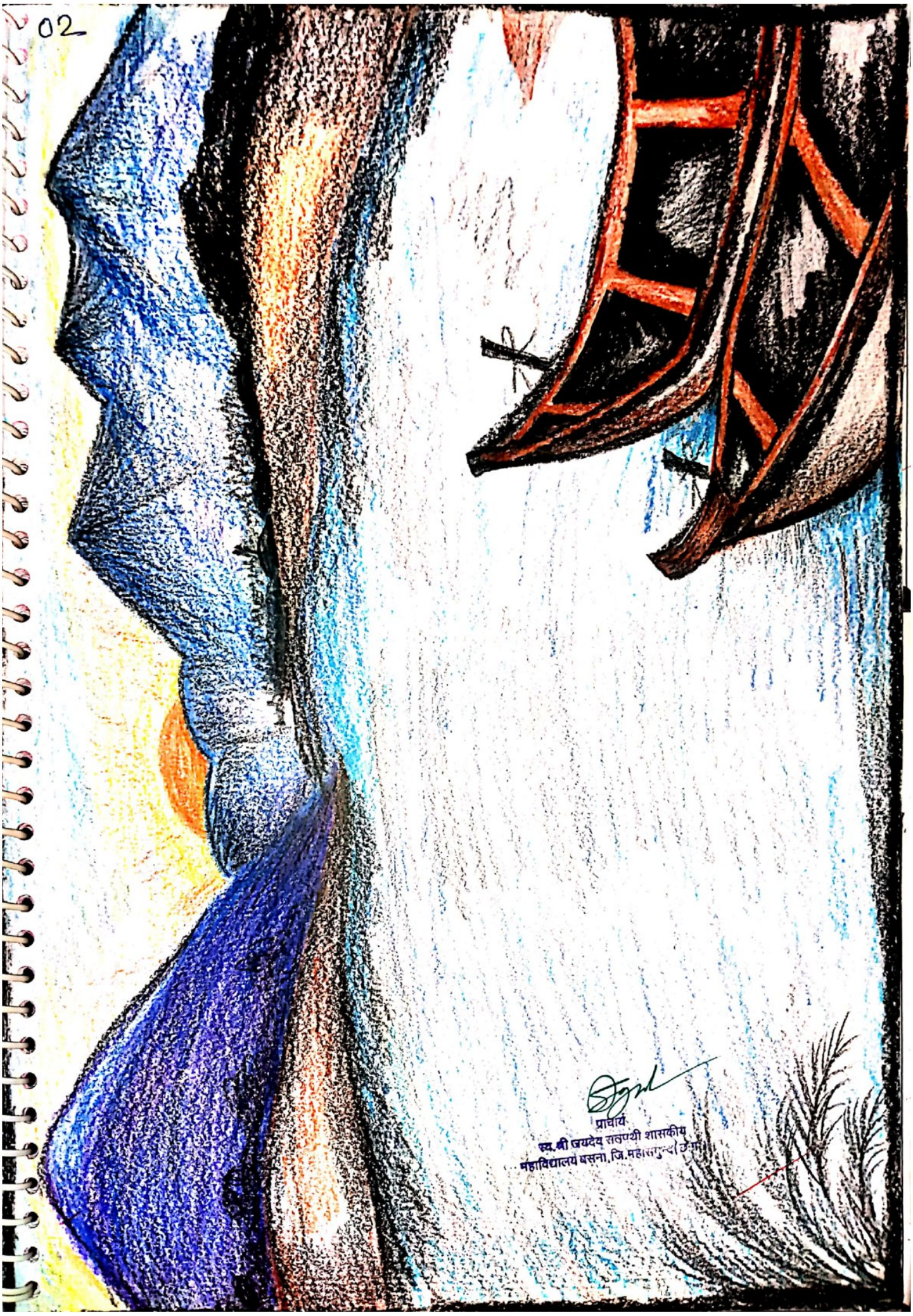
महाविद्यालय बसना, जि. महासमुंद (छ.ग.)

ABOUT MAHANADI RIVER

02



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1) किसी स्थानीय नदी, नाला का पर्यावरण अध्ययन (निम्न बिन्दुओं के आधार पर) कीजिए।

- नदी नाला का नाम - Mahanadi River

The Mahanadi is a major river in East Central India. It drains an area of around 141,600 square kilometer (54,700 sq mi) and has a total course of 858 kilometres (533 mi). Mahanadi is also known for the Hirakud Dam. The river flows through the states of chhattisgarh and Odisha.

- Where did Mahanadi river born?

The Mahanadi rises in a pool, 6 km from Pharsiya village near Nagri Town in Raipur district of chhattisgarh state at an elevation of 457 m. The total length of the river form origin to its outfall into Bay of Bengal is 851 km of which 357 km lies in chhattisgarh and 494 km in odissa.

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Where is Mahanadi located?

Raipur district
The river Mahanadi originates at an elevation of about 422 mts. above mean sea level near pharsiya village near Nagri town in Raipur district of chhattisgarh. It is one of the major inter-state east flowing rivers

What is the origin of Mahanadi river?

Sihawa
Mahanadi river originates from Sihawa (Dandakaranya region) in Dhamtari district of chhattisgarh. Main stream of Mahanadi flows through chhattisgarh & odisha.

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The place where Mahanadi Meets

One of the major sources of water in the state of Odisha is the River Mahanadi. The river has its origin in the state of chattisgarh and flows through several districts of odisha to meet the waters of the Bay of Bengal. The river forms its delta on the eastern fringe of the state of odisha.

The Mahanadi river waters several districts of the state of Odisha. Passing through the ridges and gorges of the Eastern Ghats, the Mahanadi opens its mouth into the BAY OF BENGAL at the FALSE POINT. The river segregates into several channels forming a huge delta. Several religious centres have developed near the mouth of the river Mahanadi. The Mahanadi is a major source of water in the state of odisha which is heavily dependent on the stream.

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महानदी का संगम

- गरियाबंद :

महानदी + पैरी + सोंढुर

- शिवरीनारायण (जांजगीर - चम्पा)

महानदी + शिवनाथ + जोंक

- चंद्रपुर (जांजगीर - चाम्पा)

महानदी + माड + लात

- खैरागढ़ (राजनांदगांव)

आमनेर + मुस्का + पिपरिया

Tributaries of Mahanadi

The following shows the flow of Mahanadi, from source to sea.
Mahanadi rises from Raipur district of Chhattisgarh and flows for about 851 km before its outfall into the Bay of Bengal.
The Major tributaries of Mahanadi are Seonath, Jonk, Hasdo, Mand, Ib, Ong, Tel etc.

• Seonath River

The Seonath River is the longest tributary of Mahanadi. It rises in an undulating region with numerous small group of hills at kotgal and flows 383 km to join Mahanadi at its left bank at khargand.

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• Tributaries of Seonath are khairahara, Tandula, khajun, Suzhi, Agar, Arpa rivers. The total drainage area of seonath is 22% of the total drainage area of Mahanadi Basin.

→ Jonk River

Jonk River originates from the khariar hills of kalahandi district of Odisha at an elevation of 762 meters. It flows 196 km to join the Mahanadi on its right at Sheorinarayan.

• Hasdo River

It arises in the Surguja district of chhattisgarh and traverses 333 km to meet Mahanadi at Mahuadih

→ Gej River is a principle tributary of Hasdo River

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Mand River

Mand River originates at an elevation of 686 meters in Sarguja district of Odisha and flows 241 km to meet Mahanadi at Chandarpur

Ib River

Ib originates in Pondrapat of the Raigarh district of Chhattisgarh and flows 251 km to fall into Hirakud Dam. Its a rainfed river.

Ong River

It arises at an elevation of 457 m on a hill in the northern outskirts of hills located on the course of Jonk River and flows 204 km to meet Mahanadi at Sonepur

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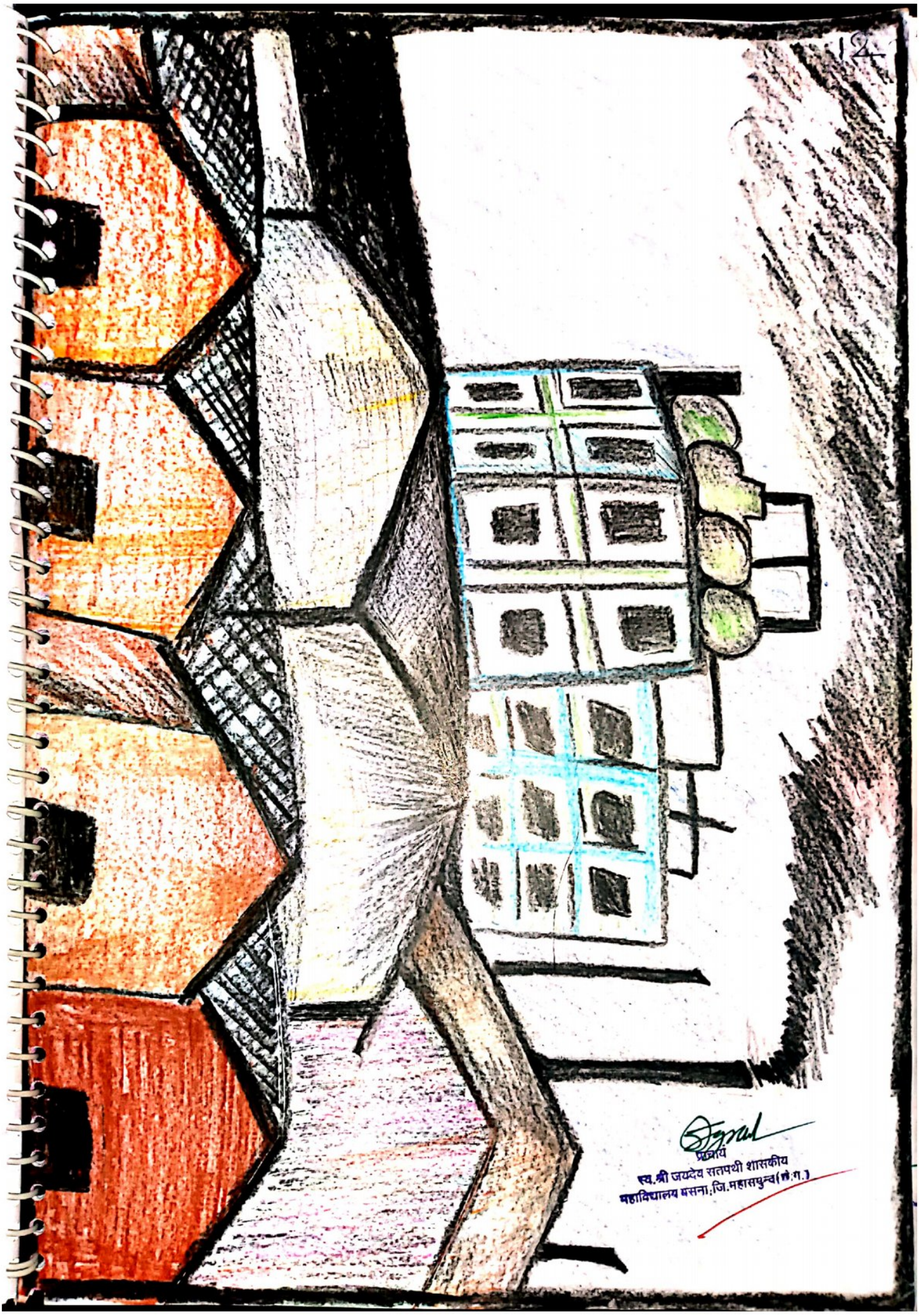
Tel River

Tel River originates in plain in the koraput of Odisha. It traverses 296 km to Meet Mahanadi at Sonepur.

POLLUTED CITY
RAIPUR



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2) <u>एक स्थानीय प्रदूषित क्षेत्र का अध्ययन (निम्न बिन्दुओं के आधार पर) कीजिए।</u>

- <u>प्रदूषित क्षेत्र का नाम - RAIPUR</u>
- <u>प्रदूषित क्षेत्र का स्थल (शहरी, ग्रामीण) शहरी (Urban)</u>

The Central pollution Control board (CPCB) declared chhattisgarh's Capital Raipur as the most polluted city.

- <u>प्रदूषण का प्रकार (जल, वायु, ध्वनि) वायु (Air)</u>

Then the Union ministry of environment and forest, A Raja presented a report in parliament based on a study on the presence of Suspended particulate matter (SPM) in air in 52 cities and Raipur ranked the highest.

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SPM in the air of Raipur is 250 micrograms per cubic meter (g/m^3), while the standard was fixed at $200 g/m^3$ and the concentration of dust particles is 350 parts per millions against the fixed limit is 200 ppm. The respirable particle are 230 ppm, much more than the fixed standard of 100 ppm. It is also belived that the presence of respirable suspended particulate matter (RSPM) is 3-4% highest than the previously fixed limits.

levels of Iron, Zinc, Nickel, lead and Manganese were very highest in the airs of Raipur, cusing the city to suffer from poor quality of air

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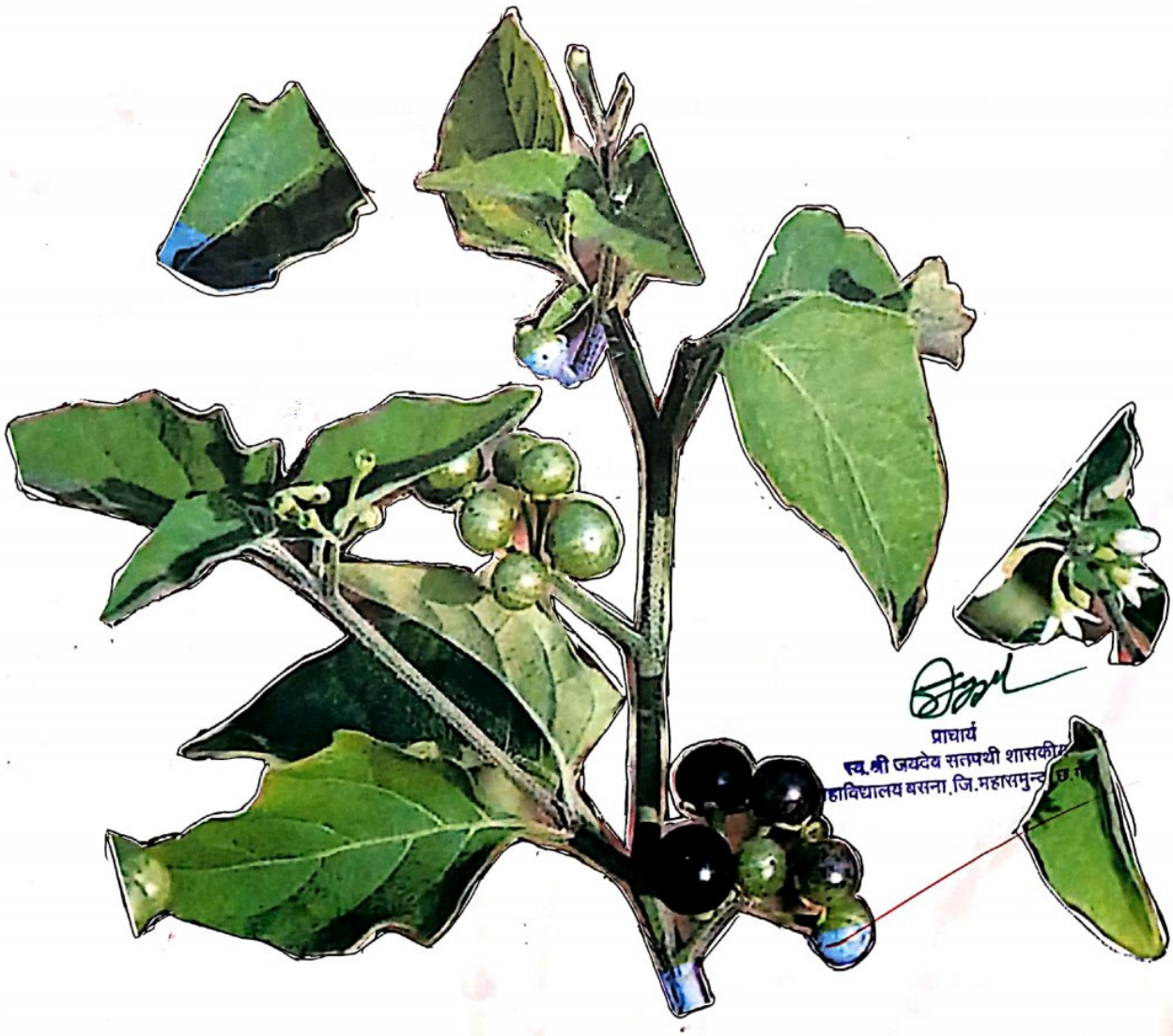
Several factors are responsible for acute air pollution in Raipur :-

Toxic industrial waste, domestic waste, too many vehicles (rough estimates say the number of vehicles has doubled in the last two years), rapidly increasing constructions and fast growing population.

NAME, USE & BENEFIT OF 5 MEDICINAL PLANT



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3) अपने क्षेत्र मे पाये जाने वाले पांच औषधि पौधो के नाम गुण उपयोग, बताते हुये सचित्र वर्णन कीजिए।

Trees and plants have an important place in the given boons of nature, Plants play an important role in the human life cycle. In view of their usefulness, they are divided into several categories. The importance of medicinal plants in them is different due to their medicinal properties. Today, due to growing chemical side effects, the attention of people all over the world is now moving towards Ayurveda, Homeopathy and Herbal medicines. Promoting the production of herbs in the country, spreading awareness about medicinal plants in empty places around the house and vacant places around the house has become a necessity today.

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ASHWAGANDHA

PLANT

ASHWAGANDHA PLANT

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Topic :..... Date :..... Page :....20.....

Ashwagandha / अश्वगंधा / Winter cherry

A small perennial shrub with white flowers and orange red berry found in warmer regions of India. Today the herb is completely domesticated and is cultivated extensively in central and western India. The roots are used in the preparation of various formulations of Ayurvedic origin.

Ashwagandha Uses :-

- Roots of winter cherry are highly acclaimed tonic for brain and nervous system in Ayurveda.
- Its usage is recommended in prevention health care.
- It is considered as 'Medhya' which implies to its beneficial effects to the brain.

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- Both clinical and experimental, observed that Ashwagandha acts as an antistress and adaptogenic herb.

- Regular use of Ashwagandha improves stress tolerance, thereby enhancing the mental capabilities. It is also known to improve the quality of immune functions.

Benefits of Ashwagandha

1) Helps Fight Depression
Ashwagandha might prove useful in reducing depression levels.

2) Treats Erectile Dysfunction
Ashwagandha is good for boosting the libido in men and can be used in the formulation of medicine for erectile dysfunction (ED).

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3) Increases Muscle Mass

Ashwagandha has been found to be useful in improving the muscle mass, body composition & overall strength.

4) Increase Fertility in Men

Ashwagandha uses also include increasing sperm count & Motility. It helps increase testosterone levels and significantly boosts sperm quality and fertility in men.

5) Controls Diabetes

One of the Ashwagandha benefits is to control diabetes. Ashwagandha stimulates the Pancreas to secrete insulin which helps lower blood sugar levels and hence control diabetes.

6) Enhances Memory

Ashwagandha supplements may improve brain function, memory & reaction times.

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7) Helps reduce Stress & Anxiety

Ashwagandha has been scientifically proven to reduce stress and anxiety. Ashwagandha helps reduce Cortisol also known as stress hormone which is released by the adrenal glands in response to stress.

8) Boosts Immunity

Studies have shown that consumption of Ashwagandha helps boost immunity. It also helps improve white blood cells & red blood cells.

9) Antibacterial properties

Ashwagandha has proven antibacterial properties. It helps to prevent bacterial infections.

10) lowers cholesterol

Ashwagandha health benefits also include improving heart health by lowering cholesterol.

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SHATAVARI PLANT

SHATAVARI PLANT

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Shatavari / Asparagus / शतावरी

A Prickly prostrate undershrub growing wild as well as cultivated in warmer region of the country. Fleshy tuberous roots of the plant are used in the preparations of traditional health care products

Uses of shatavari

- Shatawari is a well-recognized herb for its action as a nutritive tonic.
- Its use is specifically reccommended to enhance lactation in nursing mothers. The marked increase in lactation by shatavari has been scientifically proven today. Technically termed as galactogogue this effect is attributed to its action on the prolaction hormone level.

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Besides, it is recommended by Indian Ayurveda to improve physical stamina and immunity. Role of shatavari in enhancing immunity functions has also been prove scientifically.

Benefits of shatavari

1) Reduces cholesterol

Shatavari root powder has various compounds like saponins, flavonoids and ascorbic acid which increases the excretion of cholesterol. Asparagus/ shatavari helps reduce bad cholesterol and promotes the generation of good cholestrol which helps reduce the risk of cardiovascular diseases.

2) Diuretic

Shatavari is Diuretic in nature which means that regular consumption of shatavari can help to improve the volume and frequency of urination.

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3) Treats Diarrhea

Shatavari is an age-old remedy to treat diarrhea.

4) Aids Digestion

One of the shatavari benefits include enhancing digestion. It improves digestion by increasing the activity of digestion enzymes lipase and amylase. lipase aids fat digestion whereas amylase helps with the digestion of carbohydrates.

5) Treats kidney stones

Owing to shatavari's diuretic properties, it can prove useful in relieving kidney stones. Also, It is anti-urolithiasis which hastens the process of dissolving stones and stops the process of new stones formation

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6) Boosts Immunity

Shatavari roots contains Sapogenin which is a potent agent for stimulating immune cells. It helps in improving body's resistance against disease-causing agents. Sapogenins also stimulate the cells that fight infection by overpowering the infection causing cells.

7) Female Reproductive System

Shatavari's main components are saponins that help regulate estrogen. This modulation helps to control menstrual cycles, manage PMS symptoms, ease menstrual cramps and control the amount of bloss loss.

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BRINGRAJ

PLANT

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BRINGRAJ PLANT

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Bhringraj

Bhringaraj has been used as an effective home remedy in india for centuries. It is a medicinal plant used in Ayurveda not only for the known benefits of helping with hair growth but for many other health conditions as well. It also known as kesharaja.

Uses of Bhringraj

- Acts as a perfect anti-inflammatory agent. It deals effectively with pain, fever and inflammation.
- It has anti-bacterial properties too. It fights harmful free radicals in our body and improves our immunity.
- Helps in relieving pain by working on the nervous system.

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- Regular consumption of this herb gives you anti-aging effects. It also treats baldness and premature graying of hair

Benefits of Bhringraj

liver disorders

Bhringraj is an excellent herb which can be used as a liver tonic to manage liver disorders like enlargement of the liver, fatty liver and jaundice. It works by balancing pitta and promoting bile flow. The liver is the main site of metabolism of the body and Bhringraj is used to improve metabolism due to its Deepan (appetizer) and pachan (digestive) properties.

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2) Indigestion

Bhringraj is also useful in case of indigestion, constipation, and loss of appetite. This is due to its Deepan and pachan properties. These properties help to improve Pachak Agni (digestive fire) and help in easy digestion of food.

3) Boost Immunity

Bhringraj has Rasayana property which means it helps to increase immunity and vitality if used continuously for at least 3-4 months.

4) Diabetes

Bhringraj helps to control high blood sugar level due to its Tikta (bitter), Deepan (appetizer) and pachan (digestive) properties

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5) Anti - aging effect

Bhringraj has anti - aging action and rejuvenates the body due to its Rasayana (rejuvenating) property.

BHUMI AMLA PLANT

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Bhumi Amla

Bhumi Amla is also known as "phyllanthus niruri" is a tropical plant that grows 50-70 cm in height. This herb is known as "Bhumi Amla" because it's a small plant present in Bhumi (land) usually found in rainy season. The bark of this plant is light green in colour and smooth. The fruits of Bhumi Amla are tiny, smooth in capsules form containing seeds. The flowers are numerous pale green in colour which are often flushed with red colour.

Uses of Bhumi Amla

1. The juice of this whole plant is used for various medicinal disorders like loss of appetite, hyperacidity, anorexia, thirst, constipation, diarrhea and dysentery conditions etc.

- The decoction of Bhumi Amla is used for maintaining your liver function tests.
- chew few leaves of Bhumi Amla on empty stomach it will help to balance your doshas in the body.
- Use of Bhumi Amla powder is effective in various diseases
- Bhumi Amla capsules are also contains pure extract of this herb. We can use one capsule once or twice daily
- leaves paste of Bhumi Amla are used for treating skin infections
- For swelling leaves paste are used by mixing small amount of rock salt.
- Juice of Bhumi Amla use for treating splenomegaly, hepatomegaly, fever and various other disorders.

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- For indigestion, jaundice, anemia, anorexia and hyperacidity, Bhumi amla juice should be taken on empty stomach.
- Fresh leaves decoction is used for treating malaria, typhoid and various type of fever.
- For blocked nose use juice of Bhumi Amla in nasal drop form.
- Whole plant decoction is used for purification of blood

Benefits of Bhumi Amla

- The herb is very effective for anemic patients.
- Bhumi Amla is beneficial in bleeding disorders like heavy periods & nasal bleeding etc.

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- Effective herb in toxic conditions.
- Bhumi Amla improves taste and beneficial in anorexia condition.
- In all type of skin diseases the herb is beneficial.
- Not only in anorexia but also beneficial in excessive thirst condition.
- Effective herb for Asthma and chronic respiratory disorders patients.
- Gives effective results in burning sensation problems.
- Bhumi Amla is used in Cough and cold problem.
- Help to get relive from hiccups.

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BRAHMI PLANT

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महाविद्यालय बरगना, जि.महासमुन्द (छ.ग.)

BRAHMI PLANT

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एस.श्री जयदेव सतपथी शासकीय
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Brahmi/ Thyme leafed gratiola/ ब्राम्ही

A prostrate or creeping glabrous annual rooting at the nodes with numerous ascending branches found in wet places throughout India. It is also cultivated in many pockets of the country these days. Whole plant is used medicinally.

Uses of Brahmi

Brahmi is highly acclaimed for its "Medhya Rasayana" properties by Indian Ayurveda. Such property renders it to be an effective herb to enhance memory and learning process

Experimental and clinical research indicates that use of Brahmi extract reduce anxiety levels by influencing various neurohumoral complexes and increases immediate memory span.

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It has been successful used in enhancing memory and other positive mental facalties in both normal and mentally retarded children with encouraging results.

Benefits of Brahmi

1) Cognitive Abilities

Brahmi has been hailed as a memory booster for several centuries for increasing focus and attention. Ayurveda recommends Brahmi extract or supplements for kids aged between 6 to 8 years for improving hand-eye coordination. It is also recommended for people suffering from Seizures and those with Alzheimer's.

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2) Prevents Anxiety

If you are suffering from anxiety and sudden panic attack, it's time to include Brahmi in your daily diet. Studies reveal that drinking brahmi juice or taking supplements daily for 4 weeks reduce anxiety, palpitations, nervousness, insomnia, fatigue, headaches, stomach discomfort caused due to stress.

3) Avoids Asthmatic Attacks

Brahmi is highly beneficial for patients suffering from asthma. Chew on few Brahmi leaves or steep them in your tea or improving pulmonary function and to treat various respiratory issues like congestion, bronchitis, colds, sinusitis. It also acts as an expectorant by clearning phlegm and mucus in the throat and respiratory tracts.

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4) Heals Wounds

The juice of Brahmi acts as an instant healer in treating wounds and disinfecting the affected area. Apply Brahmi juice on the affected area as it prevents scars by providing a soft, supple texture to the skin.

5) Controls Blood Sugar

Brahmi leaves are known for Antihyperglycemic properties and are widely recommended for diabetics. studies reveal that regul consumption of Brahmi leaves can improve the symptoms related to diabetes and help in leading a healthy life.

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