

## B.Sc.- I (BOTANY) PAPER-I

### BACTERIA, VIRUSES, FUNGI, LICHENS AND ALGAE

#### UNIT-I

**VIRUSES:** General characteristics, types of viruses based on structure and genetic material. Multiplication of viruses (General account), Lytic and Lysogenic cycle. Economic importance. Structure and multiplication of Bacteriophages. General account of Viroids, Virusoids, Prions, and Cyanophages. Mycorrhiza-Types and Significance.

#### UNIT -II

**BACTERIA:** General characteristics and classification (on the basis of morphology), fine structure of bacterial cell, Gram positive and Gram negative bacteria, mode of nutrition and reproduction vegetative, asexual and recombination (Conjugation, transformation and transduction), Economic importance. Microbial Biotechnology, *Rhizobium*, *Azotobacter*, *Anabena*.

#### UNIT-III

**FUNGI:** General account of habit and habitat, structure (range of thallus organization), cell wall composition, nutrition and reproduction in fungi. Heterothallism and Parasexuality. Outlines of classification of fungi. Economic importance of fungi. Life cycles of *Saprolegnia*, *Albugo*, *Aspergillus*, *Peziza*, *Agaricus*, *Ustilago*, *Puccinia*, *Alternaria* and *Cercospora*. VAM Fungi

#### UNIT-IV

**ALGAE:** Algae: General characters, range of thallus organization, Gaidukov phenomenon, reproduction, life cycle patterns and economic importance. Classification, Systematic position, occurrence, structure and life cycle of following genera : *Nostoc*, *Gloeocapsa*, *Volvox*, *Oedogonium*, *Vaucheria*, *Chara*, *Ectocarpus*, *Polysiphonia*.

#### UNIT -V

Lichens- General account, types, structure, nutrition, reproduction and economic importance. Mycoplasma: Structure and importance. Blue Green Algae (BGA) in nitrogen economy of soil and reclamation of Ushar land. Mushroom Biotechnology

#### Books Recommended:

- Dubey R.C. and Maheshwari D.K. *A text book of Microbiology*, S. Chand Publishing, New Delhi
- Presscott, L. Harley, J. and Klein, D. *Microbiology*, 7<sup>th</sup> edition, Tata Mc Graw-Hill Co. New Delhi.
- Sharma P.D., *Microbiology and Plant pathology*, Rastogi Publication. New Delhi.

**B.Sc.-I (BOTANY) PAPER –II**  
**(BRYOPHYTES, PTERIDOPHYTES, GYMNOSPERMS AND**  
**PALAEOBOTANY)**

**UNIT –I**

**BRYOPHYTA:** General characteristics, affinities, range of thallus organization, general classification and economic & ecological importance, Systematic position, occurrence, morphology anatomy and reproductive structure in *Riccia*, *Marchantia*, *Pellia*, *Anthoceros*, *Funaria*. Vegetative reproduction in Bryophytes, Evolution of sporophytes.

**UNIT-II**

**PTERIDOPHYTES:** General characteristics, affinities, economic importance and classification, Heterospory and seed habit, stellar system in Pteridophytes, Aposory and apogamy, Telome theory, *Azolla* as Biofertilizer.

**UNIT-III**

Systematic position, occurrence. Morphology, anatomy and reproductive structure of *Psilotum*, *Lycopodium*, *selaginella*, *Equisetum*, *Marsilea*.

**UNIT-IV**

Gymnosperm: General characteristics, affinities, economic importance and classification, Morphology, anatomy and reproduction in *Cycas*, *Pinus* and *Ephedra*.

**UNIT-V**

PALAEOBOTANY: Geological time scale, types of fossils and fossilization, Rhynia, study of some fossil gymnosperms. *Lygenopteris*

**Books Recommended:**

Parihar, N.S. *The Biology and Morphology of Pteridophytes*, Central Book Depot, Allahabad.

Parihar, N.S. *An introduction to Bryophyta Vol.I: Bryophytes* Central Book Depot, Allahabad.

Sambamurty, AVSS, *A textbook of Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany*, IK International Publishers.



## **B.Sc.–II (BOTANY) PAPER-I**

### **(PLANT TAXONOMY, ECONOMIC BOTANY, PLANT ANATOMY AND EMBRYOLOGY)**

#### **UNIT-I**

Bentham and Hooker system of classification. Binomial Nomenclature, International Code of Nomenclature for Algae, Fungi, and plants (IUCN), Typification, numerical Taxonomy and chemotaxonomy. Preservation of Plant material and Herbarium techniques. Important botanical gardens and herbaria of India, Kew Botanical garden, England.

#### **UNIT-II**

Systematic position, distinguishing characters and economic importance of the following families, Ranunculaceae, Magnoliaceae, Brassicaceae, Rosaceae, Papaveraceae, Caryophyllaceae, Rutaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Apocynaceae, Asclepiadaceae, Solanaceae, Malvaceae, Convolvulaceae, Orchidaceae, Acanthaceae, verbenaceae, Lamiaceae, Asteraceae, Fabaceae, Euphorbiaceae, Poaceae and Liliaceae.

#### **UNIT-III**

Economic Botany: Botanical name, family, part used and uses of the following economically important plants, fiber yielding plants; Cotton, jute, sun, hemp, coir. Timber yielding plants: Sal, Teak, Shisham and Pine. Medicinal plants: Kalmegh, Ashwagandha, Ghritkumari, Giloy, Brahmi, sarpagandha, ---of medicinal plants of C.G. Food plants: Pearl millet, Buck of wheat, Sorghum, Soyabean, gram, Ground nut, Sugarcane and Potato. Fruit plants: Pear, Peach, Litchi. Spices: Cinnamon, Turmeric, Ginger, Asafoetida and Cumin. Beverages : Tea, Coffee Rubber Cultivation of important flowers: Chrysanthemum, Dahelia, Biodiesel plants Jatropha, Pongamia Ethnobotany in context of Chhattisgarh.

#### **UNIT-IV**

Plant Anatomy: Root and shoot apical meristems theories of root and shoot apex organization, permanent tissues, anatomy of root, stem and leaf of dicot and monocot, secondary growth in root and stem, Anatomical anomalies in the primary structure of stems (Nyctanthes, Boerhaavia, Casuarina), Anamolous secondary growth in Dracaena, Bignonia, Laptadenia.

#### **UNIT-V**

Embryology: Flower as a reproductive organ, anther, microsporogenesis, types of ovules, megasporogenesis, development of male and female gametophyte, pollination, mecha : incompatibility, fertilization, endosperm, embryo, polvembryu

**Books Recomm**

**B.SC.-III (BOTANY) PAPER –I**  
**(ANALYTICAL TECHNOLOGY PLANT PATHOLOGY,  
EXPERIMENTAL EMBRYOLOGY, ELEMENTARY BIOSTATISTICS,  
ENVIRONMENTAL POLLUTION AND CONSERVATION)**

**UNIT-I**

Structure, Principle and applications of analytical instrumentation.

Chromatography technique, Oven, Incubator, Autoclave, Centrifuge, Spectrophotometere

**UNIT-II**

Plant Tissue culture techniques, growth media, totipotency, protoplast culture, somatic hybrids and cybrids, micropropagation , somaclonal variations, haploid culture.

Analytical techniques: Microscopy-Light microscope, Electron microscope

**UNIT-III**

General principles of plant pathology, general symptoms of fungal, bacterial and viral diseases, mode of infection, diseases resistance and control measures, plant quarantine. A study of epidemiology and etiology of following plant diseases.

Rust diseases of wheat, Tikka diseases of ground nut, Red rot of sugar can, Bacterial blight of rice, Yellow vein mosaic of b hindi, Little leaf of brinjal.

**UNIT-IV**

Introduction to pollution, green house gases, Ozone depletion, Dissolve oxygen, B.O.D., C.O.D.

Bio magnification, Eutrophication, Acid precipitation, Phytoremediation, Plant indicators,. Biogeographical Zones of India, Concept of biodiversity, CBD, MAB, National parks and



**Paper- II: Environmental, industrial and Agricultural Microbiology**

**UNIT-1: AIR MICROBIOLOGY**

Basics of Aerobiology, Microbes in atmosphere, source of microorganism in air, droplet nuclei, infectious dust, and bio-aerosol. Factors affecting microbial survival in the air. Sampling, collection and Isolation of microbes from air.

**UNIT-2: WATER MICROBIOLOGY**

Basic concept, water zonation, eutrophication, microbial community in natural water. Determining the quality of water- bacteriological evidence for fecal pollution, indicator of fecal pollution. Water purification methods. Disinfection of potable water supply.

**UNIT-3: SOIL MICROBIOLOGY.**

Soil as an environmental culture medium, microbes of soil. Brief account of microbial interactions-symbiosis, mutualism, commensalism, competition, predation, parasitism. Microbiological examination of soil. Rhizosphere- concept and role of microbes, rhizosphere and non rhizosphere micro-flora. Mycorrhiza.

**UNIT-4: INDUSTRIAL MICROBIOLOGY.**

Introduction and brief history and scope, important microbes in various industries. Fermentation- definition, types-Aerobic and anaerobic, Batch and SSF. Important products bread, cheese, vinegar, fermented dairy products and oriented fermented food involving microbes. Microbial cells as food. SCP -mushroom cultivation, production of alcohol and fermented beverages, beer and Wine

**UNIT-5: AGRICULTURAL MICROBIOLOGY**

History of Agricultural Microbiology; Microbes and their importance in maintenance of soil, Biogeochemical cycles, role of microbes in maintaining the fertility of soil. Bio fertilizers –Bacterial, azotobacter and vermiform compost. Soil microorganism - association with vascular plants- phyllosphere, Rhizobium, Rhizoplane associative nitrogen fixation. Bio-fertilizers - Cyanobacterial and Azolla

***Text Books Recommended:***

1. Hugo, W.B., Russell, A.D, pharmaceutical Microbiology 4th edition. Blackwell scientific publications / Oxford.
2. Russell and Ayliffe, G. A .J (1982) Principles and practice of Disinfection, preservation and sterilization Oxford:
3. Gregory P.H. Microbiology of the atmosphere.2nd edition. Leonard Hill.
4. Food Microbiology by WC Frazier and D Westhoff.
5. Agricultural Microbiology by Bhagyaraj and Rangaswamy.
6. Bioremediation by KH Baker and DS Herson

*Sullana*

*Phorale*

*S/B*

*Dominikabhar*

*Amirala*

**B.Sc. III  
BIOTECHNOLOGY**

**PAPER – I**

**PLANT, ENVIRONMENTAL AND INDUSTRIAL BIOTECHNOLOGY**

**UNIT-I**

**MM-50**

1. Introduction to Plant cell and Tissue culture: History, Scope and Application.
2. Tissue culture Media and Cellular Differentiation.
3. Protoplast Isolation and Fusion, Organogenesis, Embryogenesis, Anther and Ovary culture.

**UNIT-II**

1. Agrobacterium Mediated Transformation, Ti and Ri Plasmid.
2. Bt Gene and Bt Cotton, Edible vaccines and Genetically modified plants- Golden Rice, Herbicide Resistance, Drought Resistance.
3. Germplasm storage and Cryopreservation.

**UNIT-III**

1. General Introduction and Scope of Environmental Biotechnology.
2. Environmental Pollution and its type.
3. Solid Waste Management: Principle of management, Types of Sources, Effect of Solid waste, Concept of composting and Vermi composting.
4. Wastewater Treatment: Physical, Chemical, and Biological.

**UNIT-IV**

1. Biofertilizer and Biopesticides- Cyanobacteria, Bacteria, Fungi; Significance and Practices.
2. Bioremediation of Xenobiotics compounds.
3. Types of IPR-Patents, Copyright, Trademark, G.I., Patenting Genes and Life form.

**UNIT-V**

1. Types of Bioreactor: Design of Stirred tank, Fluidized bed.
2. Fermentation: Lactic acid and Alcohol.
3. Industrially important Microorganisms: Isolation, Preservation (Slant, Mineral Oil and Lyophilize) and its application.
4. Food Technology: Food spoilage. Canning, Packing and Food Preservation.

**Zoology**  
**B.Sc. Part III 2018-19**

**Paper-I**

**ECOLOGY, ENVIRONMENTAL BIOLOGY: TOXICOLOGY,  
MICROBIOLOGY AND MEDICAL ZOOLOGY**

**Unit: I (Ecology)**

- Aims and scopes of ecology
- Major ecosystems of the world-Brief introduction
- Population- Characteristics and regulation of densities
- Communities and ecosystem
- Bio-geo chemical cycles
- Air & water pollution
- Ecological succession

**Unit: II (Environmental Biology)**

- Laws of limiting factor
- Food chain in fresh water ecosystem
- Energy flow in ecosystem- Trophic levels
- Conservation of natural resources
- Environmental impact assessment

**Unit: III (Toxicology)**

- Definition and classification of Toxicants
- Basic Concept of toxicology
- Principal of systematic toxicology
- Heavy metal Toxicity (Arsenic, Mercury, Lead, Cadmium)
- Animal poisons- snake venom, scorpion & bee poisoning
- Food poisoning

**Unit: IV (Microbiology)**

- General and applied microbiology
- Microbiology of domestic water and sewage
- Microbiology of milk & milk products
- Industrial microbiology: fermentation process, production of penicillin, alcoholic beverages, bioleaching.

**Unit: V (Medical Zoology)**

- Brief introduction to pathogenic microorganisms, Rickettsia, Spirochaetes, AIDS and Typhoid
- Brief account of life history & pathogenicity of the following pathogens with reference to man: prophylaxis & treatment
- Pathogenic protozoan's- Entamoeba, Trypanosome & Plasmodium
- Pathogenic helminthes- Schistosoma
- Nematode pathogenic parasites of man
- Vector insects



## PART - I

### SULLABUS FOR ENVIRONMENTAL STUDIES" FOR UNDER GRADUATE

1. "इन्वाहमेन्टल साईसेस" 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।
2. पाठ्यक्रम 100 अंको का होगा, जिसमें से 75 अंकर सैद्धांतिक प्रश्नों पर होंगे एवं 25 अंक क्षेत्रीय कार्य (Field Work) पर होंगे।
3. सैद्धांतिक प्रश्नों पर अंक - 75 (सभी प्रश्न इकाई आधार पर रहेंगे जिसमें आंतरिक विकल्प रहेगा)  
(अ) लघु प्रश्नोंत्तीर - 25 अंक  
(ब) निबंधात्मक - 50 अंक
4. Field Work - 25अंकों का मूल्यांकन आंतरिक मूल्यांकन पद्धति से कर विश्वविद्यालय को प्रेषित किया जावेगा। अभिलेखों की प्रयोगिक उत्तर पुस्तिकाओं के समान संबंधित महाविद्यालयों द्वारा सुरक्षित रखेंगे।
5. उपरोक्त पाठ्यक्रम से संबंधित परीक्षा का आयोजन वार्षिक परीक्षा के साथ किया जाएगा।
6. 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 सैद्धांतिक एवं फील्ड वर्क में संयुक्त रूप से 33% (तैंतीस प्रतिशत) अंक उत्तीर्ण होने के लिए अनिवार्य होंगे।
7. स्नातक स्तर भाग-एक के समस्त नियमित/भूतपूर्व/अमहाविद्यालयीन छात्र/छात्राओं को अपना फील्ड वर्क सैद्धांतिक परीक्षा की समाप्ति के पश्चात 10 (दस) दिनों के भीतर संबंधित महाविद्यालय/परीक्षा केन्द्र में जमा करेंगे एवं महाविद्यालय के प्राचार्य/केन्द्र अधीक्षकों/परीक्षकों की नियुक्ति के लिए अधिकृत रहेंगे तथा फील्ड वर्क जमा होने के सात दिनों के भीतर प्राप्त अंक विश्वविद्यालय को भेजेंगे।

## PART - I

### SULLABUS FOR ENVIRONMENTAL STUDIES" FOR UNDER GRADUATE

M.M. 75

#### UNIT-I THE MULTI DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES :

Definition, scope and importance

Need for public awarness.

#### Natural Resources :

#### Renewable and nonrenewable resources :

Natural resources and associated problems.

- (a) Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- (b) Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.
- (c) Mineral resources : Use and explotation, environmental effects of extracting and

(7)

- using mineral resources, case studies.
- (d) Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- (e) Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
- (f) Land resources : Land as a resources, land degradation, man induced landslides, soil erosion and desertification.
  - Role of an individual in conservation of natural resources.
  - Equitable use of resources for sustainable life-styles.

(9 Lecture)

## UNIT-II ECOSYSTEMS

**Concept of an ecosystems.**

**Structure and function of an ecosystem.**

- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem :
  - a. Forest ecosystem
  - b. Grassland ecosystem
  - c. Desert ecosystem
  - d. Aquatic ecosystems (Ponds, streams, lakes, rivers, oceans, estuaries)

(9 Lecture)

## UNIT-III Biodiversity and its Conservation

- Introduction - Definition : genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as mega-diversity nation.
- Hot-spots of biodiversity
- Threats to biodiversity : habitat loss, poaching of wildlife, manwildlife conflicts.
- Endangered and endemi species of India.
- Conservation of biodiversity : In situ and Ex-situ conservation of biodiversity

(9 Lecture)

## UNIT-IV Environmental Pollution

**Definition**

- Causes, effects and control measures of -
  - a. Air pollution



- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- g. Nuclear hazards.
- Solid waste management : Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies
- Disaster management : floods, earthquake, cyclone and landslides.

### **Human Population and the Environment**

- Population growth, variation among nations,
- Population explosion - Family Welfare Programme.
- Environment and human health.
- Human Rights.

(9 Lecture)

### **UNIT-V Social Issues and the Environment**

- From Unsustainable to Sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people, its problems and concerns. Case studies.
- Environmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of environmental legislation.
- Public awareness.
- Value Education
- HIV/AIDS
- Women and Child Welfare.
- Role of Information Technology in Environment and Human Health.
- Case Studies.

(9 Lecture)

### **FIELD WORK**

- Visit to a local area to document environmental assets-river/forest/grassland/hill/mountain.
- Visit to local polluted site : Urban/Rural/Industrial/Agriculture.



# ENGLISH LANGUAGE AND INDIAN CULTURE

(Based on Revised Unified Foundation Course for B.A., B.Sc.,  
B.H.Sc and B.Com I Year Students  
in force from Academic Session 1999-2000)

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**Madhya Pradesh Hindi Granth Academy**  
**Bhopal**

## CONTENTS

Foreword	i
1. Where the Mind is Without Fear Rabindranath Tagore	1
2. The Ideals of Indian Art K. Bharatha Iyer	4
3. The Wonder That was India A.L. Basham	21
4. The Heritage of Indian Art Kapila Vatsyayan	35
5. Life in Vedic Literature Krishna Chaitanya	45
6. The Ramayana and the Mahabharata	61
7. Freedom Movement in India Sudhir Chandra	76
8. Dandi March Louis Fischer	94
9. Aspects of Indian Constitution M.C. Chagla	111
10. Individual Freedom Jawaharlal Nehru	125
11. Fundamental Duties	141
12. Delhi in 1857 Mirza Ghalib	152
13. Raja's Diamond R.L. Stevenson	160
14. Tree Tina Morris	175
Hints on Consulting a Dictionary	183



# FOUNDATION ENGLISH

(For B.A., B.Sc., B.Com., B.H.Sc., Second Year Students of Chhattisgarh)

छत्तीसगढ़ राज्य हिंदी ग्रंथ अकादमी

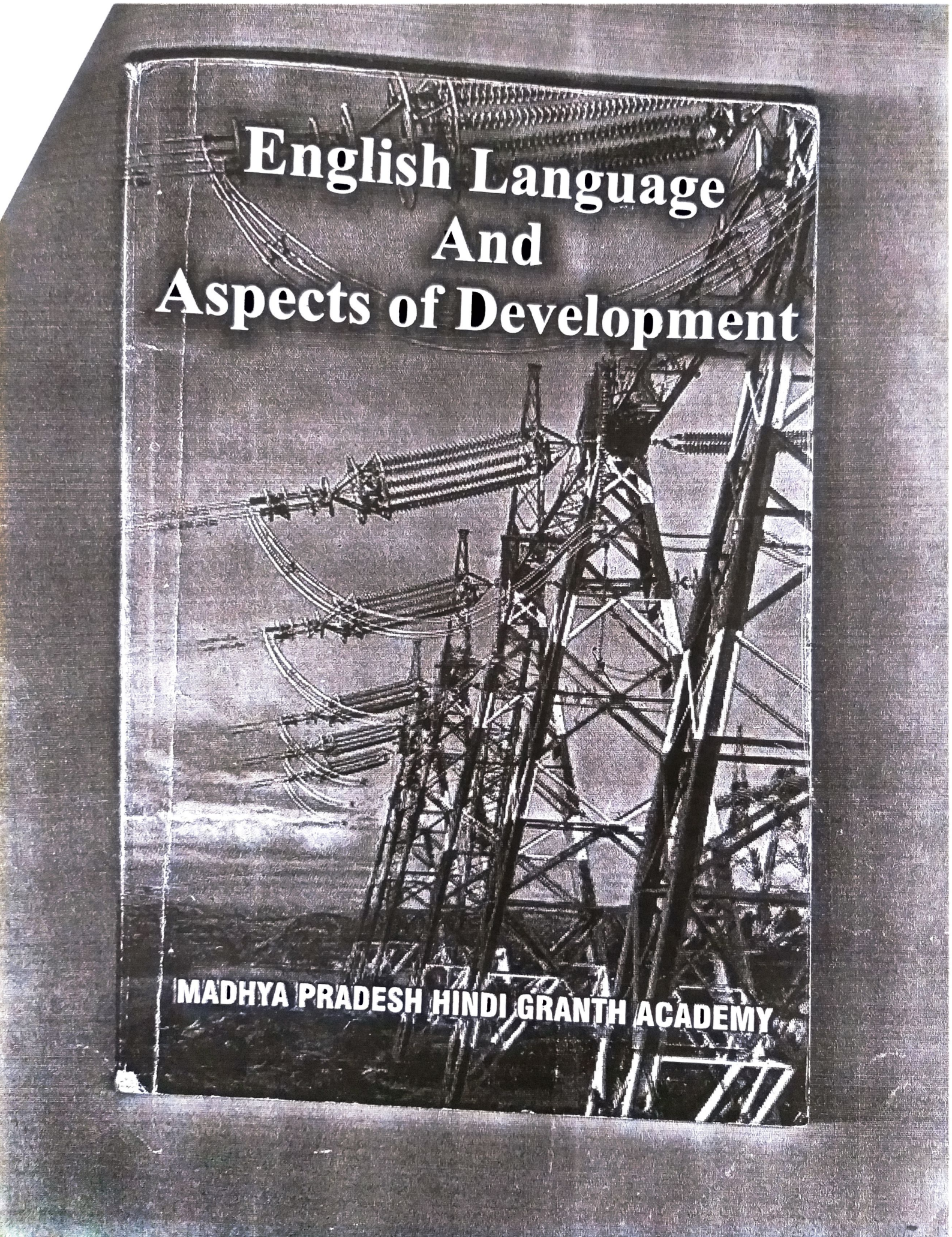


# Contents

1.	Sonnet — To Science	1
2.	All men Are Scientists ✕	9
3.	Science in Ancient India ✕	27
4.	Major Ancient Indian Scientists	38
5.	J.C. Bose	58
6.	Srinivasa Ramanujan ✕	73
7.	Communication in the Modern Age ✕	82
8.	Computers ✕	94
9.	Plastic Surgery' ✕	108
10.	Fighting Disease	118
11.	Water Pollution ✕	127
12.	Hiroshima ✕	141
13.	War	158
14.	October 2026 : The Million-Year Picnic ✕	171

मा महामाया बुक डिपो  
कालेज बुक अजय माली परीक्षा बोध  
फोटो कॉपी लेमिनेशन स्पाइरल बाइंडिंग  
पी.जी.कालेज के सामने अम्बिकापुर (छ.ग.)





**English Language  
And  
Aspects of Development**

**MADHYA PRADESH HINDI GRANTH ACADEMY**



# TABLE OF CONTENTS

I	Three Years She Grew × William Wordsworth	1
II	Death of a Clerk Anton Chekhov	14
III	The Judgement- Seat of Vikramaditya Sister Nivedita	27
IV	Rana Pratap E.L. Turnbull	42
V	Bores × E.V. Lucas	60
VI	The Universality of Religion Romain Rolland	72
VII	Communication Education and Information Technology × K. Aludiapillai	80
VIII	Women and Development Leela Dube	91
IX	Democratic Decentralisation ×	100
X	Basic Quality of Life × S.C. Dube	112



# हिंदी के श्रेष्ठ निबंध एवं प्रयोगगत व्याकरण

## हिंदी भाषा

भाग - दो, आधार पाठ्यक्रम

प्रश्न पत्र - प्रथम (हिंदी भाषा)

पूर्णांक 75

## विषय-सूची

क्र.	लेखक	खंड क निबंध	(अंक 30) पृष्ठ
1.	महात्मा गाँधी	- सत्य और अहिंसा	7
2.	विनोबा भावे	- ग्राम सेवा	11
3.	आचार्य नरेन्द्र देव	- युवकों का समाज में स्थान	13
4.	वासुदेव शरण अग्रवाल	- मातृ-भूमि	17
5.	भागवत शरण उपाध्याय	- हिमालय की व्युत्पत्ति	23
6.	हरि ठाकुर	- डॉ. खूबचंद बघेल	28
<b>खंड ख</b>			<b>(अंक 20)</b>
	हिन्दी भाषा और उसके विविध रूप		38
	- कार्यालयीन भाषा		44
	- मीडिया की भाषा		62
	- वित्त एवं वाणिज्य की भाषा		65
	- मशीन की भाषा		65
<b>खंड ग</b>			<b>(अंक 25)</b>
	अनुवाद व्यवहार - अंग्रेजी से हिंदी में अनुवाद		71
	हिंदी की व्यावहारिक कोटियाँ		78
	रचनागत प्रयोग उदाहरण, संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण, समास, संधि एवं संक्षिप्तियाँ, रचना एवं प्रयोगगत विवेचना ।		

## अनुक्रमणिका

### इकाई - 1

(क)	1. भारतमाता (कविता)	1
	— सुमित्रानंदन पंत	
	2. परशुराम की प्रतीक्षा	4
	— रामधारी सिंह दिनकर	
	3. बहुत बड़ा सवाल (एकांकी)	9
	— मोहन राकेश	
	4. संस्कृति और राष्ट्रीय एकीकरण	43
	— योगेश अटल	
(ख)	कथन की शैलियाँ	51
	1. विवरणात्मक शैली	
	2. मूल्यांकन शैली	
	3. व्याख्यात्मक शैली	
	4. विचारात्मक शैली	

### इकाई - 2

(क)	1. विकासशील देशों की समस्याएँ : मानव विकास प्रतिवेदन	62
	— डॉ. रामशंकर तिवारी	
	2. विकासात्मक पुनर्विचार : कल्याण के प्रश्न	73
	— डॉ. ओंकारशरण श्रीवास्तव	
(ख)	विभिन्न संरचनाएँ	80
	1. विनम्रता सूचक संरचना	
	2. विधि सूचक संरचना	
	3. निषेधपरक संरचना	
	4. कालबोधक संरचना	
	5. स्थानबोधक संरचना	
	6. दिशा बोधक संरचना	