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Department of Higher Education Govt of M.P.  
Under Graduate year wise syllabus

As recommended by central Board of Studies and approved by The  
Governor of M.P.

उच्च शिक्षा विभाग, म.प्र. शासन

स्नातक कक्षाओं के लिये वार्षिक पद्धति अनुसार पाठ्यक्रम  
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा म.प्र. के राज्यपाल द्वारा अनुमोदित  
सत्र-2020-2021

Class: B.Sc. Second Year  
Subject: Environmental Science  
Paper : I  
Title of paper: Environmental Pollution  
Max. Marks : 40+10 CCE- Regular Students  
50- Private Students

**UNIT-I**

- Introduction to pollution and brief idea about natural and man induced pollution, classification and types of pollutants.
- Definition of Air pollution, types and sources of air pollutants.
- Effect of air pollutants on environment, oxides of carbon, Nitrogen, sulfur
- Photochemical SMOG, Air pollution control measures, automobile pollution; general idea.

**UNIT-II**

- Sources and types of water pollutants.
- Types of water pollution, water quality parameters; general idea.
- Eutrophication.
- Effects of water pollutants on human health.
- Effects of water pollutants on aquatic organisms.
- Marine pollution, sources and types of marine pollutants, effects and control of marine pollutants.

**UNIT-III**

- Problems caused due of water pollutants like cadmium, mercury & detergents.
- Control measures of water pollution with special reference to:
  - Industrial effluent treatment plant.
  - Sewage treatment plant.
- Introduction of thermal Pollution.
- Sources, effects and control measures of thermal pollution.

*Rameshwar*  
(Dr RK Divastar)  
3/6/19

*Arjun*  
3/6/19  
(Dr. S. M. Karmacharya)

- Radiation pollution, ionizing and non ionizing radiation.

**UNIT-IV.**

- Soil Pollution, definition and sources.
- Types of soil pollutants and their effects on soil organisms
- Control measures for soil pollution, Phytoremediation
- Solid waste pollution-introduction and classification.
- Sources of solid wastes and methods of their disposal.
- Solid waste management.

**UNIT-V**

- Noise pollution, sources, causes, effects, and control measures.
- Environmental Laws; needs, importance and scope.
- Environmental Protection Act 1986, general idea.
- Problems in implementation of Environmental laws.

Dr. R. K. Pillai  
Dr R K Pillai  
3/6/19

AG  
3/6/19  
Dr. D. M. Kumar

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उच्च शिक्षा विभाग, म.प्र. शासन  
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केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा म.प्र. के राज्यपाल द्वारा अनुमोदित  
सत्र-2020-2021

Class: B.Sc. Second Year  
Subject: Environmental Science  
Paper : II  
Title of paper: - Plant Life, Physiology & Environmental Management

Max. Marks : 40+10 CCE- Regular Students  
50- Private Students

### UNIT-I

- Brief idea about non vascular and vascular plants.
- Characteristics, habitat, mode of vegetative multiplication, economic importance of Bryophytes & their role in soil formation.
- Characteristics, habitat, and economic importance of lichens.
- Lichens as environmental indicator and pioneer of vegetation.
- Pteridophytes – Characteristics, habitat and economic importance, stellar organization in pteridopytes.
- Gymnosperms and Angiosperms; characteristics, habitat and economic importance.

### UNIT-II

- Plants of Medicinal importance in Allopathic, Unani, Ayurvedic and Homoeopathy Systems.
- General idea about Ethnobotany, plants in Indian literature and their medicinal importance.
- Water and plants relations; imbibitions, osmosis, plasmolysis and water potential.
- Absorption of water, types & mechanism, factors affecting absorption of water.

### UNIT-III

- Transpiration; definition, types and mechanism.
- Effect of Environmental factors on transpiration.
- Ascent of Sap; mechanism, theories and its significance.

Revised  
Dr. R.K. Gaur  
3/6/19

Dr. D. K. Kumar  
3/6/19



Department of Higher Education, Govt of M.P.  
Under graduate Annual Pattern wise syllabus  
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उच्च शिक्षा विभाग, म.प्र. शासन  
स्नातक कक्षाओं के लिये वार्षिक पाठ्यक्रम  
केंद्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा म.प्र. के राज्यपाल द्वारा अनुमोदित

Session 2019-2020

सत्र -2019-20

Class/	:	B.A/बी.ए. प्रथम वर्ष
Subject/	:	हिन्दी साहित्य
प्रश्न पत्र	:	द्वितीय / second
Title of paper	:	Hindi katha sahitya
प्रश्नपत्र का शीर्षक	:	हिन्दी कथा साहित्य
Max.Marks /अधिकतम अंक	:	40 नियमित 50 स्वाध्यायी

Particulars/विवरण

इकाई एक	गोदान - प्रेमचन्द अथवा महाभोज- मन्नू भंडारी निर्धारित उपन्यासों एवं कहानियों से व्याख्या
इकाई दो	हिन्दी उपन्यास एवं कहानी का उद्भव, विकास एवं प्रवृत्तियाँ
इकाई तीन	"गोदान" अथवा "महाभोज" पर समीक्षात्मक प्रश्न
इकाई चार	निर्धारित कहानियों पर समीक्षात्मक प्रश्न
इकाई पांच	द्रुत पाठ - अमृतलाल नागर, यशपाल, फणीश्वरनाथ रेणु, राजेन्द्र यादव, कृष्णा सोबती, मालती जोशी और चित्रा मुद्गल (व्यक्तित्व एवं कृतित्व)
नोट-	द्रुत पाठ के कहानीकारों पर लघु उत्तरीय प्रश्न पूछे जाएंगे।

पाठ्यांश-

1 उपन्यास:-

गोदान- प्रेमचंद अथवा महाभोज-मन्नू भंडारी

2 हिन्दी कथा साहित्य :-

- (1) पुरस्कार-जयशंकर प्रसाद
- (2) बूढ़ी काकी -प्रेमचंद
- (3) अपना-अपना भाग्य-जैनेन्द्र कुमार
- (4) रोज-अज्ञेय
- (5) वापसी -उषा प्रियंवदा
- (6) चीफ की दावत-भीष्म साहनी
- (7) दीपहर का भोजन-अमरकांत

द्रुत पाठ- अमृतलाल नागर, यशपाल, फणीश्वरनाथ रेणु, राजेन्द्र यादव, कृष्णा सोबती, मालती जोशी और चित्रा मुद्गल । द्रुत पाठ के कहानीकारों पर लघु उत्तरीय प्रश्न पूछे जाएंगे।

3  
Dr. Yashpal  
Dr. Yashpal

Dr. Anand  
Dr. Anand  
(21/11/2019)



**BARKATULLAH UNIVERSITY, BHOPAL**

<i>Class</i>	-	<b>M.Sc.</b>
<i>Subject</i>	-	<b>Microbiology</b>
<i>Paper Name</i>	-	<b>MB-302 ENVIRONMENTAL MICROBIOLOGY</b>
<i>Paper</i>	-	<b>10</b>
<i>Semester</i>	-	<b>Third</b>

**MM : 85**

- UNIT-I** Microorganisms of air, enumeration of air microflora, significance of microorganisms in air, control of air borne microorganisms. Some common diseases caused due to airborne microflora Interdisciplinary approach of air borne microorganisms.
- UNIT-II** Microbial assessment of water quality: test for coliforms (presumptive test confirmed test and completed test), MPN of coliforms. Purification of water. Brief account of water borne diseases and their control measures. Microorganisms of sewage, small scale sewage treatment (cesspools, septic tanks), large scale sewage treatment (primary treatment, secondary and tertiary treatment (lagoons, trickling filter, activated sludge, anaerobic digesters).
- UNIT-III** Microbial degradation of biogenic compounds: cellulose and lignins. Microbiology of degradation of xenobiotics: ecology considerations, decay behavior and degradative plasmids. Microbial degradation of hydrocarbons and substituted hydrocarbons Microbial degradation of surfactant, pesticides and synthetic polymers.
- UNIT-IV** Bioremediation, principles and strategies. Phytoremediation - Types of energy sources and their uses, Biofuels-biogas, bioethanol, biohydrogen, biodiesel.

**UNIT-V** Mining with microorganisms: Bioleaching and bioextractive metallurgy. Accumulation of metals by microbial cells. Microbial restoration of wastes and degraded land. Microbial toxins in the environment: bacterial and algal toxins.

**REFERENCE BOOKS**

- Odum, E.P., Fundamentals of Ecology
- Metcalf & Eddy, Wastewater Engineering - Treatment, Disposal and Reuse, 3rd ed., Tata McGrawhill
- Rao, C.S., Environmental Pollution Control Engineering, New Age International, 1999
- Arceiwala, S.J., Wastewater treatment for pollution control, 2nd Ed. TMH

**BARKATULLAH UNIVERSITY, BHOPAL**  
**SEMESTER WISE SYLLABUS FOR M.Sc. BOTANY EXAMINATION AS**  
**RECOMMENDED BY BOARD OF STUDIES B.U. BHOPAL**  
**(REVISED SYLLABUS)**  
**SESSION- 2016-17**

Class	-	M.Sc.
Subject	-	Botany
Course Code	-	403
Paper name	-	Elective-(VII) Environmental Science
Semester	-	IV

RA ✓  
**Max. Marks : 85**  
**Min. Marks : 31**

- Unit I-** Global distribution and Classification of climate(Koppen's classification); Climatic types and their distribution. Climate of India. Soil types of India.
- Unit II-** Global warming and climate change: Green house effect; consequences ; responsible factors. Environmental Impact Assessment Environmental management.
- Unit III-** **Toxicology:** Radiation toxicants Kinds, sources & biological effects. Chemical toxicants Sources & biological effects of Mercury Lead, Chlorine, DDT, Fluorine, Arsenic & Pesticides. Bioremediation : Need, scope & technology.
- Unit IV-** Environmental Laws: Goal, objectives and guiding principles of Environmental Laws; Indian Environmental Laws; National Environmental Policies; 'Environmental priorities in India and sustainable development.
- Unit V-** Environmental Education and Organization: Goal, objectives and guiding principles of Environmental Education; Environmental Education in educational Institutes; Environmental organizations and agencies ; Man and Biosphere Programme (MAB).



Department of Higher Education, Govt. of M.P.  
 Post Graduate Semester wise Syllabus  
 as recommended by Central Board of Studies and approved by the Governor of M.P.  
 उच्च शिक्षा विभाग, म.प्र. सरकार  
 एकात्मिकीकरण कक्षाओं के द्वितीय सेमेस्टर अनुशासन चयनक्रम  
 केंद्रीय अख्ययन समिति द्वारा अनुमोदित तथा म. प्र. के राज्यपाल द्वारा अनुमोदित  
 Session (सत्र) 2010-2011

Class / कक्षा : M.Sc.  
 Semester / सेमेस्टर : III  
 Subject / विषय : Chemistry  
 Title of Subject Group : ENVIRONMENTAL  
**CHEMISTRY**  
 विषय समूह का शीर्षक :  
 Paper No. / प्रश्नपत्र क्रमांक :  
 Compulsory / अनिवार्य या Optional / वैकल्पिक अनिवार्य : III (Code- MCH-503)  
 Max. Marks अधिकतम अंक : 35

Particulars / विवरण

Unit-1 ✓	<p><b>Atmosphere</b>            Atmospheric layers, Vertical temperature profile, heat/radiation budget of the earth atmosphere systems. Properties of troposphere, thermodynamic derivation of lapse rate. Temperature inversion. Calculation of Global mean temperature of the atmosphere. Pressure variation in atmosphere and scale height. Biogeochemical cycles of carbon, nitrogen, sulphur, phosphorus, oxygen. Residence times.</p> <p><b>Atmospheric Chemistry</b>            Sources of trace atmospheric constituents : nitrogen oxides, sulphurdioxide and other sulphur compounds, carbon oxides, chlorofluorocarbons and other halogen compounds, methane and other hydrocarbons.</p> <p><b>Tropospheric Photochemistry</b>            Mechanism of Photochemical decomposition of NO<sub>2</sub> and formation of ozone. Formation of oxygen atoms, hydroxyl, hydroperoxy and organic radicals and hydrogen peroxide. Reactions of hydroxyl radicals with methane and other organic compounds. Reaction of OH radicals with SO<sub>2</sub> and NO<sub>2</sub>. Formation of Nitrate radical and its reactions. Photochemical smog meteorological conditions and chemistry of its formation.</p>
Unit-2 D.C.	<p><b>Air Pollution</b>            Air pollutants and their classifications. Aerosols-sources, size distribution and effect on visibility, climate and health.</p> <p><b>Acid Rain</b>            Definition, Acid rain precursors and their aqueous and gas phase atmospheric oxidation reactions. Damaging effects on aquatic life, plants, buildings and health. Monitoring of SO<sub>2</sub> and NO<sub>2</sub>. Acid rain control strategies.</p> <p><b>Stratospheric Ozone Depletion</b></p>

	<p>Mechanism of Ozone formation, Mechanism of catalytic ozone depletion, Discovery of Antarctic Ozone hole and Role of chemistry and meteorology. Control Strategies.</p> <p><b>Green House Effect</b></p> <p>Terrestrial and solar radiation Spectra, Major green house gases and their sources and Global warming potentials. Climate change and consequences.</p> <p><b>Urban Air Pollution</b></p> <p>Exhaust emissions, damaging effects of carbon monoxide. Monitoring of CO. Control strategies.</p>
Unit-3 18/10	<p><b>Aquatic Chemistry and Water Pollution</b></p> <p>Redox chemistry in natural waters. Dissolved oxygen, biological oxygen demand, chemical oxygen demand, determination of DO, BOD and COD. Aerobic and anaerobic reactions of organic sulphur and nitrogen compounds in water acid-base chemistry of fresh water and sea water. Aluminum, nitrate and fluoride in water. Petrification. Sources of water pollution. Treatment of waste and sewage. Purification of drinking water, techniques of purification and disinfection.</p>
Unit-4 18/10	<p><b>Environmental Toxicology</b></p> <p><b>Toxic heavy metals</b> : Mercury, lead, arsenic and cadmium. Causes of toxicity. Bioaccumulation, sources of heavy metals. Chemical speciation of Hg, Pb, As, and Cd. Biochemical and damaging effects.</p> <p><b>Toxic Organic Compound</b> : Pesticides, classification, properties and uses of organochlorine and ionospheres pesticides detection and damaging effects.</p> <p><b>Polychlorinated biphenyls</b> : Properties, use and environmental continuation and effects.</p> <p><b>Polynuclear Aromatic Hydrocarbons</b> : Source, structures and as pollutants.</p>
Unit-5 18/10	<p><b>Soil and Environmental Disasters</b></p> <p>Soil composition, micro and macronutrients, soil pollution by fertilizers, plastic an metals. Methods of re-mediation of soil. Bhopal gas tragedy, Chernobyl, three mile island, Minimtata Disease, Sevoso (Italy), London smog.</p>

**BOOKS SUGGESTED**

1. Environmental Chemistry, Colin Baird, W.H. Freeman Co. New York, 1998.
2. Chemistry of Atmospheres, R.P. Wayne, Oxford.
3. Environment Chemistry, A.K. De, Wiley Eastern, 2004.
4. Environmental Chemistry, S.E. Manahan, Lewis Publishers.
5. Introduction to atmospheric Chemistry, P.V. Hobbs, Cambridge.

Department of Higher Education,  
Govt. of M.P.  
Post Graduate Semester wise  
Syllabus  
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Session - 2010-2011

Theory / Practical

Session	2010-2011
Class	M.Sc.
Semester	IV
Subject	Zoology
Paper	IV(d) (Optional)
Title of the paper	Environment & Biodiversity Conservation
Medium of instructions	English / Both
Question Paper Language	English / Both
Max. Marks	

Unit	Syllabus	Periods
Unit I	<ul style="list-style-type: none"> <li>Basic concept of Environmental Biology Scope and Environmental Science</li> <li>Biosphere and Biogeochemical cycles.</li> <li>Environmental monitoring and impact assessment.</li> <li>Environmental and sustainable development.</li> <li>Water conservation, rain water harvesting,</li> </ul>	
Unit II	<ul style="list-style-type: none"> <li>Cause, effects and remedial measure of Air pollution, Water pollution.</li> <li>Noise, radioactive and thermal pollution.</li> <li>Agriculture pollution</li> <li>Basic concepts of Bioaccumulation.</li> <li>Solid waste management</li> </ul>	

Unit III	<b>(English)</b>	<b>Global warming and disaster management</b> <ul style="list-style-type: none"><li>• Cause of global warming</li><li>• Impact of global warming – acid rains and ozone depletion, green house effect.</li><li>• Control measures of global warming<ul style="list-style-type: none"><li>(a) Afforestation (b) reduction in the use of CFCs</li></ul></li></ul>	
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		<ul style="list-style-type: none"> <li>Disaster management -floods, earthquake, Cyclones landslides.</li> </ul>	
Unit IV	(English)	<p>Natural Resources :-</p> <p><b>Forest -</b></p> <ul style="list-style-type: none"> <li>- Use and over exploitation of forests.</li> <li>- Timber extraction.</li> </ul> <p><b>Land</b></p> <ul style="list-style-type: none"> <li>- Land degradation. Landslides.</li> <li>- Soil-ersion and desertification.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>- Use and over utilization of surface and ground water</li> <li>- Floods. Drought dams- benefits and problems</li> </ul> <p><b>Mineral</b></p> <ul style="list-style-type: none"> <li>- Use and exploitation ,</li> <li>- Environmental effect of extracting and using mineral resources</li> </ul> <p><b>Food</b></p> <ul style="list-style-type: none"> <li>- World food problem</li> <li>- Effects of modern agriculture and overgrazing</li> </ul> <p><b>Energy</b></p> <ul style="list-style-type: none"> <li>- Conventional and nonconventional energy resources.</li> </ul>	
Unit V	(English)	<ul style="list-style-type: none"> <li>Conservation of Biodiversity</li> <li>- Biodiversity crisis – habitat degradation poaching of wild life.</li> <li>- Socio economic and political causes of loss of biodiversity.</li> </ul> <p>In situ and exsitu conservation of</p>	
Recommended Books		(English)	
		%fgUnh%	

- Mechanism of photosynthesis – general idea, C3, C4 & CAM Pathways, factors affecting photosynthesis.
- Photophosphorylation and its importance.
- Respiration; mechanism – general idea and factors affecting respiration

UNIT-IV-

- Environment Management; needs and priorities.
- Recent development in environmental management.
- Environmental Management in urban & rural area.
- Environmental Education – objectives, need and guiding principle.
- Approaches of environmental education.
- Environmental education at different education level.
- Status and Policy of environmental education in India.

UNIT-V

- IUCN and RED DATA Book (brief idea only)
- Rare, endangered and extinct species of India, Invasive species
- National organization for improvement of environmental quality.
- Role of International organization as UNESCO & UNEP in Environmental management.
- Phytogeographical regions of India.
- Detailed study on tundra biome, tropical evergreen forest, desert biome.

R. Kiran  
(Dr RK Anand)  
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(Dr DM Kumar)