

**ENVIRONMENTAL SCIENCE**  
**SARGUJA VISHWAVIDYALAYA, AMBIKAPUR**



**PROPOSED SYLLABUS FOR RESEARCH ENTRANCE TEST (RET)**  
**IN**  
**M.Phil & PhD PROGRAMME**  
**[W.E.F. 2018]**

*Prepared by*  
**Department of Environmental Science**  
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*7.9.12*

## PROPOSED SCHEME OF EXAMINATION :

### Question pattern

Type of Questions	No. of Questions to be set from Section A and B	No. of Questions to be answered from Section A and B	Marks
Short Answer Type	40	30	30X2=60
Explanatory	12	08	8X5=40
TOTAL MARKS			100
MINIMUM PASS MARKS			50
TIME			3 Hrs

**Note: Each question of 5 marks should be written within 50-100 Words.**

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## SECTION A: Research Methodology

### Basic Concept on research methodology

Defining Research Problems; Steps of research; Types of research (Educational, Clinical, Experimental, historical, descriptive, Basic applied and Patent oriented Research) and objectives of research, phases of research, Research hypothesis

Review of Research Literature: Purpose and use of literature review, locating relevant information, use of library & electronic databases, preparation & presentation of literature review, research article reviews, theoretical models and frame work. Identification of gaps in research, formulation of research problem, definition of research objectives.

Sampling design; Data Collection; Source of data; Sampling error; NPC and its application;

Statistics: Basic elements and tools of statistical data analysis, testing of hypothesis: Null and alternative hypothesis, level of significance, degree of freedom, t-test; Statistical analysis (ANOVA, Multivariate Analysis) and processing of experimental data.

Interpretation and Report Preparation.

Computer Basics: Course introduction, MS Windows basics, File management, E-mail (PINE, EUDORA, Internet mail), File Transfer (ftp, WSftp). Office Applications : MS Office 2000/XP including MS Word, MS Excel, MS PowerPoint.

Writing of Research Proposal, Report and Research Paper: Meaning and types - Stages in preparation - Characteristics - Structure - Documentation: Footnotes and Bibliography -Editing the final draft-Evaluating the final draft- Checklist for a good proposal/report/research paper. Basic knowledge of organizing conferences, symposia, workshop, exhibition etc.

Ethical, legal, social and scientific issues in Biological Research. A brief idea about the funding agencies such as DST, DBT, ICMR, CSIR and UGC. Role of IPR in Research and Development.

## SECTION B: Environmental Science

Environment and Fundamentals of Earth & Processes: Lithosphere, hydrosphere, atmosphere and biosphere; physical and biological environments; Origin of Earth; Geological time scale; origin of life; role of natural selection, genetic drift, evolutionary divergence; Principles of taxonomy – nomenclature, an outline of classification and identification

Ecology and Community Ecosystems: Concept of ecosystem; homeostasis of the ecosystem structure and functional aspects of ecosystem; ecological energetics; Biomes and biome types; forest, grassland, tundra, desert biomes; Dynamics of population growth, metapopulation; human demography, promotion and development, demographic transition

Community Ecology: Community structure, factors influencing the structure of communities, community dynamics, species diversity in communities, pattern in communities; ecological succession – causes, trends, of succession, basic types of succession, general process of succession, climax concept; parasitism and allelopathy

Biodiversity and its conservation : 'Hotspots' of biodiversity; strategies for biodiversity conservation and Agenda-21; *ex-situ* and *in-situ* conservation; Biodiversity acts of India; National biodiversity authority; Indian board on Wildlife; convention on biodiversity; value of biodiversity

Fundamentals of Climatology: Scale of meteorology; elements of climate; Climate of India Spatial and temporal patterns of climatic parameters in India. Natural Disaster Management: IDNDR viewpoint; disaster studies – Indian scenario. IPCC, UNFCCC, Kyoto protocol.

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Forest and Wildlife: Classification and distribution of forests, ecological and economic value of forest, forest degradation and deforestation, impact of deforestation on the environment; current strategies of forest management.

Microbial Sciences: Microbiology of air, water and soil; general idea about bacterial morphology; Distinctive properties of virus, types of viral nucleic acids, replication of viral DNA and RNA; Isolation and characterization, microbial growth analysis; preservation of microorganisms

Principles of Remote Sensing-: Electromagnetic remote sensing process; physics of radiant energy; energy source sources and radiation principles; an ideal remote sensing system

Environmental Impact Assessment: Concept and evolution, origin of EIA; principle and characteristics of different EIA processes and their relationship; Environmental Impact Statement (EIS); Evaluation of methodologies, different methods -- Ad Hoc, Checklist, Overlay, Matrix, use of Computers & expert system; Environmental modeling methods and future development of EIA Process.

Pollution and Waste Management: Pollution of Air, Water, Soil, Noise, Radiation: Natural and anthropogenic sources of pollution; ozone, SPM, photochemical smog, acid rain; different control measures and air and water quality standards Types, sources and generation of wastes, their characterization, chemical composition; methods of disposal and management of wastes (Municipal, Bio-medichospital wastes management and Hazardous e-waste.

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### Suggested Readings :

1. Environmental Science: S.C. Santra, New Central Book Agency
2. Pollution Prevention: Fundamentals and Practice Int. Ed.-2000, Paul L. Bishop, McGraw Hill
3. A text book of Environmental Chemistry and pollution Control: S. S. Dara., S. Chand & Company Ltd
4. Global Ethics & Environment, Nicholas Low, British library Cataloguing in publication data.
5. Environmental and social impact assessment an introduction; C. J. Barrow
6. Environmental problems protections and control; Arun kumar, Anmol publications pvt. Ltd. New delhi, 1999
7. Environmental Science; Cunningham & Saigo WCB McGraw Hill, 19
8. Standard methods for the examination of water and wastewater 20<sup>th</sup> eds.; Lenore, S. Clesceri, Arnold E. Greenberg, Andrew D. Eaton; American Public Health Association
9. Manual for the Examination of Water, Wastewater and Soil, Ramp, H. H., and Krist, H., Laboratory , VCH Publishers. Environmental Pollution analysis; S. M. Khopkar, New age Int. (p) Ltd.
10. Ecology and Environment: P. D. Sharma., Rastogi Publication
11. Wildlife Management and Conservation by M. M. Ranga:Published by Agrobios, Jodhpur, India.
12. Fundamental of Ecology: E.P. Odum., W. B. Sauders Company, USA
13. Ecology: R. E. Ricklefs, Gray L. Miller, W. H. Freeman & Company. NY
14. Concept of Ecology: E. J. Kormondy, Prentice hall of India Pvt. Ltd.
15. Environment & pollution Law Manual; S. K. Mohanty, Universal Law Publisher Ltd. New Delhi
16. Environmental Biology; Biswarup Mukherjee, Tata McGraw Hill Co. Ltd., New delhi
17. Ecology a bridge between science & society by E. P. Odum, Sinauer associates, 1997
18. Principles of Systematic Zoology, E Mayer. McGraw-Hill Publishing Com.Ltd.
19. Principles of Animal Taxonomy, G G Simpson, Columbia University Press
20. An Introduction to Behavioural Ecology, J R Krebs & N B Davies. Sinauer Associates.
21. Ecology and Environment, PD. Sharma, Rastogi Publications
22. A text book of Plant Ecology and Soil Science, Shukla Chandel, S.Chand and Co. pvt. Ltd.
23. Misra, R. (1968) Ecology Workbook, Oxford & IBH Publications Co., New Delhi.
24. Maiti, S.K. (2003) Hand Book of Methods in Environmental Studies, Vol. I & II, ABDPublishers, Jaipur.
25. Animal Ecology by M. M. Ranga:Published by Agrobios, Jodhpur, India.
26. Bailey, N. T. J. (1995). *Statistical Methods in Biology*. 1<sup>st</sup> ELBS ed.
27. Boyer, R. (2000). *Modern Experimental Biology*. Pearson Education. English Universities Cambridge Low-price Ed.
28. Forthofer, N. & Lee, E. S. (2006). *Introduction to Biostatistics: A Guide to Design, Analysis and Discovery*. Academic Press.
29. Gotelli, N.J. Ellison, A.M. (2004). *A primer of Ecological Statistics*. Sunderland, Massachusetts, USA, Sinauer Associates.

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30. Holmes, D. Moody, P., Dine, D. (2006). *Research Methods for the Bioscience*. Oxford University Press, 381pp.
31. Kolhari, C.R. (2004). *Research Methodology: Methods and Techniques*. New Age International (P) Ltd., Publishers. 401pp.
32. Kothari, C R. (1990) *Research Methodology - Methods and Techniques* New Delhi, Wiley Eastern Ltd.
33. Selvin, S. (2004). *Biostatistics: How it works?* Pearson Education.
34. Sokal, R.R & Rolf, F.J. (1995). *Biometry*. 3<sup>rd</sup> ed. W.H. Freeman and Co. NY, 1-887. SPSS Release 10.
35. Zar, J.H. (1999). *Biostatistical Analysis*. IV<sup>th</sup> ed. Pearson Education (India) Ltd

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