

FIRST YEAR SCIENCE - 2018-19

ENVIRONMENTAL SCIENCES

PAPER-I

BASIC CONCEPTS OF ECOLOGY & EVOLUTION

Duration : 3 Hrs

M.M.: 50

UNIT-I

Fundamental principles of environment; Man's attitude towards environment, Rise of agriculture, Domestication of animals, Ancient civilization and environment.

Ecology : Definition , aim, scope and branches; Historical background of ecology : Ecology in Indian classics and ancient Greek and Roman Literature, growth of ecology from 12th to 20th Century; Growth of plant as well as Animal Ecology in India.

UNIT-II

Natural processes – Primeval atmosphere and origin of life; Structure and composition of present day atmosphere; atmosphere and earth radiation balance; Hydrosphere: atmospheric humidity and precipitation, hydrological cycle. Lithosphere – soil formation, soil texture, soil profile, soil classification.

UNIT- III

Energy - Brief idea of Biogas, biomass, solar energy, coal, hydro – power and nuclear power. Environmental impacts of energy use. Energy conservation.

UNIT- IV

Evolution and Ecology : Evolution – evidences and theories of organic evolution. Darwinism & Lamarkism. Adaptation, co-evolution, speciation and selection. Evolution of Man.

UNIT - V

Plant nomenclature : Plant kingdom – classification, general characters and examples of different groups.

Animal kingdom – Classification and general characters upto class level with examples.

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PAPER -II

ECOLOGICAL ORGANISATION

Duration : 3 Hrs.

M.M.: 50

UNIT-I

Population ecology : Definition, natality, mortality, fecundity, age and sex ratio; population growth form and concept of carrying capacity, population regulation.

UNIT-II

Community ecology - The biotic community concept; community characteristics- analytical characteristics of the community - quantitative, qualitative characteristics, synthetic characteristics of community, IVI and concept of ecological dominance.

UNIT-III

Methods of studying vegetation, gradient analysis and continuum concept, concept of ecotone and edge effect. Species diversity and diversity indices; community classification; Ecological niche.

UNIT- IV

Interspecific interactions - Commensalism, Amensalism, Mutualism, Protocooperation, Symbiosis, Predation, Parasitism, Competition, Epiphytism, Types of association-Colonization, Aggregation, Social organization and behaviour.

UNIT-V

Ecological succession; Types, cause and processes of succession, hydrosere, xerosere, significance of ecological succession; concept of climax.

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PAPER – III ECOSYSTEM ECOLOGY

Duration: 3 Hrs.

M.M.:50

UNIT-I

The Ecosystem - Ecosystem concept, its structure and function, homeostasis in the ecosystem.

Energy flow in ecosystems, food chains, food webs, trophic levels, ecological pyramids, ecological efficiencies.

UNIT-II

Major ecosystems of the world: The pond ecosystem, the ocean ecosystem, the forest ecosystem, the grassland ecosystem, the desert ecosystem; Productivity in different ecosystem.

UNIT-III

Concept of production and decomposition in nature, concept of productivity – primary and secondary production; gross and net production; standing crop, turn over, energy subsidies, methods of measuring primary productivity.

UNIT-IV

Concept of plant growth; Primary production process, factors affecting growth and pattern of resource allocation in plants; Plant growth indices and their ecological significance.

UNIT-V

Biogeochemical cycles with special reference to water, nitrogen, carbon, phosphorus and sulphur.

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ENVIRONMENTAL SCIENCES

PRACTICALS

Duration: 5 Hrs.

M.M.:75

	Regular	Ex- Students
1. Major Exercise	15	25
2. Major Exercise	15	15
3. Minor Exercise	10	08
4. Spots	20	20
5. Viva– Voce	10	10
6. Record	05	--
Total :	75	75

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ENVIRONMENTAL SCIENCES

PRACTICALS

1. Examination of Soil:

- i) Determination of soil structure
- ii) Determination of soil texture
- iii) Determination of soil moisture
- iv) Determination of soil organic matter
- v) Study of soil profile
- vi) Quantitative estimation of carbonate / bicarbonates / chlorides
- vii) Estimation of percentage of calcium carbonate by rapid titration method
- viii) Water holding capacity, wilting coefficient and specific gravity, bulk density, porosity.

2. Community studies:

To determine the minimum size of a quadrat for a grassland / forest by species area curve method.

Determination of frequency, density, abundance and IVI with the help of Quadrat method.

To determine the index of dominance in a grassland community.

3. Aquarium as an ecosystem.

4. Determination of rate of production by harvest method.

5. Rapid field tests for pH, carbonate, nitrate and chloride.

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ENVIRONMENTAL SCIENCES

BOOKS RECOMMENDED:

- 1 E.P. Odum: Fundamentals of Ecology , Saunders (3rd Edition)
- 2 Subhramanyam and Sambhamurthi : Ecology
- 3 K.C. Agarwal: Fundamentals of Environmental Biology, Nidhi Publishers, Bikaner.
- 4 V.Verma: Plant Ecology (4th Edition) Emkay Publishers.
- 5 Paul Colinvaux: Ecology, John Wiley and Sons.
- 6 P.D.Sharma: Ecology and Environment, Rastogi Publications, Meerut.
- 7 JhokLro ,oa jko] i;kZoj.k vkSj ikfjLFkfrdh] olqU/kjk izdk'ku] xkSj[kiqj A
- 8 HkkfV;k dksgyh ,oa Lo:i % i;kZoj.k tSfodh ds fofHkUu vk;ke] jes'k cqd fMiks] t;iqj

PRACTICAL :

- 9 J. Pandey and M.S.Sharma: Environmental Science: Practical and Field Manual, Yash Publications, Bikaner.