

## SECOND YEAR T. D.C.SCIENCE, 2018-19

### ENVIRONMENTAL SCIENCES

The second year TDC examination shall consist of three theory papers, each of three hours duration and a practical examination of five hours duration.

	<u>Marks</u>
<b>Paper-I: Ecological Factors, Adaptations and Distribution</b>	<b>50</b>
<b>Paper-II: Aquatic Ecology</b>	<b>50</b>
<b>Paper-III: Terrestrial Ecology</b>	<b>50</b>
<b>Practical:</b>	<b>75</b>

#### **Pattern of question paper in the annual examination and distribution of marks:**

Each theory paper in the annual examination shall have three sections i.e. A, B, and C. In section A, total 10 questions will be set in the paper, selecting at least two from each unit. These questions to be answered in a word or so. All questions are compulsory. Each question carries 0.5 marks, total 05 marks.

In section B, there shall be total 10 questions, selecting two questions from each unit, five questions to be answered by the student selecting at least one from each unit. Answer should be given in approximately 250 words. Each question carries 05 marks, total 25 marks.

In section C, 04 descriptive type questions will be set in the examination paper from five units of the syllabus of the paper, selecting not more than one question from a unit. Each question may have two sub divisions. Students are required to answer any two questions approximately in 500 words. Each question is of 10 marks, total 20 marks.

# SECOND YEAR T. D.C.SCIENCE, 2018-19

## ENVIRONMENTAL SCIENCES

### PAPER-I

#### ECOLOGICAL FACTORS, ADAPTATIONS & DISTRIBUTION

Duration: 3 Hrs.

M.M.:50

#### UNIT-I

Ecological factors in relation to plants and animals:

1. Edaphic
2. Light
3. Temperature
3. Precipitation
5. Topography

Laws of limiting factors – Leibig and Shelford's.

#### UNIT-II

Ecological adaptation- Xerophytes, hydrophytes, halophytes, adaptations and ecotypes; Plant indicator; animal fitness to habitats; fossorial, arboreal, aquatic, volant adaptations.

#### UNIT-III

Patterns in vegetation – brief idea of morphological, environmental and sociological patterns. Measurement of non-randomness in vegetation, continuous and discontinuous distribution, interpretive phytogeography. Endemic areas and theories of endemism; Endemic flora of India.

#### UNIT-IV

Major biomes of the world: Forest, savannah, grassland, desert and tundra biomes. Flora and vegetation of India; vegetation of Rajasthan.

#### UNIT-V

Zoogeographical regions – Palaearctic, Nearctic, Neotropical, Ethiopian, Oriental, Australian region, Dynamic biogeography – Dispersal dynamics, barriers, dispersal pathways, continental drift theory, land bridge, centre of origin, age and area hypothesis; Migration.

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### **ENVIRONMENTAL SCIENCES**

#### **PAPER - II**

#### **AQUATIC ECOLOGY**

Duration: 3 Hrs.

M.M.:50

#### **UNIT-I**

Physico-chemical characteristics of aquatic habitats (light, temperature, pH, nitrate and phosphate); lentic and lotic habitats; Lakes and Ponds; ecological zonation in the lake environment.

#### **UNIT-II**

Definition and general account of lakes; origin of lakes, classification of lakes; Productivity of lakes; Lake fertility and fish production; Eutrophication.

#### **UNIT-III**

Biotic communities of lakes: Plankton, Benthos, Nekton and Neuston, Diversity and Biomass of plankton and benthos in time and space, aquaculture.

#### **UNIT-IV**

Features of marine environment, zonation of marine environment, biotic communities of marine environment; Brief account of pelagic, coastal, deep sea, coral reefs and mangrove communities; Marine resources.

#### **UNIT-V**

Estuarine ecology, Definition and types, biota and productivity, Ecological adaptation in estuarine environment. Eco- characteristics of Chilka lake.

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#### **PAPER-III**

#### **TERRESTRIAL ECOLOGY**

Duration: 3 Hrs.

M.M.:50

#### **UNIT-I**

Physico-chemical characteristics of terrestrial ecosystem, Grassland ecosystem – Grassland environment; food chain and trophic levels, energetics of grasslands, productivity of grassland, biogeochemical cycles operating in grasslands; grass legume association; Grasslands in relation to soil and water conservation.

#### **UNIT-II**

Basis of grassland classification, Major grassland types in the world, grasslands in India with special reference to Rajasthan; Range management.

#### **UNIT-III**

Forest ecosystem – Major forest types of the world and of India; forest ecosystem, forest environment, food chains, energetics and biogeochemical cycles operating in forests. Forest biota.

#### **UNIT-IV**

Desert ecosystem – Introduction to world deserts, causes of desertification and control, climate of desert; Ecological adaptations to desert in plants and animals.

#### **UNIT-V**

Flora and fauna of Indian desert, Dryland farming, sylvipastoral agro forestry, solar energy utilization, arid horticulture and resource management activities with special reference to Rajasthan. Aims and activities of CAZRI, Desert Development Board and Arid- Forestry Research Institute (AFRI).

## SECOND YEAR T. D.C.SCIENCE, 2018-19

### 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

Duration : 5 Hrs.

M.M.:75

1. Measurement of depth of visibility in a lake or pond with the help of a Secchi disk.
2. Studies of water samples for :
  - i) pH
  - ii) Dissolved oxygen
  - iii) Alkalinity
  - iv) Total hardness
  - v) Chlorides
  - vi) Dissolved organic matter
  - vii) Suspended particulates
3. Observation of zooplanktons and phytoplankton, benthos, nektons and macrophytes.
4. Estimation of primary productivity with the help of dark and light bottle experiment.
5. Sampling equipments.
6. Analysis of vegetation by line transect method.
7. Determination of cover in a grassland community with the help of chart quadrat method.
8. Determination of DBH of the tree species in a forest and calculation of the basal area.
9. Characteristic adaptation of animals of ecological significance.
10. Morpho – anatomical characteristics of hydrophytes and xerophytes.
11. Study of primary productivity (in terms of chlorophyll) in relation to light.
12. Study of animal communities in a terrestrial ecosystem.

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#### BOOKS RECOMMENDED:

- 1 P.D.Sharma: Ecology and Environment, Rastogi Publications, Meerut.
- 2 R.S.Ambasht : Ecology
- 3 Verma and Agarwal: Environmental Biology. S.Chand and Co. Ram Nagar, New Delhi.
- 4 V.B.Rastogi: Animal Ecology, Kedarnath Ramnath, Meerut.

#### PRACTICAL:

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