Sr. No. 7051

M. Sc. Botany - 2nd Sem.

(2517)

Paper-BOTC-526: Ecological Modeling & Remote Sensing

Time allowed: 3 hrs.

Max. Marks: 50

Instructions: All sections are mandatory. Use of calculators is permitted.

Section A. Each part of the question carries one mark. Answer to any part should not exceed four lines. (8 Marks)

Q1. i) Which two characteristics of electromagnetic radiations are particularly important in understanding remote sensing?

ii) Generally, different species directly or indirectly influence each other in any community. Distinguish between inter-specific and intra-specific interactions.

iii) What is a survivorship curve? How it is generated?

iv) Satellites have several unique characteristics which make them particularly useful for remote sensing of the Earth's surface. What is the difference between an orbit and a swath?

v) What is the difference between dispersal and dispersion?

vi) Explain intrinsic rate of natural increase.

vii) What are the various factors that regulate the population size?

viii) What is carrying capacity of the environment?

Section B Attempt any seven questions. Each question carries three marks. Answer to any of the questions should not exceed two pages. (21 marks)

Q1. *Ageratum Conizoides* is a weed that grows in moist mineral soils from sea level to atleast 2400 m in altitude in tropical and subtropical environments. Eleven plants of the species *Ageratum Conizoides* were observed in an agricultural field of size 1000 sq meters in Himachal Pradesh, where the potential damage by herbivores is negligible. The plants were sampled for their height variations that was recorded as 30 cm, 75cm, 47cm, 39 cm, 63 cm, 72cm, 80cm, 54cm, 68cm, 38cm, 69cm. Estimate the mean height of plants in the species.

Q2. What do you understand by in-situ conservation strategies?

Q3. What are the various factors that control litter decomposition?

Q4 . Discuss Lotka-Volterra model for predator-prey interactions.

Q5. Illustrate different types of dispersion pattern of individuals in a continuous habitat.

Q6. Assume that you are being provided with a region of x by x square meters and asked to study the diversity of the region. How will you quantify species diversity of the area?

Q7. What are objectives of the Air (Prevention and Control of Pollution) Act 1981?

Q8. What is a life table? What information can you get from a life table?

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Q9. For some remote sensing instruments, the distance between the target being imaged and the platform, plays a large role in determining the detail of information obtained and the total area imaged by the sensor. Distinguish between Instantaneous field of view (IFOV) and Resolution cell.

Q10. Biosphere reserves are 'Science for Sustainability support sites' – special places for testing interdisciplinary approaches to understanding and managing changes and interactions between social and ecological systems, including conflict prevention and management of biodiversity. Discuss the concept of biosphere reserve, its design and applications.

Section C. Attempt any three questions. Each question carried 7 marks. Answer to any question should not exceed four pages. (21 Marks)

Q1. Describe the basic technological aspects of Digital Image Processing with special reference to satellite image processing.

Q2. The Government of India enacted Wildlife Protection Act in 1972. Discuss its provisions and amendments.

Q3. Population ecology is the study of how populations — of plants, animals, and other organisms — change over time and space and interact with their environment. Distinguish between the exponential growth and logistic growth models of population.

Q4. Islands, a small isolated microcosms with discrete boundaries, have always fascinated biologists. Discuss the basic model of island biogeography.

Q5. Lord Howe island that has an area of approx 22 square miles, lies 373 miles of east of the Australian main land. The island has recorded 240 species of indigenous plants. Given the slope of plant-species in a log-log plot is 0.40, how many species would be expected on a bigger island of area 1000 square miles?

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