

B.E (CIVIL ENGG.) 4th YEAR 2nd SEMESTER EXAMINATION, 2025(1st/ 2ndSemester /Repeat/ Supplementary/ Annual /Biannual)**SUBJECT: Ecology & Environmental Management (Elective)**

Time: Three hours

Full Marks: 100

Question No.	Part-I Marks: 50	Marks
	Answer any five questions:	
Q.1)	a) State the objectives behind the 'Environmental Impact Assessment'.	5
	b) Draw the "Waste Management Hierarchy" diagram and justify the order of preference.	5
Q.2)	a) What are the essential features of "Leopold Matrix method of Environmental Impact Analysis"?	4
	b) What are the potential impacts of the following activities during the construction phase of any project? i) Site clearing ii) Civil Works iii) Operation of Heavy Equipment	6
Q.3)	a) Discuss in brief on the steps followed in the "Semi-quantitative Index Method of Environmental Impact Analysis" to estimate the potential environmental impact.	7
	b) What are objectives behind the recommendation of mitigation measures ?	3
Q.4)	a) Describe the three-step process applied for impact mitigation for any type of developmental project	5
	b) State the mitigation measures recommended by MoEF for air and noise environment .	5
Q.5)	a) Explain the significance of "Recycling of Paint Sludge" in achieving waste minimization for automobile industry.	5
	b) State the significance of "Product Modification" in achieving waste minimization for distillery industry.	5
Q.6)	a) What do you mean by "Carrying Capacity of an environment?"	3
	b) Discuss on the "Verhulst Model of Population Dynamics" and its graphical interpretation.	7

[Turn over

Ref. No.: Ex/CE/5/T/405D/2025

BACHELOR OF ENGINEERING (CIVIL ENGINEERING) FOURTH YEAR SECOND SEMESTER-2025

SUBJECT: ECOLOGY AND ENVIRONMENT MANAGEMENT

Time- 3 Hours

Full Marks: 100

Part-II

[Use separate answer scripts for each part

Instructions: Group-A – Answer all questions. Group-B – Answer any four questions.]

Group-A

1. Ecology comes from two Greek words 'OIKOS' meaning _____ and _____ meaning 'Study'.
2. The eddies formed will entrap the nutrients that have been carried into the estuary by upland discharge and are circulated around the boundary region. Such a zone is referred to as a _____ by the ecologists.
3. The average chloride (anion) content is _____% in sea water.
4. _____ is more important than rooted vegetable in the production of basic food for the pond ecosystems.
5. The name of the bottom zone _____ of biological zone in lake.
6. Similarity index of Ecological Indices is also known as _____ index.
7. The range of Dominance index is _____ to _____.
8. One of the examples of Ecologically Balanced Waste Treatment Method (Environment Engineering view _____).
9. A study of the groups of organisms in relation to their environment, is known as _____ in Ecology.
10. The phosphorous cycle is primarily a _____ cycle. (gaseous/sedimentary)

Group-B

1. Write short note on "Stratification of a lake" and "biological zones in a lake". (7+3)
2. Write a note on the Nitrogen Cycle (N-cycle) and illustrate it with a schematic diagram. (10)
3. Describe the various components of a pond ecosystem, including abiotic substances, producer organisms, macroconsumer organisms, and saprotrophic organisms. ($2\frac{1}{2} \times 4$)

4. Describe material cycling and energy flow in a pond ecosystem using a simplified model illustrating the interactions among different biological communities. (10)
5. Write short notes on ecological indices, including the Dominance Index, Shannon Diversity Index, Richness Index, Similarity Index, and Dissimilarity Index. (2×5)
6. A. Different ecological zones contain various species with the following distribution:

Species	No of Individual
a	50
b	50

Two different species (a and b) are distributed as follows: Tree a (A, B, C, D, E), Tree b (A, C, D, F, G). Calculate the Dominance Index, Shannon Diversity Index, Richness Index, and Similarity Index. (4)

- B. The Jadavpur University ecosystem comprises four major streams, each with the following distribution:

Stream	No of Individual
Science	50
Arts	30
Engineering	10
Interdisciplinary	20

Consider two faculties—FOS and FET—with the following distribution:

FOS - (Physics, Chemistry, Mathematics, Material Science, Biology)

FET - (Civil, Mechanical, Electrical, Material Science, Mathematics)

Calculate the Dominance Index, Shannon Diversity Index, Richness Index, Similarity Index, and Dissimilarity Index. (6)

7. The pond ecology includes different species with the following distribution:

Species	Count
Fish-A	50
Fish-B	30
Snail	10
Algae	5
Insect Larvae	5

Calculate the Dominance Index, Shannon Diversity Index, Richness Index, Similarity Index, and Dissimilarity Index. Discuss and provide remarks on the results. (10)