

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANIZATION OF ISLAMIC COOPERATION (OIC)
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Semester: Mid Semester Examination
Course No.: GS 4253
Course Title: Ecology and Environment

Winter Semester: 2022-2023
Full Marks: 75
Time: 1.5 hours

There are 4 (four) questions. Answer 3 (three) questions, where **Questions 1 and 2 are COMPULSORY** and answer either **Question 3 or 4**. Programmable calculators are not allowed. Do not write on this question paper. The figures in the right margin indicate full marks and corresponding CO and PO. Symbols convey their usual meanings. **Assume reasonable values for any missing data/info.**

- | | Marks | CO | PO |
|---|-------|-----|-----|
| 1. (a) Describe the importance of the supporting services of an ecosystem with necessary examples. | 5 | CO1 | PO1 |
| (b) A certain area is having an annual rainfall of about 18 cm whereas another area faces very high rainfall throughout the year. Distinguish between the ecosystems of the two areas based on rainfall amount. | 6 | CO2 | PO2 |
| (c) At a certain zone of the Sundarbans, there are 128 Bengal tigers and 20 deer residing and competing for the resources. The maximum number of tigers that can stay in that place is 200 and the value of co-efficient of the effect of a deer on the growth of population of tiger is 4. On the other hand, the maximum number of deer that can sustain is 102 and the value of co-efficient of the effect of a tiger on the growth of population of deer is 1. Analyze if they can co-exist in that zone with the help of Lotka Volterra Model. | 14 | CO4 | PO2 |
| 2. (a) State how belt transect method is efficient in data production than the line transect method. | 5 | CO1 | PO1 |
| (b) The following Table 1 contains the population of each species present at a pond. Predict if the pond is diverse enough to withstand any kind of pollution based on the data from Table 1. | 16 | CO3 | PO2 |

Table 1

Species	Population
Frog	155
Snail	37
Catfish	110
Water beetle	2
Larvae	200
Leech	14

- (c) Analyze the scenario of a country having a per capita ecological footprint of 1.6 hectares per person and per capita biocapacity of 0.8 hectares per person. 4 CO4 PO2
3. (a) Describe the type of ecological succession that may take place after an incident of forest fire. 5 CO1 PO1
- (b) Explain the importance of Nitrogen fixing bacteria and denitrifying bacteria along with diagram to maintain the percentage of Nitrogen in the atmosphere. 12 CO2 PO2
- (c) The data on the population of the different species of two forests has been tabulated in Table 2. Predict the status of species richness & evenness for each of the forests based on the data of Table 2. 8 CO3 PO2

Table 2

	Forest 1	Forest 2
Species A	563	700
Species B	550	0
Species C	525	980
Species D	500	0
Species E	0	50

4. (a) Describe the concepts of inertia and resilience in case of forest and grassland ecosystems. 5 CO1 PO1
- (b) Explain the importance of percolation in recharge of the water bodies with the help of hydrological cycle along with diagram. 8 CO2 PO2
- (c) Explain the adaptability method of the producers in a Tundra ecosystem. 4 CO2 PO2
- (d) In Figure 1, the circle represents species A, and the triangle represents species B. The dimension of each quadrat is 2m X 2m. 8 CO3 PO2



Figure 1

Based on the Figure 1,

- Estimate the density and relative density of both the species.
- Estimate the frequency and relative frequency of both the species.