B.Sc. In Environmental, Water Resources, and Coastal Engineering
Level- 1, Term-I Final Examination :June- July2018

Subject:EWC-131, Ecology, Environmental Pollution and Management

Full Marks:210

Time: 3.00 hours

INSTRUCTIONS:

a. Use SEPARATE answer scripts for each section.
b. Answer any THREE questions from each section out of FOUR.
c. Figures in the margin indicate full marks.
d. Assume reasonable data if necessary.
e. Symbols used have their usual meanings.

## SECTION-A

**Question – 1**

a. What do you mean by Environmental pollution? Differentiate between point source and non-point source of Environmental pollution. 07

b. Critically discuss about population growth and its related Environmental problem. 10

c. How does lake water get polluted? Explain about self-purification capacity of a river. 08

d. The $BOD_5$ of a wastewater is determined to be 145 mg/L at $20^0$ C. The k value is known to be 0.21 per day. What would be the $BOD_8$ if the test were run at $17^0$ C? 10

**Question – 2**

a. Define turbidity. State the causes of turbidity in surface water. 05

b. Write down the causes and consequences of sediment pollution in surface water. How can you control sediment pollution? 10

c. How does thermal pollution in river water occur? Suggest possible measures to control thermal pollution. 10

d. Differentiate between oligotrophic lake and eutrophic lake. Write down the consequences of eutrophication. 10

**Question – 3**

a. Define air pollution and noise pollution. Explain the sources and effects of CO, $CO_2$, $SO_2$ and $NO_2$ gases of air. 10

b. How does global warming occur? Explain the role of $CO_2$ in triggering global warming and local climate change scenario. 10

c. How can you adopt the climate change effects in your community? 08

d. Define sound pressure and decibel scale. Given two machines producing 78 dB each, what is the total SPL? 07

**Question – 4**

a. How does land get polluted? Suggest possible measures to control land pollution. 09



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b. How does agriculture related activities change the environment? 08

c. Explain briefly about integrated pest management to reduce environmental pollution. 08

d. A soil is sampled by a cylinder measuring 7.4 cm in diameter and 8.4 cm length. Calculate gravimetric and volumetric water contents and wet and dry bulk densities using the following data: 10

Weight of empty cylinder = 200 gm
Weight of cylinder plus weight of soil = 880 gm
Weight of cylinder plus oven dry (105° C) soil = 760 gm

## SECTION-B

**Question – 5**

a. Explain – (i) biocapacity, (ii) ecological footprint, (iii) overshoot. 3×3=09

b. Describe the biotic and abiotic components of an ecosystem. Also explain the imporances of these components for the sustainability of the ecosystems. 10+6=16

c. Briefly discuss how biodiversity loss occurs due to habitat alteration and pollution. 5+5=10

**Question –6** 10

a. Briefly describe the impacts of pesticides and fertilizers on aquatic environment. 2+3+10=15

b. What is eutrophication? How detergents released into environment can cause eutrophication? How the pharmaceutical footprint can be reduced?

c. Draw the pathway of arsenic from ground water to human body. Briefly describe the health effects of arsenic contamination. 3+7=10

**Question –7**

a. Explain the following soil parameters – (i) drainage, (ii) water holding capacity, (iii) aeration, (iv) organic matter content and (v) erodibility. 3×5=15

b. What is the cation exchange capacity of soil? Write the characteristics of soils with low and high cation exchange capacity? 2+8=10

c. Briefly explain the phytoremediation approaches used for heavy metal management. 10

**Question–8**

a. What are the differences between inherited variation and natural selection? Explain briefly. Write the causes of biodiversity gradient. 5+5=10

b. Define the "Rules of 10" from the perspectives of ecological pyramids. Briefly discuss about (i) pyramid of productivity and (ii) pyramid of biomass. 2+8=10

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c. For the ecosystems of X,Y and Z following data are given: 15

| Species | No of individuals | | |
|---|---|---|---|
| | Ecosystem X | Ecosystem Y | Ecosystem Z |
| A | 05 | 10 | 10 |
| B | 10 | 05 | 10 |
| C | 15 | 15 | 10 |
| D | 12 | 10 | 10 |
| E | 08 | 10 | 10 |

Determine the Simpson's Index, Shannon-Weinar index, Margalef's index and Pielou's index for each of the ecosystems mentioned above. Also compare the ecosystems based on the index results.

$D = \frac{n(n-1)}{N(N-1)}$

$D_m = \frac{S-1}{\ln N}$

$-\sum P_i \ln P_i$

$e = \frac{H}{\ln S}$

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