

B.Sc. Chemistry, Geography, Geological Sciences, Mathematics, Physics
1st year 2nd Semester Examination, 2022

SUBJECT : ENVIRONMENTAL SCIENCE

Time: Two hours

Full Marks: 50

1. Answer the following questions:

- (i) Sketch temperature profile from surface to the top of the troposphere showing an elevated inversion layer.
- (ii) Mention two mechanisms by which excess heat over the tropical region is distributed elsewhere.
- (iii) How can a renewable natural resource become a non-renewable resource?
- (iv) List out separately the abiotic and biotic components of a forest ecosystem.
- (v) What are the threats to desert ecosystems?
- (vi) Why is genetic diversity important?
- (vii) How do you relate loss of biodiversity to global climatic changes?
- (viii) Differentiate between National parks and Zoological parks in the context of conservation of biodiversity.
- (ix) What is carrying capacity in population model?
- (x) How does tropospheric ozone form?
- (xi) What is photochemical smog?
- (xii) What is the difference between BOD and COD?
- (xiii) What is secondary air pollutant? Give an example.
- (xiv) Differentiate between in-situ and ex-situ conservation methods.
- (xv) Mention two main damaging factors that lead to rapid degradation of our environment.

[15 x 2 = 30]

2. Answer any **four** from the following questions:

- (a) Mention the scope and importance of environmental studies.
- (b) Take one article that you use in your daily life. Trace its components journey backward from your home to their origins as natural resources in our environment. How many of these components are from renewable and non-renewable resources?
- (c) Point out one environmental issue in our University campus and list some individual actions, you think appropriate, to minimize it.

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(d) Observations at Jadavpur 8B bus stand on a particular day show concentration of some of the pollutants as given below:

PM_{2.5} value of 103.9 $\mu\text{g}/\text{m}^3$,

CO value of 5.4 ppm and

NO₂ value of 32.5 ppb.

Find Air Quality Index (AQI) based on the given observations.

AQI Index and breakpoint pollution concentration for India are as follows:

PM 2.5 ($\mu\text{g}/\text{m}^3$) 1-hour	CO (ppm) 1-hour	NO ₂ (ppb) 1-hour	AQI
0 – 60	0 - 1.7	0 – 42	0 – 100
61 – 90	1.8 - 10.3	43 – 94	101-200
91 – 210	10.4 - 14.7	95-295	201-300
211 -252	14.8-30.2	296-667	301-400
253 & above	30.3 & above	668 & above	401 & above

(e) Write a short note on ecological pyramid.

(f) The BOD₆ of a wastewater is determined to be 400 mg/L at 20° C. The k value at 20° C is known to be 0.23 per day. What would be BOD₈ value if tests were run at 15° C?

[4 x 5 = 20]