KATHMANDU UNIVERSITY
End Semester Examination
March, 2025

Marks Scored:

Level : B.Sc.
Year : II

Course : ESEE 211
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 20

20 MAR 2025

Registration No.:

Date :

SECTION "A"

[20 Q. × 1 = 20 marks]

Choose and mark [X] encircle the most appropriate option from each set of choices

1. Among the followings, comparatively less essential mineral for the human body
   [ ] Cadmium [ ] Copper [ ] Selenium [ ] Zinc

2. The death of birds like Eagles and Vultures in Nepal are linked to the chemical or drug
   [ ] DDT [ ] Diclofenac [ ] Metacide [ ] Endosulphan

3. Among the following, the most toxic form
   [ ] Arsenic (V) [ ] Arsenic (IV) [ ] Arsenic (III) [ ] Arsenic (II)

4. The volume of ozone present in the stratosphere is
   [ ] 250ppm [ ] 100ppm [ ] 10ppm [ ] 1ppm

5. The rate of "Environmental Lapse Rate" is about
   [ ] 0.4°C per kilometer [ ] 2.4°C per kilometer
   [ ] 4.4°C per kilometer [ ] 6.4°C per kilometer

6. Among the air pollutants, it is not the secondary air pollutant
   [ ] SO_3 [ ] O_3 [ ] H_2O_2 [ ] CO

7. In the graph of elevation and temperature, the environmental lapse rate and adiabatic lapse rate cross each other in
   [ ] Trapping plume [ ] Looping plume [ ] Fanning plume [ ] Coning plume

8. A "good water" quality based on the value of dissolved oxygen at 20 °C is
   [ ] 3-5 ppm [ ] 5-7 ppm [ ] 7-9 ppm [ ] Above 10 ppm

9. Cholera causing microorganism is a type of
   [ ] Virus [ ] Bacteria [ ] Protozoa [ ] Fungi

10. According to Nepal drinking water quality standard, the maximum concentration limit of chloride in drinking water is
    [ ] 100 mg/L [ ] 150 mg/L [ ] 200 mg/L [ ] 250 mg/L

11. If the concentration of Ca and Mg in water is in the range of _____, it is classified as "hard water"
    [ ] Up to 70 mg/l [ ] 70-140 mg/l [ ] 150-300 mg/l [ ] Above 350 mg/l

12. The municipal waste in Nepalese municipalities consist maximum percent of
[ ] Decomposable waste [ ] Rubber
[ ] Paper [ ] Glass and metals

13. The direct and fastest exposure route of chemical in the human body is through
[ ] Ingestion [ ] Dermal [ ] Inhalation [ ] Injection

14. The lowest oxygen level in oligotrophic lake is in the area of
[ ] Limnetic zone [ ] Littoral zone [ ] Photic zone [ ] Profundal zone

15. The most common solid waste disposal system in major cities of Nepal
[ ] Sanitary landfilling [ ] Open dumping
[ ] Riverside dumping [ ] Open burning

16. The outer mantle of the earth consisting of different minerals and the soil
[ ] Hydrosphere [ ] Biosphere [ ] Atmosphere [ ] Lithosphere

17. Nitrobacter is basically involved in the process of
[ ] Dinitrification [ ] Nitrification
[ ] Ammonification [ ] Methane generation

18. Among the four layers of atmosphere, seventy percent of the atmospheric mass is occupied by
[ ] Troposphere [ ] Stratosphere [ ] Mesosphere [ ] Thermosphere

19. One mol of carbon reacts with one mol of oxygen to give carbon dioxide weighing
[ ] 44 g [ ] 32 g [ ] 28 g [ ] 22 g

20. The more powerful component in greenhouse effect
[ ] Methane [ ] Carbon dioxide [ ] Oxygen [ ] Water vapour

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SECTION "B"
[4 Q. × 7 = 28 marks]

Attempt *ANY FOUR* questions.

1. How the temperature, dissolved oxygen, and depth of lake water are linked. Show the relationship with a chart/graph/table.

2. How biological organisms are exposed to toxic chemicals? Explain their effects over long exposures.

3. If 1 mol of carbon monoxide is present per 100 mol of atmospheric air then calculate the concentration of carbon monoxide. Please consider the temperature and pressure of atmospheric air as 20°C and 1 atm respectively. Assume standard values for other parameters for the calculation.

4. Among the different environmental problems in Nepal, which is a serious problem and why? Give your answer with scientific reasons.

5. What is the best way to manage solidwaste of Nepal? Explain with reasons.

SECTION "C"

6. Explain the process of atmospheric transport and dispersion of pollutants. What is the role of a chimney in this process? [4+2=6]

7. Write briefly on water quality parameters and standards. Why do different countries have different standard values? [3+2=5]

8. Calculate the bulk density of soil samples taken from agricultural fields. The wet weight of soil was 140 g (with 20% soil moisture) and the soil sample was taken with a soil core of an internal radius 4 cm and height 7 cm [5]

9. Explain biochemical cycle of nitrogen OR carbon with a sketch diagram [5]

10. Differentiate between (***ANY TWO***): [2Q × 3=6]
    a. $PM_{2.5}$ and air quality index
    b. Climate change and climate adaptation
    c. Phytoremediation and ecological risk assessment