Roll No. | | | | | | | | | | | | | **Total No. of Pages: 02**

Total No. of Questions: 11

Master of Science (Chemistry)(Sem. – 1)

ENVIRONMENTAL CHEMISTRY

Subject Code: CHL405-18

M Code: 75117

Date of Examination : 18-01-23

Time: 3 Hrs. **Max. Marks: 50**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of FIVE questions carrying TWO marks each.**
2. **SECTION-B contains EIGHT questions carrying FOUR marks each and students have to attempt any SIX questions.**
3. **SECTION-C is COMPULSORY consisting of TWO questions with internal choice carrying EIGHT marks each.**

SECTION-A

1. Write briefly:

a) Enumerate any two global effects of air pollution and its causative pollutants.

b) List the classification of water pollutants.

c) What are the sources of pesticide residue in soil? What is its life cycle in soil?

d) Differentiate between

i) BOD and COD

ii) TOC and ThOD

e) Mention the units of radioactivity measurement. Define nuclear fallout.

SECTION-B

2. Consider the vehicular exhaust as a source of air pollution and explain the mechanism of photochemical smog formation. Discuss the various reactions that take place in a photolytic cycle.

3. Explain the process of organomercurials formation in the aquatic environment due to mercury pollution.

4. Explain the difference between gas chromatography, liquid chromatography and gas-liquid chromatography.

5. Establish the relationship between pH, acidity, alkalinity and hardness in natural water systems. Also, comment this relationship under different alkalinity conditions.

6. How do measure cation exchange capacity (CEC) of soil. Explain its importance in soil pollution studies.

7. How do you decide the site for radioactive waste disposal from the point of view of soil pollution?

8. Explain the classification and effects of radiation.

9. Present a critical assessment of the environmental chemistry associated with the 'Bhopal gas tragedy'.

SECTION-C

10. Consider a lake with volume $10 \times 10^6 m^3$ that is fed by a stream with flow rate $4.0 m^3/s$ with pollution concentration of $15 mg/L$. The effluent discharge of a nearby industry also discharges to the lake at a rate $0.5 m^3/s$ with a concentration of $100 mg/L$ of the pollutant. The decay reaction coefficient of the pollutant in the pond is estimated as $0.20/$ day. Assuming the pollutant completely mixed in the lake, find the steady state concentration. (Assume no other loss of the pollutant except decay)

OR

Explain the practical use correlation between COD/BOD and BOD/TOC as measures of organic content. Compute the carbonaceous and nitrogenous oxygen demand of waste represented by the formula $C_9N_2H_6O_2$ (Assume that N is converted to NH_3 in the first step).

11. Bioremediation is considered as a potential methodology treatment and reclamation of soil. Develop and explain a detailed protocol for reclaiming soil contaminated with industrial effluent containing phenolic compounds.

OR

Write notes on:

a) Environmental toxicology

b) Chemical solutions to environmental problems

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.