

2014

M.Sc. Part-II Examination

ENVIRONMENTAL SCIENCE

PAPER—IXA

Full Marks : 100

Time : 4 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer Q. No. 1 and any five questions from the rest.

1. Answer any ten questions of the following : 2×10

- (i) What is Gibbs free energy ?
- (ii) Write down the chemical structure of one high energy compound.
- (iii) What do you mean by 'Bronsted-Lowry' acid-base theory ?
- (iv) What are the difference between 'exergonic and endergonic reaction'.

(Turn Over)

- (v) What do you mean by Chemical equilibrium of a system ?
- (vi) Define 'Solubility product'.
- (vii) What is Common ion effect ?
- (viii) What is free radical oxidation ?
- (ix) What are the uses of radio nuclides ?
- (x) Define gravimetry.
- (xi) What do you mean by inorganic particulate matter ?
- (xii) What is Bragg's law ?
- (xiii) What are saturated and unsaturated hydrocarbons. Give example in each case.
- (xiv) Write the main components of Photochemical Smog.
- (xv) Name any two pesticide used in agriculture and write their names.
- (xvi) How carbon monoxide effect living system ?
2. Write explanatory notes on — 4×4
- (i) Methyl isocyanate (MIC),
- (ii) Photochemical Smog.
- (iii) Biochemical Oxygen Demand (BOD).
- (iv) Ozone hole.

3. Elaborately discuss the toxicity of the following metal ions —
- (i) Arsenic;
- (ii) Cadmium. 8+8
4. (a) Write down the classification of natural water.
- (b) Discuss the removal of suspended solids and liquids from waste water.
- (c) What is Chemical Oxygen Demand (COD) ? 4+10+2
5. Elaborately discuss about the toxicity of lead and mercury in the environment. 8+8
6. How would you broadly divide the major regions of the atmosphere. State their respective altitudes and temperature ranges. What are the important chemical species in each region. 16
7. (a) How DDT is transmitted in food chain ? Write the Chemical Formula of DDT.
- (b) Write the biological mode of action of pesticides.
- (c) How Ozone and 'PAN' disturb the living system. 6+4+6

8. (a) Write and discuss the nature of water pollution origination from its source.
- (b) Discuss the process of removal of suspended solids and liquids from water.

6+10

9. (a) "Oxygen plays a key role in the troposphere, while Ozone in the stratosphere" — Explain the statement with proper reading.
- (b) What is 'ozone hole'? Discuss its effect on living system.
- (c) What are the different components of smog.

6+8+2

10. (a) How soil chemistry influences mineral nutrition of plants?
- (b) What is meant by chromatography? Write the different types of Chromatographic method of separation.
- (c) Explain Bragg's law of X-ray diffraction.
- (d) Write down the gel electrophoresis in environmental science.

4+4+4+4