

M.Sc. DEGREE II SEMESTER EXAMINATION IN  
ENVIRONMENTAL TECHNOLOGY  
NOVEMBER 2000

CHEMICAL METHODS IN  
ENVIRONMENTAL ANALYSIS

Time : 3 Hours

Maximum Marks : 50

**PART - A**

(Answer any five questions)

(All questions carry equal marks)

(5 x 2 = 10)

- I. 1. What do you mean by acid and alkaline errors of a glass electrode?
2. (a) State and explain Beer-Lambert Law.  
(b) If a 0.0100 M solution exhibits 45% transmittance at some wavelength, what will be the %-transmittance for a 0.0200 M solution of the same substance.
3. What is Dobson unit?
4. Describe the functioning of a hollow cathode lamp.
5. The mean concentration of SO<sub>2</sub> in the atmosphere in Bombay is 47 μgm<sup>-3</sup> at 25°C and 1 atm. What is the equivalent concentration in ppm?
6. What is 'plain chlorination'?

**PART - B**

(Answer any five questions)

(All questions carry equal marks)

(5 x 3 = 15)

- II. i. Give a schematic diagram of a double-beam spectrophotometer. What are its advantages over a single-beam instrument?

(Turn over)

- ii. Sensitivity in atomic absorption is defined as the concentration of analyte that absorbs 1% of the light from the lamp and therefore gives 99% transmittance. A sample containing  $1.00 \mu\text{g Fe/ml}$  gave an absorbance of 0.055. Estimate the sensitivity for Fe.
- iii. How will you determine the gamma-activity of a sample?
- iv. Describe the electrostatic precipitation method of particulate sampling.
- v. Describe the absorption method of collecting an air sample for the analysis of pollutant gases and vapours.
- vi. What is pE? Describe a procedure to determine it.

### PART - C

(Answer any five questions)

(All questions carry equal marks)

(5 x 5 = 25)

- III. Write a note on nephelometry and turbidimetry.
- IV. Explain spectral, chemical and ionization interferences in AAS. How can they be minimized?
- V. Describe the Griess-Saltzman method of determining nitrogen oxides.
- VI. Write a note on desulphurization of flue gases.
- VII. Describe the systematic procedure for the determination BOD of a water sample. What is the BOD limit of drinking water?
- VIII. Define hardness of water. What is its unit? Describe a method of determining the hardness of a water sample.