

M.Sc. DEGREE I SEMESTER EXAMINATION IN ENVIRONMENTAL TECHNOLOGY,
DECEMBER 2005

ENV-2108 CHEMOMETRICS AND GOOD LABORATORY PRACTICES

Time: 3 h

Maximum marks: 50

PART - A

(Answer ANY FIVE questions)
(All questions carry EQUAL marks)

(5 x 2 = 10)

- I. 1. Calculate the results with appropriate number of significant figures
(i) $14.040 \times 0.007 / 4.6$ (ii) $5080.1 + 0.067 - 687.5$
2. What are the sources of determinate errors in a titration using visual indicator?
3. Mention any three important precautions to be taken in a laboratory handling flammable solvents?
4. A student measured the pH of double distilled water prepared in the laboratory on different days and found that it is always below 7.0. Comment on this.
5. In a maximum of three sentences outline the recommended procedure for effecting transfer with a 20 mL pipette.
6. What is buoyancy correction in weighing? Why is it not considered in routine measurements?

PART - B

(Answer ANY FIVE questions)
(All questions carry EQUAL marks)

(5 x 3 = 15)

- II. 1. The following results were obtained from a laboratory for the replicate analysis of nickel in an alloy: 5.78%, 6.21%, 5.89%, 5.81%, 5.64%, and 5.56%. Are there any outliers in the results? Justify your answer.
2. Explain any one method for cleaning pipettes. What are the merits and demerits of the method?
3. The true content of iron in a soil is 11.2 mg/kg. Two sets of replicate measurements gave the following values.
Set A: 9.87, 12.40, 11.54, 10.18, 9.991
Set B: 13.84, 12.99, 10.89, 11.67, 13.10
Identify sets with better precision and better accuracy.
4. The DO in 300 mL of a water sample is fixed; iodine equivalent to DO is generated and titrated with 0.05192 normal sodium thiosulphate. If the titre is 1.2 mL, what is the concentration of DO in the sample? Express the result in meq/L.
5. What is meant by calibration of a metrological instrument?
6. What is meant by a *reference material* used in analysis? Name a source of reference material in our country.

PART - C

(Answer ANY FIVE questions)
(All questions carry EQUAL marks)

(5 x 5 = 25)

- III. 1. What is meant by Daltonism? How does it affect the results generated by an analyst?
2. What is meant by a *primary standard*? What are the desirable qualities of a primary standard? Name a primary standard for pH.
3. Outline any one method used to remove heavy metal content of laboratory effluents.
4. What are the good practices to be implemented by an environmentally responsible laboratory? How far your laboratory satisfies criteria?
5. Briefly discuss the dress and gear code to be followed in a good laboratory.
6. Give a drawing illustrating the following hazards: radioactive, biomedical, and explosion. What are the precautions to be followed to prevent biohazards in a laboratory?