

**M.Sc. DEGREE I SEMESTER EXAMINATION IN ENVIRONMENTAL TECHNOLOGY,
DECEMBER 2006**

ENV-2108 CHEMOMETRICS AND GOOD LABORATORY PRACTICES

Time: 3 h

Maximum marks: 50

PART - A

(Answer **ANY FIVE** questions)
(Each question carries **TWO** marks)

(5 x 2 = 10)

- I. (a) Indicate the number of significant figures in the following numbers:
 (i) 1.9040 (ii) 2.40×10^{-4}
 (iii) 0.00032 (iv) 6.023×10^{23}
 (b) Explain the term buoyancy correction. What is its significance?
 (c) A particular measurement gave the following numbers. Find the standard deviation.
 15.67, 15.69, 16.03, 15.72, 15.90
 (d) What is the relationship between standard deviation and accuracy? Explain.
 (e) What is the use of MS Excel in chemometrics? Explain.
 (f) What do you understand by the term '95% confidence limit'?

PART - B

(Answer **ANY FIVE** questions)
(Each question carries **THREE** marks)

(5 x 3 = 15)

- II. (a) 0.6030 g of organic solute (M=60) was dissolved in one liter of solvent (density = 0.802 g per ml). Find the concentration in the units of molality, molarity and ppm.
 (b) Give a brief account of safety practices in laboratory.
 (c) Explain the working of a piezoelectric balance.
 (d) Calcium content of powdered mineral sample was analysed five times by each of two methods with similar standard deviation. Are mean values significantly different at 95% confidence level. Which of these is more accurate?

Method I :	0.0271	0.0282	0.0279	0.0271	0.0275
Method II :	0.0271	0.0268	0.0263	0.0274	0.0269

 (e) How would you calibrate a 10 ml pipette? Explain.
 (f) Write a brief note on the disposal of toxic solvents in the laboratory.

PART - C

(Answer **ANY FIVE** questions)
(Each question carries **EQUAL** marks)

(5 x 5 = 25)

- III. (a) Discuss briefly the origin and methods to minimize random error.
 (b) Give a brief account of waste disposal in a laboratory.
 (c) How would you plot a Gaussian curve? Illustrate with example.
 (d) Explain the following terms illustrating the importance of each of these term:
 Control chart, Q test
 (e) How is error propagated in mathematical operations? Discuss.
 (f) Give brief account of the safety aspects in design of a laboratory.