

**M.Sc. DEGREE I SEMESTER EXAMINATION IN ENVIRONMENTAL TECHNOLOGY,
APRIL 2009**

ENV 2108 CHEMO METRICS AND GOOD LABORATORY PRACTICES

Time: 3 Hours

Maximum Marks : 50

PART - A

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

(4 x 5 = 20)

- I. 1. Write brief note on **any three** of the following:
- (i) Precision and Accuracy
 - (ii) Types of error
 - (iii) Control chart
 - (iv) Q-test
2. Safe Laboratory procedures. Define briefly procedure for handling hazardous chemicals and MSDS.
3. Calibration of volumetric glass wares. Define class A and class B glass wares.
4. Sampling protocol for water and waste water.
5. Define :
- (i) Systematic error and random error
 - (ii) Precision and accuracy
 - (iii) Standard deviation and confidence limit.

PART - B

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

(4 x 3 = 12)

- II. 1. An aqueous solution containing 219.6g HCl per liter has a specific gravity 1.0980 calculate
- (i) Molarity
 - (ii) Molality
 - (iii) Wt % of HCl in solution.
2. A 50 ml sample of 0.1 N NaOH is titrated with 0.1 M HCl. Calculate pH of the solution after the addition of
- (i) 10 ml
 - (ii) 50 ml
 - (iii) 80 ml acid.
3. Define students test, confidence limit, Q test for laboratory data.
4. Basic tools for statistical analysis.
5. Analytical balances. Principle and operation of electronic and mechanical balances.

(Turn Over)

PART - C(Answer ***ANY NINE*** questions)(Each question carries ***TWO*** marks)

(9 x 2 = 18)

III.

Complete the following :

1. $\text{Cr}_2\text{O}_7 + 3 \text{S}_2\text{O}_3 + 3\text{H}_2\text{O} = \dots\dots\dots + 3 \text{SO}_4 + + \dots\dots\dots$
2. For estimation of cyanide $\dots\dots\dots$ is added to water sample for preservation.
3. $\dots\dots\dots$ of pipette with a given chemical increases the precision.
4. 2 N sulphuric acid means $\dots\dots\dots$ molar.
5. Pb^{2+} is converted to $\dots\dots\dots$ before disposal in an approved land fill.
6. ppm means $\dots\dots\dots$ and ppb means $\dots\dots\dots$
7. How many grams of NaCl is present in 0.1L, 1.3 M aqueous solution?
8. How many grams of H_2SO_4 is present in 0.4L, 1N aqueous solution?
9. Express to four significant figures in liters
 - (i) 14.24ml
 - (ii) 44.21 ml
10. pH of 2×10^{-8} M HCl is $\dots\dots\dots$
11. Highly toxic and volatile compound $\dots\dots\dots$ is produced when chloride is added to chromic acid solution.
12. In acid base chemistry normality is used to express $\dots\dots\dots$