LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **CHEMISTRY**

FIRST SEMESTER – **APRIL 2016**

CH 1815 / CH 1809 - ANALYTICAL CHEMISTRY

Date: 03-05-2016 Dept. No. Max. : 100 Marks
Time: 01:00-04:00

Part-A

Answer ALL questions. **(10 × 2 = 20)**

1. A chemist determined the percentage of iron in an ore and obtained the following results: Mean = 12.3l, standard deviation = 0.10, and n = 4. Calculate the 90% confidence interval of the mean. (Table value = 2.35)
2. The standard deviation from one set of 5 determinations was 0.210, while the standard deviation from another set of 6 determinations was 0.641. Is there any significant difference between the precision of these 2 sets of results? (Table value = 2.88)
3. Mention any two advantages of hydrogen used as a carrier gas in GC.
4. How are suspended bubbles removed from the mobile phase in HPLC?
5. What is the effect of structural rigidity on fluorimetric analysis of a sample?
6. Sketch the DTA graph of calcium oxalate monohydrate.
7. Distinguish Faradaic from non-Faradaic currents.
8. State Beer-Lambert's Law.
9. What is the significance of autoprotolysis constant of solvents?
10. What are the mole fractions of each gas in a mixture having 2.8 g N_2 and 3.2 g O_2 and 0.2 g H_2 ?

Part-B

Answer any EIGHT questions. **(8 × 5 = 40)**

11. What are determinate errors? How are they minimized?
12. Explain the principle of HPLC using van Deemter equation.
13. What is electro-osmotic flow? Explain.
14. Discuss the determination of sulphate by turbidimetry.
15. Explain how is quinine determined by fluorimetry?
16. Sketch and explain the working principle of flame ionization detector.
17. Explain the principle of complexometric titration using suitable example.
18. What are non aqueous titrations? Write the reactions of ethanol as non aqueous solvent.
19. Discuss the principles of two types of coulometry.
20. Explain the following terms: i) half wave potential ii) supporting electrolyte.
21. Discuss the principle and any one application of DSC.
22. How is potentiometry used to find E_{eq} in any redox process?

Part-C

Answer any FOUR questions. **(4 × 10 = 40)**

23a. Lead was determined in a sample of dust by eight different methods and the results are 9.11, 9.14, 9.21, 9.12, 9.08, 9.09, 9.14, and 9.16. Calculate the arithmetic mean and standard deviation.

b. Discuss any two types of column packing in HPLC. **(6+4)**

24. Explain the types of sample injection systems and sample derivatisation in GC.
25. Sketch and explain the instrumentation and working principle of spectrofluorimeter.

26a. Write Ilkovic equation and explain the terms in the equation. **(4)**

b Write a note on i) modified electrodes ii) amperometric titrations. **(3+3)**

27. Give a comparative account of TGA and DTA.
28. Discuss the principle, instrumentation and applications of AAS.

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