



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – CHEMISTRY

FIRST SEMESTER – APRIL 2014

CH 1815/1809 - ANALYTICAL CHEMISTRY

Date : 11/04/2014

Dept. No.

Max. : 100 Marks

Time : 09:00-12:00

Part-A

Answer all questions. Each question carries two marks.

1. What are the errors commonly occurring in titrimetric analysis?
2. A random sample of nine observations shows a mean of 4.13 with a standard deviation of 0.189. Test whether the sample values deviate from the mean of 4.0? ($t_{table} = 2.306$)
3. What are the impurities in the solvent to be avoided during HPLC?
4. State the principle of GLC.
5. Mention any two functions of the flame in FES.
6. What are leveling agents? Give an example.
7. Write any four differences between DTA and DSC.
8. Give the important advantages of using platinum electrode in electro deposition.
9. Define half wave potential.
10. State Beer-Lamberts law.

Part-B

Answer eight questions. Each question carries five marks.

11. Discuss the working principle of katharometer.
12. Explain the types of pumps used in HPLC.
13. How is quinine in water determined by Fluorimetry? Explain.
14. What are the factors affecting the fluorescence emission. Discuss.
15. Lead was determined in a sample of dust and the following values were obtained. 4.3, 4.1, 4.0, 3.2, 4.2, 3.9, 4.0 $\mu\text{g/g}$. Should the value 3.2 $\mu\text{g/g}$ be rejected? The critical value of Q is 0.831.
16. Discuss the various sample injection systems in GC.
17. Define dielectric constant and explain its effect on solvent behavior.
18. What is decomposition potential? Discuss its significance.

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19. Write a note on alternating polarography.
20. Discuss briefly the various electrode systems used in potentiometric titration.
21. Explain the advantages and disadvantages of atomic absorption spectroscopy over other methods.
22. Calculate the diffusion coefficient of Pb^{2+} for a solution of lead ions of concentration 1.00mM, the limiting diffusion current is 8.76 μA and the capillary constant value is found to be 1.9987.

Part-C

Answer four questions. Each question carries ten marks.

23. The normality of a solution is determined by four separate titrations, the results being 9.11, 9.14, 9.21, 9.12, 9.08, 9.09, 9.14, and 9.16. Calculate the mean, average deviation, standard deviation and variance.
24. a) What is FID? Explain the working principle.
b) Discuss any two ways of minimizing the constant errors. (5+5)
25. a) Draw the block diagram and explain the working principle of capillary electrophoresis.
b) List a few supporting electrolytes and explain its role in polarographic studies. (5+5)
26. a) Discuss the instrumentation of thermogravimetry and explain any two factors affecting it.
b) Define dielectric solvent and explain its effect on solvent behavior. (6+4)
27. a) Explain the different types of stripping voltammetry.
b) What is dropping mercury electrode? Mention its advantages. (6+4)
28. Write the principle involved in spectrophotometric titration. Mention its advantages. How will you determine Fe^{3+} with EDTA using this method? (3+3+4)
