LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIRST SEMESTER – **NOVEMBER 2014**

CH 1815 / CH 1809 - ANALYTICAL CHEMISTRY

Date : 08/11/2014 Dept. No. Max. : 100 Marks

Time : 01:00-04:00

Part-A

Answer all the questions. Each question carries two marks: ***10x2=20***

1. Citric acid was determined in lemon juice and the following values were obtained: 4.3, 4.1, 3.2, and 4.0 μg/g. Should the value 3.2 μg/g be rejected? (critical value is 0.831).
2. What are the common errors in gravimetric titrations?
3. State the principle of GLC.
4. What are the electrodes used in amperometric detectors?
5. Define gradient elution.
6. What is autoprotolysis? Give an example.
7. How many milliliters of 0.1 M HCl are required to react completely with an equimolar mixture containing 1 g of sodium carbonate and sodium bicarbonate.
8. Mention any two advantages of DME.
9. Sketch a cyclic voltammogram for a reversible system. Explain the parameters.
10. State Beer-Lambert's Law.

Part-B

Answer any eight questions. Each question carries five mark: ***8x5=40***

11. Explain the working principle of flame ionization detector in GC.
12. Discuss briefly any four types of pumps used in HPLC.
13. What are the different sample injection systems used in GC? Explain any two methods.
14. How is a mixture of codeine and morphine determined by fluorimetry? Explain.
15. Briefly discuss the chemical interferences in flame emission spectrometry.
16. Discuss any five factors affecting the fluorescence spectra with examples.
17. What are masking agents? Explain its role in complexometric titrations.
18. How is copper estimated by electrogravimetry?
19. Discuss the principle and reactions of acid-base titrations.
20. Discuss in detail any two applications of potentiometry.
21. How is calcium oxalate monohydrate studied using TGA?
22. Coulometric analysis is based on Faraday's Law. Substantiate.

Part-C

Answer any four questions. Each question carries ten marks: ***4x10=40***

23a. Analysis of a sample of an alloy gave the following % values of chromium content. 9.11, 9.14, 9.21, 9.12, 9.08, 9.09, 9.14, 9.16. Calculate the average deviation, standard deviation, and variance. (6+4)

b. Mention the differences between additive and proportional errors with examples.

24. Draw the block diagram and explain the instrumentation of electrophoresis.

25. Discuss the methods of column packing in HPLC.

26. Describe the principle, instrumentation and applications ofAAS.

27a. Write Ilkovic equation. Explain the terms involved in it.

b. Explain the principle and instrumentation of electrogravimetry. (4+6)

28a. Explain the principle and reactions involved in precipitation titrations. (6+4)

b. Concentrated nitric acid used in the lab work is 68% nitric acid by mass in aqueous solution. What should be the molarity of this acid if its density is 1.504 gL^{-1}?

****