# LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIRST SEMESTER – APRIL 2017

## 16PCH1MC04 / CH 1815 / CH 1809 - ANALYTICAL CHEMISTRY

Date: 04-05-2017          Dept. No.          Max. : 100 Marks
Time: 09:00-12:00

## Part-A

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

1.  Mention the common errors encountered in precipitation titrations.
2.  The standard deviation from one set of determinations was 0.250, while from another set, it was found to be 0.650. Is there any significant difference between the precision of these two sets of results? (Table value = 2.3)
3.  Define Eddy diffusion.
4.  What are the impurities present in the solvents used in HPLC? How are they removed?
5.  Mention any two advantages of electrophoresis over other chromatographic techniques.
6.  Define autoprotolysis constant of solvents.
7.  How is an indicator chosen for a redox titration?
8.  What is the role of supporting electrolyte in an electrochemical cell?
9.  State the principle of DSC.
10. Mention the principle of nephelometry.

## Part-B

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

11. What are additive and proportional errors? Explain with suitable examples.
12. Discuss any five factors affecting the fluorescence.
13. What is electro-osmotic flow? Explain its role in electrophoresis.
14. Explain any three types of column packing in HPLC.
15. Discuss the working principle of flame ionization detector with a neat diagram.
16.  Describe the significance of partition columns in gas chromatography.
17. Write short notes on the chemical interferences in FES.
18. When a monochromatic light is passed through a cell of 1cm length the intensity of the radiation is reduced to 10%. What is the transmittance if the same radiation is passed through a cell of length 8 cm? Calculate the length of a cell in order to have 25% absorbance.
19. How do enzymatic or biochemical electrodes work?
20. How will you estimate copper electrogravimetrically?
21. Explain the classification of non aqueous solvents.

22. What is the molarity and molality of a 13% solution by weight of sulphuric acid? Its density is 1.090 g/ml. To what volume should 100 ml of this acid be diluted in order to prepare 1.5 N solution?

## Part-C

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

23a. Draw Jablonski diagram and discuss the phenomena in brief. (5)

b. Analysis of a sample of alloy gave the following % values of iron content. 9.16, 9.14, 9.08, 9.09, 9.12, 9.21, 9.14, and 9.11. Calculate the average and standard deviations.(5)

24. Write a short note on the three methods of sample injection and derivatisation in gas chromatography.

25a. How is fluorimetry used for the determination of codeine and morphine in a

mixture? (6)

b. Discuss the solvent delivery system using pumps in HPLC. (4)

26.a. Derive an expression for pH for hydrolysis of the salt of a strong base and a weak acid.

(6)

b. Explain the principle and reaction of precipitation titration. (4)

27.a. Explain the instrumentation of coulometric titration with an example. (6)

b. Draw and interpret the TGA thermogram of copper sulphate pentahydrate. (4)

28 a. Determine the concentration of lead in petrol or gasoline using AAS. (5)

b. Distinguish between nephelometry and turbidimetry. (5)

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