# LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**M.Sc.** DEGREE EXAMINATION - **CHEMISTRY**

THIRD SEMESTER – **NOVEMBER 2013**

**CH 3901 - INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS**

Date : 12/11/2013 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

**Part-A**

***Answer all questions. Each question carries two marks.***

1. Define distillation.
2. Calculate the pH of 0.001N NaOH.
3. How will you prepare 250 ml of 0.01M NaOH ? (MW = 40)
4. State Lambert Beer's law.
5. What is gradient elution?
6. How is a fatty acid determined by GC?
7. What are the factors responsible for the broadening of elution curves in HPLC?
8. State the principle of GLC.
9. How is spin angular momentum calculated?
10. Give Van Deemeter equation.

**Part-B**

***Answer eight questions. Each question carries five marks***

11. Derive Henderson equation for the pH of buffer.
12. Discuss any four types of pumps used in HPLC.
13. State the principle of PC. Explain any one application.
14. Draw and explain the working principle of Katharometer in GC.
15. What is the role of atomizer unit in AAS? Explain.
16. How is the presence of alkali metals determined by FES? Discuss.
17. Assign the characteristic absorption peaks of $CH_3COOH$,IR spectral bands at 3030-3040 $cm^{-1}$, 1720 $cm^{-1}$, 1280 $cm^{-1}$ and 940 $cm^{-1}$ to the corresponding vibrations.
18. Draw and explain the DTG curve of $CuSO_4.5H_2O$.
19. Briefly discuss the instrumentation of DTA.

20. Discuss the role of monochromator and PMT in UV-Visible spectroscopy.

21. What is common ion effect? Explain with an example.

22. What are the factors affecting the separation of a mixture in ion exchange chromatography?

## Part-C

***Answer four questions. Each question carries ten marks***

23a. What is the significance of burners in AAS?

b. Explain the types of burners with a neat diagram. (5+5)

24a. Write short notes on the sample injection system in GC. (5)

b. Explain the determination of solubility using conductometric method? (5)

25a. What are the factors affecting the TGA? Explain.

b. Briefly explain the significance of finger print region in IR spectroscopy. (5+5)

26a. Discuss the important properties of ion exchange resins. What do you mean by ion exchange capacity? (6)

b. Explain how columns are packed for different purposes in GC?

27a. What is FID? Draw and explain.

b. Explain any five requirements of a primary standard with an example. (5+5)

28. Explain the working principle of double beam UV spectrometer.

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