LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **PHYSICS**

THIRD SEMESTER – APRIL 2010

CH 3900 - INSTRUMENTAL ANALYSIS (FOR PHYSICS)

Date & Time: 26/04/2010 / 9:00 - 12:00 Dept. No. Max. : 100 Marks

PART A

Answer all the questions 10 x 2 = 20

1. Calculate the molarity of a sulfuric acid solution containing 24.4g of sulfuric acid in 198g of water (molar mass of sulfuric acid is 98.08g).
2. Mention any two functions of burner in flame photometer.
3. Define gradient elution.
4. What is the principle of GLC?
5. Draw and explain the DTA curve of sulphur.
6. Mention any two important characteristics required for a detector.
7. Calculate the pH of 0.001N NaOH.
8. Give any two requirements of a primary standard.
9. Define diverse ion effect.
10. State Beer-Lambert's law.

PART B

Answer any eight questions 8 x 5 = 40

11. Draw and explain the fractional distillation of liquids.
12. Discuss the working principle and any one application of FID.
13. Describe the different ways of column packing in HPLC.
14. How is methylene blue and fluorescein separated by column chromatography?
14. What are the factors affecting TG-DTA analysis? Explain.
15. Explain the DTG analysis of $CuSO_4.5H_2O$.
16. Explain the determination of Mg^{2+} using AAS.
17. How is flame photometry used for the determination of sodium in samples?
18. Derive Henderson equation for an acidic buffer.
19. How is ion exchange chromatography helpful for the determination of Zn-Mg in the mixture?
20. Explain the two important regions in IR spectroscopy.
21. What is common ion effect? Explain with an example.
22. How is the separation of vitamins carried out by paper chromatography?

PART C

Answer any four questions 4 x 10 = 40

23. What are the two types of burners used in AAS? Explain the working principle along with their advantages and disadvantages.
24. a) How is pH of the solution determined by glass electrode?
    b) Discuss the different molecular vibrations in IR spectroscopy.
25. Draw and explain the instrumentation of TGA.
26. Draw and explain the working principle of double beam spectrophotometer.
27. Discuss the principle and technique involved in ion exchange chromatography.
28. Explain the different types of columns used in GC.

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