LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **BIODED.INSTRUMENTATION SCIENCE**

THIRD SEMESTER – APRIL 2010

CH 3901 - INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS

Date & Time: 28/04/2010 / 9:00 - 12:00 Dept. No. | Max. : 100 Marks

PART – A

Answer all the questions: (10 × 2 = 20)

1. 5 liters of a water sample is found to contain 0.0162 g of $MgCO_3$. Calculate the concentration of $MgCO_3$ in ppm.
2. State Beer – Lambert's law.
3. What is the effect of polar solvents on $n \rightarrow \pi^*$ transition?
4. Distinguish between fluorescence and phosphorescence.
5. What are the advantages of electro-thermal atomizer over other atomizer?
6. What is meant by buffer solution? How will you prepare phosphate buffer?
7. Illustrate ion – selective electrode with examples.
8. Mention any two advantages and disadvantages of Gas chromatography?
9. What is Bragg's equation?
10. What is R_f value in chromatography?

PART – B

Answer any EIGHT questions (8×5 = 40)

11. How will you estimate the following using UV-Visible spectroscopy?
    (i) Total blood volume (ii) alcohol content in blood
12. Explain the factors affecting measurements in turbidimetry.
13. Derive an expression relating fluorescence intensity and concentration.
14. Describe the working of hollow cathode tube with a diagram.
15. How will you determine mercury using flameless AAS?
16. For the cell Hg, Hg_2Cl_2(s); KCl (sat)‖H+(unknown); Q, QH_2, Pt the EMF at 25°C is 0.2640 volt. Calculate the pH of the solution at this temperature.
    $E_{calomel}$ = +0.2422 V at 25°C and $E°(H^+, Q, Q_{H2})$ = +0.6996 V.
17. Explain potentiometric acid-base titration.
18. Mention the advantages and disadvantages of hydrogen electrode.

19. Discuss the working of any two detectors used in HPLC.
20. Give the principle of mass spectrometry.
21. What are the advantages and disadvantages of flame ionization detector?
22. Explain any one pumping system for HPLC. Why does HPLC require pump?

PART – C

Answer any FOUR questions $(4 \times 10 = 40)$

23. Describe with a neat diagram the working of double beam spectrophotometer.
24. Explain the various factors affecting fluorescence.
25. Discuss in detail about the atomization devices used in AAS.
26. How will you measure pH of a solution using glass electrode?
27. Explain the principle, instrumentation and two applications of mass spectrometry.
28. Briefly explain isotopic dilution analysis and its applications.

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