

**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

M.Sc. DEGREE EXAMINATION – BIOMED.INSTR.SCIENCE&ZOOLOGY

THIRD SEMESTER – NOVEMBER 2009

**CH 3901 / 2901- INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS**

Date & Time: 10/11/2009 / 9:00 - 12:00 Dept. No.

Max. : 100 Marks

**PART – A**

Answer all the questions:

(10×2 = 20)

1. Calculate the molarity of a solution which contains 6 g of NaCl (M.W = 58.44) in 200 mL of solution.
2. What are auxochromes? Give examples.
3. Mention the various types of electronic transition that occurs in  
(a) acetone                      (b) ethanol
4. State the principle of atomic absorption spectroscopy.
5. Differentiate between continuous atomizer and discrete atomizer.
6. Write the cell representation for Quinhydrone electrode.
7. Mention the principle of a glass electrode.
8. Mention the general principle of chromatographic techniques.
9. Why is gas chromatography not generally useful for inorganic compounds?
10. What is the condition for a nucleus to be NMR active?

**PART – B**

Answer any EIGHT questions

(8×5 = 40)

11. Calculate the normality of a solution of nickel nitrate made by dissolving 2 g of pure nickel metal in HNO<sub>3</sub> and diluting the solution to 500 mL. The nickel is to be titrated with KCN, the following reaction occurring



Also calculate the molarity of CN<sup>-</sup>.

12. Describe the working of photomultiplier tube as detector.
13. Explain the principle involved in fluorimetry with Jablonski diagram.
14. How will you determine phosphate using turbidimetry?
15. Describe with a neat sketch the working the spectrofluorimeter.

16. Explain the application of Circular Dichroism spectra in determining the protein conformation.
17. Explain how the glass electrode functions as an indicator electrode for hydrogen ions.
18. How will you determine the pH of a solution using indicator method?
19. Why are pumping systems required for HPLC experiments?
20. What are free radicals? How are they produced? How are they stabilized and detected?
21. Mention various types of electromagnetic radiations and nature of excitations caused by them on molecules on interaction.
22. Explain the principle of HPLC.

### PART – C

Answer any FOUR questions

(4×10 = 40)

23. 4 g of NaOH is contained in a deci-litre of solution. Calculate the following:  
(i) mole fraction of NaOH;      (ii) molarity of NaOH;  
(iii) molality of NaOH. Density of the solution is 1.038 g/mL
24. Explain the instrumentation of single beam spectrophotometer with a block diagram.
25. a) How will you determine thiamine using fluorimetry?  
b) Explain the various types of interferences in AAS.
26. Describe the determination of pH using Quinhydrone electrode.
27. Discuss principles and working of any two detectors used in gas chromatography.
28. Compare the principles, advantages and disadvantages of  
(i) X-ray, and (ii) Neutron diffraction experiments

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