

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI - 600 034

B.Sc. DEGREE EXAMINATION - FOOD CHEMISTRY & FOOD PROCESSING

FIRST SEMESTER - NOVEMBER 2013

FP 1808 - ANALYTICAL AND INSTRUMENTATION TECHNIQUES

Date : 11/11/2013

Dept. No.

Max. : 100 Marks

Time : 1:00 - 4:00

Part A

Answer all the questions.

10 x 2 = 20 marks

1. Define Beer Lambert's law and mention its limitations.
2. Calculate the normality of the solution of 100g of NaOH dissolved in 5 litres of water and considering the above solution, how much volume is needed to make 100ml of 0.05N NaOH?
3. Define normality.
4. Write the equation to calculate the energy levels for molecular vibrations in IR spectroscopy.
5. List the applications of NIR spectroscopy in food analysis.
6. Define atomization in atomic absorption spectroscopy.
7. Why do we apply a magnetic field to the nuclei or electrons in NMR spectroscopy?
8. List the basic requirements for mass spectroscopy.
9. Give three general requirements for HPLC column packing materials.
10. Define chromatography. What are the types of paper chromatography?

Part B

Answer any eight questions.

8 x 5 = 40 marks

1. Describe the principle and instrumentation of UV visible spectroscopy.
2. What are buffer solutions? Explain the steps involved in calibrating pH meter using buffer solutions.
3. Discuss the principle and instrumentation of spectrofluorimeter.
4. What is the advantage of having atomic absorption unit with graphite furnace?

15. Describe the unique aspects of data that a mass spectrometer provides. How is this useful in the analysis of food?
16. How are binding nature of proteins and polysaccharides identified using NMR spectral technique?
17. Explain the working methodology of TLC.
18. How can chromatographic data be used to quantitate sample components?
19. Compare paper and column chromatography.
20. Explain the instrumentation and components of supercritical fluid chromatography.
21. Explain the advantages of using HPLC than conventional low pressure column chromatography.
22. Explain the principle of IR and Mass spectroscopy.

Part C

Answer any four questions.

4 x 10 = 40 marks

23. Explain the potentiometric titration procedure. Compare pH and buffer control in foods.
24. Discuss the instrumentation of atomic absorption spectroscopy. How can tin be determined by AAS in canned fruit juices?
25. Explain the principle and instrumentation of NMR spectroscopy
26. Explain the principle and mention the types of detector used in GC. How can it be used in food analysis?
27. Solve the following (2.5 x 4 = 10)
 - i) How many moles of salt are contained in 500 mL of a 0.60 M NaCl solution?
 - ii) How would you prepare 400 ml of 1.20 M solution of oxalic acid ?
 - iii) What is the molarity of a solution made by dissolving 5 g of NaCl in enough water to make 500 ml of water ?(Molecular weight of NaCl = 58.45).
 - iv) Describe the preparation of 2 litres of 0.4 N HCl starting with the concentrated HCl solution (28 %W/W HCl, SG = 1.15)
28. What are the types of isomers? Explain the geometrical isomers of organic acids.
