Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD (now MoE)
Re-accredited with A++ Grade by NAAC. CGPA 3.65/4, Category I by UGC
Coimbatore - 641 043, Tamil Nadu, India

Master's Degree Examination – May 2025
II Semester

Class : I P.G. **Time: 3 Hours**
Major : Food Science and Nutrition **Max. Marks: 100**

23MFNC10 Analytical Instrumentation for Foods

Course Outcomes:
CO1: Understand the need for analysis and instrumentation
CO2: Identify an appropriate technique for analysing specific substances
CO3: Learn the principles of different instruments used for analysis
CO4: Have an insight into the advanced techniques in food and nutrient analysis
CO5: Update knowledge on analytical instruments by visiting laboratories

Part A **10 x 1 = 10**
Choose the Correct Answer

1. Which of the following is a function of the flame or Emission system in Atomic Absorption spectroscopy? CO1K1
   a. Split the beam into two b. Break the steady light into pulsating light
   c. Filter unwanted components d. Reduce the sample into atomic state

2. State the purpose of the detector in optical emission spectrophotometry? CO1K1
   a. measure the intensity of the emitted radiation
   b. measure the intensity of the absorbed radiation
   c. measure the intensity of the scattered radiation
   d. measure the intensity of the reflected radiation

3. Which of the following type of chromatography involves the separation of substances in a Mixture over a 0.2mm thick layer of an adsorbent? CO2K1
   a. gas liquid b. column c. Thin layer d. paper

4. In HPLC terminology gradient elution refer to CO2K1
   a. Changing the column temperature b. Varying the mobile phase composition during analysis
   c. Adjusting the detector sensitivity d. Controlling the autosampler speed

5. What is the application of fluorimetry in biochemistry? CO3K1
   a. Determination of protein structure b. Study of enzyme kinetics
   c. Analysis of DNA sequences d. Detection of biomarkers for diseases

6. Which of the following is commonly used for the separation of DNA by electrophoresis? CO3K1
   a. Agarose - vertical b. Agarose- horizontal c. PAGE-Vertical d. PAGE-horizontal

7. What is the resolution of a typical SEM? CO4K1
   a. 1-10nm b. 10-100nm c. 100-1000nm d. 1-10micro m

8. Which of the following is an advantage of SEM over TEM? CO4K1
   a. Ability to analyse large samples b. higher magnification
   c. basic sample preparation d. Higher resolution

9. Which of the following is not the function of the drive mechanism in Fourier Transform infra red spectrophotometer? CO5K1
   a. Movement of mirror to obtain a satisfactory interferogram
   b. Acquire a good interferogram pattern
   c. Allow 50% of the beam to pass
   d. keep the speed the moving mirror constant

10. Identify the type of refractometer that uses a prism to measure refracrive index CO5K1

a. Abbe Total solid refractometer b. Hand held refractometer

c. Digital refractometer d. Total solids refractometer

Part B 5 x 6 = 30

Answer ALL questions

Each answer should not exceed 400 words or two pages

11.a. How is LOD calculated and what factors affect the LOD? CO1K1

(or)

11.b. Recall Lambert-Beer's law. CO1K1

12.a. Compare adsorption and partition chromatography. CO2K2

(or)

12.b. Demonstrate ion exchange chromatography procedure and applications. CO2K2

13.a. Sketch the theory of fluorescence. CO3K3

(or)

13.b. Highlight the key applications of electrophoresis in food system. CO3K3

14.a. Classify radio isotopes. CO4K4

(or)

14.b. Outline the working of gas scintillation. CO4K4

15.a. Defend why viscosity is important in food processing. CO5K5

(or)

15.b. Assess the type of samples that can be analysed by FTIR and conclude the applications of FTIR. CO5K5

Part C 5 x 12 = 60

Answer ALL questions

Each answer should not exceed 800 words or four pages

16.a. Recall the advantages of Atomic adsorption spectroscopy in food industry. CO1K1

(or)

16.b. Describe the principles, advantages and applications of ICP – OES. CO1K1

17.a. Compare HPLC and gas chromatography. CO2K2

(or)

17.b. Discuss the procedure of TLC. CO2K2

18.a. Demonstrate the procedure of PAGE. CO3K3

(or)

18.b. Examine the key components of flame photometer. CO3K3

19.a. Outline the principle and advantages of AFM. CO4K4

(or)

19.b. Explain the principles, sample preparation and applications of SEM and TEM. CO4K4

20.a. Summarize the instrumentation of differential scanning calorimeter. CO5K5

(or)

20.b. Assess the role of Brabender Farinograph in food texture analysis. CO5K5

****