

Name:			
Enrolment No:			
UPES End Semester Examination, December 2024			
Course: Bio-analytical Chemistry Program: Int. B.Sc. MSc. Chemistry Course Code: CHEM4008		Semester : VII Time : 03 hrs. Max. Marks: 100	
Instructions: Read all the below mentioned instructions carefully and follow them strictly: 1). Mention Roll No. at the top of the question paper. 2). ATTEMPT ALL THE PARTS OF A QUESTION AT ONE PLACE ONLY			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	List common food adulterants found in everyday food items and explain the health risks associated with each.	4	CO3
Q 2	Describe the clinical significance of a Complete Blood Count (CBC) test.	4	CO2
Q 3	Explain the fundamental principles of Gas Chromatography (GC) in the determination of pesticide residues in food and beverage samples.	4	CO3
Q 4	A beverage sample of 250 ml, weighing 260g, is analyzed for its moisture and ash content. After drying, the sample weights were reduced to 210g. After that, the sample was kept in muffle furnace for ashing, the residue weight was found to be 1g. Calculate the percentage of moisture and ash in the original sample.	4	CO3
Q 5	Outline the steps for determining the mineral content (calcium, potassium, sodium, and phosphates) in food samples.	4	CO3
SECTION B (4Qx10M= 40 Marks)			
Q 5	Describe the main components of blood and explain their functions.	10	CO2
Q 6	Explain the process of determining the total carbohydrate content in food and beverages samples.	10	CO3
Q 7	Classify the different types of blood groups. Why is type AB considered the universal recipient, while type O is the universal donor? OR A patient arrives at the emergency room in need of an urgent blood transfusion. After initial testing, the patient is identified as having blood type AB+. However, the hospital blood bank only has O+, A-, and B- blood types available in sufficient quantities.	10	CO2

	Explain the compatibility of each available blood type with the AB+ patient based on the ABO and Rh blood group system. Which blood types are safe for transfusion, and why?		
Q 8	Write the advantages and limitations of Supercritical Fluid Chromatography compared to traditional chromatographic techniques.	10	CO1
SECTION-C (2Qx20M=40 Marks)			
Q 9	Describe the process of urine analysis for both normal and abnormal constituents. What are the common parameters to be assessed?	20	CO2
Q10	What is Gel Permeation Chromatography (GPC), and how does it work? Describe its principle and major applications in bioanalysis. OR Explain the principle, types, and working mechanisms of the Enzyme-Linked Immunosorbent Assay (ELISA). Discuss the advantages and limitations of the ELISA technique in the context of diagnosing infectious diseases.	20	CO1