



Date:

Registration number:

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27

M.Sc. Chemistry - IV SEMESTER

SEMESTER EXAMINATION: APRIL 2023

(Examination conducted in March 2023)

**CH 0121 – APPLIED ANALYSIS**

Time- 2 ½ hrs

Max Marks-70

This question paper contains **THREE** printed pages and **THREE** parts

**Part A**

**Answer any 6 out of 8 questions. Each question carries 2 marks.** [ 6 x 2 = 12]

1. Give two differences between fibrous and globular proteins.
2. What is meant by carbon residue of a fuel?
3. Mention any two sources of zinc that contribute towards heavy metal pollution.
4. State the principle of confocal microscopy. What is the role of objective lens in confocal microscopy?
5. Give one example of analgesics with structure.
6. What is the principle of assay of alkaline phosphatase?
7. Mention any two methods for the safe disposal of radioactive wastes.
8. What is liming?

**Part B**

**Answer any 4 out of 6 questions. Each question carries 12 marks.** [4 x 12 = 48]

9. (a) Explain the principle behind the working of (i) MALDI (ii) ultracentrifuge.  
(b) Give the reactions for the N-terminal determination of amino acid with dansyl chloride? How is the Edman degradation method different from the dansyl chloride method. (6+6)
10. (a) What are the different types of ELISA? Explain briefly the principle of each type.  
(b) Discuss any two applications of recombinant technology in agriculture.  
(c) Explain how you would analyse hardness in a water sample. (4+4+4)
11. (a) Describe a method for the determination of sulphur dioxide content in air.  
(b) Elaborate on the estimation of zinc by spectrophotometry.  
(c) Define turbidity of a water sample. What is the standard unit of turbidity? (5+4+3)
12. (a) What is the role of the following additives in food (i) monosodium glutamate (ii) saccharin (iii) sodium benzoate?  
(b) Describe a method for the estimation of added water in milk.  
(c) What are (i) sedatives (ii) expectorants? Give an example each.

(d) Describe a method of determination of barbiturate drugs (phenobarbital) in drug samples and its clinical significance. (3+3+3+3)

13.(a) Explain the principle and method used in the determination of molecular weight of biopolymers using viscometer.

(b) Explain the Folin – Wu method of estimation of glucose level in a given blood sample.

(c) What is the disease caused due to the deficiency of (i) iron (ii) copper (iii) calcium in the diet? (6+3+3)

14. (a) What is rancidity? Mention the different types of rancidity.

(b) In the qualitative tests for purity of edible oils, how do you detect the presence of (i) castor oil (ii) argemone oil (iii) sesame oil?

(c) What are radio tracer experiments? Mention any one of the (i) advantages and (ii) restriction each of radio tracer experiments.

(d) Explain the principle and working of solid scintillation counter used in the determination of the radioactivity of a sample. (3+3+3+3)

### Part C

**Answer any 2 out of 3 questions. Each question carries 5 marks.** [ 2 x 5 = 10]

15. Construct a restriction map for a 52bp plasmid, pBR 607, using the data provided below. Mark the sizes of each fragment and indicate the locations where the restriction enzymes cut the plasmid.

Restriction Enzyme(s)	Number of base pairs			
Bam HI	52.0			
Hind III	26.0	12.0	8.0	6.0
Hind III and Bam HI	14.0	12.0	8.0	6.0

16. (a) In a biochemistry lab, students carry out a SDS-PAGE electrophoresis experiment on a protein with a known molecular weight of 45 kDa. Unfortunately, each student group, made a different mistake during the protocol. Consider each mistake and explain how it would alter the results for the respective groups.

Group A: The pH of the stacking gel was taken as 0.125 M Tris - HCl pH, 8.8 instead of 0.125 M Tris – HCl, pH 6.8

Group B: The students attached the anode of the power supply to the top of the gel and the cathode to the bottom of the gel.

Group C: The sample was mixed with the sample buffer that did not contain SDS, prior to loading on the gel.

(b) The food safety department has to investigate the cause of food poisoning that was reported at a restaurant. Suggest any three sources that the food inspector will investigate to identify the source of the food poisoning. Give a brief method of determining the presence of any one of the adulterants that lead to food poisoning. (3+2)

- 17.(a) 1 mol<sub>c</sub> K<sup>+</sup> are required to replace 1 mol<sub>c</sub> Ca<sup>2+</sup>. Is the statement correct? Explain.  
(b) How many mol<sub>c</sub> of K<sup>+</sup> does it take to replace 12 mol<sub>c</sub> of Ca<sup>2+</sup>? What weight of Ca<sup>2+</sup> is required to replace 12 mol<sub>c</sub> K<sup>+</sup>?  
[Atomic mass of K=39, Ca = 40]. (3+2)

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