Reg. No ..... Name **22P1037**

M. Sc. DEGREE END SEMESTER EXAMINATION : OCTOBER 2022

SEMESTER 1 : ZOOLOGY

COURSE : **21P1ZOOT03 : BIOPHYSICS, INSTRUMENTATION AND BIOLOGICAL TECHNIQUES**

(For Regular - 2022 Admission and Supplementary - 2021 Admission)

Duration : Three Hours Max. Weights: 30

PART A

Answer any 8 questions **Weight: 1**

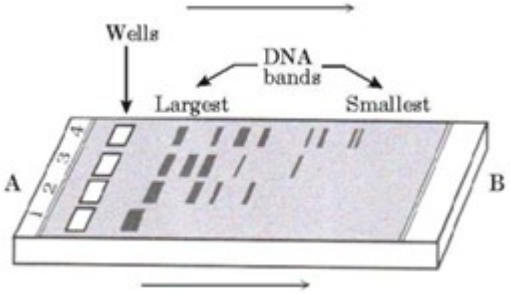
1. Explain briefly, the technique of Atomic Absorption Spectroscopy. (U, CO 8)
2. Explain the principle of centrifugation technology. (U)
3. Define 'absorbed dose' of radiation. (R)
4. Comment on the significance of Proton pump. (R, CO 3)
5. Explain the methodology of Radio Immuno Assay. (U, CO 8)
6. Explain the mechanisms of radiation damage on cells. (U, CO 2)
7. Explain the unique features of Gas chromatography. (U, CO 4)
8. Explain the impact of Photoelectric effect on human body. (U, CO 2)
9. What are carbon nanotubes. (R, CO 7)
10. Outline the salient features of Pinocytosis. (U, CO 1)

(1 x 8 = 8)

PART B

Answer any 6 questions **Weights: 2**

11. Draw a schematic diagram of a Scanning Electron microscope. (A, CO 3)
12. Given below is the diagram representing the observations made for separating DNA fragments by the Gel electrophoresis technique. Observe the illustration and answer the questions that follow :



(An)

a) Why are the DNA fragments seen to be moving in that direction?
(b) Write the medium used on which DNA fragments are separated.
(c) Mention how the separated DNA fragments can be visualised for further technical use.

13. Explain briefly the fixation methods used for different types of microscopy. (U, CO 8)

14.	Distinguish between Reversible thermodynamics and irreversible thermodynamics.	(A, CO 1)
15.	Briefly describe the different types of ELISA.	(U, CO 8)
16.	What is radiation dosimetry? Explain the methods	(R, CO 6)
17.	Explain the principle and technology involved in isopycnic centrifugation.	(U)
18.	Compare and contrast osmosis and diffusion?	(A, CO 1)

(2 x 6 = 12)

PART C

Answer any 2 questions **Weights: 5**

19.	Write an essay on any three types of microscopy and their significance.	(An, CO 2)
20.	Discuss the methodology of specimen preparation for scanning electron microscopy.	(E, CO 8)
21.	Write an account on Gas chromatography. In what way it is different from HPLC?	(U, CO 4)
22.	Elaborate the basic principle involved in NMR spectral analysis and explain the features that can be analyzed using NMR spectroscopy.	(E, CO 8)

(5 x 2 = 10)

OBE: Questions to Course Outcome Mapping

CO	Course Outcome Description	CL	Questions	Total Wt.
CO 1	Interpret the biophysical principles that govern the functioning of life processes.	Cr	10, 14, 18	5
CO 2	Examine the interactions of electromagnetic radiations with the matter.	E	6, 8, 19	7
CO 3	Illustrate the techniques for studying live cells and preserved cells under the microscope.	A	4, 11	3
CO 4	Examine the principles of chromatographic and electrophoretic separation and characterisation of biomolecules.	U	7, 21	6
CO 6	Discover the physics behind radioactivity measurement for medical as well as environmental dosimetry.	U	16	2
CO 7	Explain the basic principles of bio-nanotechnology and its potential in biomedical applications	U	9	1
CO 8	Interpret the principles of colorimetric, spectroscopic, and biochemical assay techniques for monitoring physico-chemical perturbations of life processes.	U	1, 5, 13, 15, 20, 22	16

Cognitive Level (CL): Cr - CREATE; E - EVALUATE; An - ANALYZE; A - APPLY; U - UNDERSTAND; R - REMEMBER;