

**M.Sc. DEGREE END SEMESTER EXAMINATION - NOVEMBER 2024****SEMESTER 1 : ZOOLOGY****COURSE : 24P1ZOOT03 : BIOPHYSICS, INSTRUMENTATION AND BIOLOGICAL TECHNIQUES***(For Regular 2024 Admission and Improvement/Supplementary 2023/2022/2021 Admissions)*

Duration : Three Hours

Max. Weights: 30

**PART A****Answer any 8 questions****Weight: 1**

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|-----|---|--------------------|
| 1.  | Give a short description of different types of pH meters.                 | (U, CO 1)          |
| 2.  | Mention the salient features of a Positron.                               | (U)                |
| 3.  | Explain what are nanosensors.   | (U, CO 7)          |
| 4.  | Explain the working of solid scintillation counters.                      | (U)                |
| 5.  | What are the uses of ELISA?   | (R, CO 8)          |
| 6.  | Mention the factors that regulate the opening of a Uniporter.             | (R, CO 1)          |
| 7.  | Explain the staining procedure for protein histochemistry.                | (U, CO 8)          |
| 8.  | What is Nuclear Magnetic Resonance?                                       | (R, CO 8)          |
| 9.  | Explain the principle of a Differential Interference Contrast microscope. | (U, CO 3)          |
| 10. | Classify different types of osmosis.                                      | (Cr)               |
|     |   | <b>(1 x 8 = 8)</b> |

**PART B****Answer any 6 questions****Weights: 2**

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|-----|--|---------------------|
| 11. | Comment on the radiation effects at the cellular level.  | (E, CO 2)           |
| 12. | Explain the structure and functions of Na <sup>+</sup> K <sup>+</sup> pump.                        | (U)                 |
| 13. | Describe preparative ultracentrifugation.  | (U)                 |
| 14. | Draw the scheme diagram of a Confocal microscope.  | (A)                 |
| 15. | Explain the functioning of radiation detection devices.  | (U)                 |
| 16. | Outline the features of Ion Exchange chromatography.   | (U, CO 4)           |
| 17. | Explain the principle and technology involved in Liquid chromatography - Mass spectrometry (LCMS). | (U, CO 8)           |
| 18. | Classify the solution based on osmotic pressure?   | (E, CO 1)           |
|     |  | <b>(2 x 6 = 12)</b> |

**PART C****Answer any 2 questions****Weights: 5**

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|-----|---|---------------------|
| 19. | Discuss in detail the principle, components, types and applications of electrophoresis.   | (U, CO 3)           |
| 20. | Outline the process of mitochondrial electron transport and show how it is linked to oxidative phosphorylation (ATP synthesis)? | ( )                 |
| 21. | Present an explanatory note on the biological effects of radiation on living organisms.   | ( )                 |
| 22. | Discuss the principle and methodology involved in Flame emission and atomic absorption spectroscopy.                            | (E, CO 8)           |
|     |   | <b>(5 x 2 = 10)</b> |

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	1, 6, 18	4
CO 2	Examine the interactions of electromagnetic radiations with the matter.	E	11	2
CO 3	Illustrate the techniques for studying live cells and preserved cells under the microscope.	A	9, 19	6
CO 4	Examine the principles of chromatographic and electrophoretic separation and characterisation of biomolecules.	U	16	2
CO 7	Explain the basic principles of bio-nanotechnology and its potential in biomedical applications	U	3	1
CO 8	Interpret the principles of colorimetric, spectroscopic, and biochemical assay techniques for monitoring physico-chemical perturbations of life processes.	U	5, 7, 8, 17, 20	10

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