

QP Code: P25B010

Reg. No :

Name :

ST MARY'S COLLEGE (AUTONOMOUS), THRISSUR-20

II SEMESTER (CBCSS-PG) DEGREE EXAMINATION, MARCH 2025

M Sc Biology

BIO2C05 : BIOPHYSICS

2024 Admission Onwards

Time:3 Hours

Maximum Weightage:30

Part A

*Short answer type questions: Answer **any four** questions. Weightage 2 for each question.
(4x2 = 8 Weightage)*

1. What are colloidal particles, and how do they function in biological systems? [BTL1]
2. Detail the importance of buffers in biology. [BTL2]
3. State the Svedberg equation and its significance in centrifugation. [BTL1]
4. Analyze the applications of ultrafiltration in pharmaceutical industry. [BTL4]
5. Suggest how Electron Spin Resonance (ESR) spectroscopy could be applied to detect free radicals in a biological sample. [BTL3]
6. Explain the concept of nanoremediation and how it differs from traditional remediation methods. [BTL4]
7. Examine the role of Van't Hoff's law in predicting osmosis across a semi-permeable membrane. [BTL5]

Part B

*Short essay-type questions: Answer **any four** questions. Weightage 3 for each question.
(4x3 = 12 Weightage)*

8. Describe the principle of Fluorescence Resonance Energy Transfer (FRET) and its role in studying molecular interactions. [BTL2]
9. How does the charge of a protein change as it moves through the pH gradient in IEF? [BTL1]
10. Why is the dissociation of water considered an endothermic process, and how does this impact K_w ? [BTL4]
11. If you have a mixture of RNA, DNA, and protein, which density gradient centrifugation would you choose for separation, and why? [BTL3]

Turn Over

12. Compare the advantages and disadvantages of silica gel and alumina as stationary phases in column chromatography. [BTL4]
13. Compare the working principles and detection capabilities of Geiger-Muller counters and Scintillation counters. [BTL4]
14. Which theory of pitch perception do you think is most accurate, and why? [BTL5]

Part C

*Long essay-type questions: Answer **any two** questions. Weightage 5 for each question.
(2x5 = 10 Weightage)*

15. How is Fick's Law relevant in drug delivery systems like transdermal patches? [BTL2]
16. Define a pulse-chase experiment and state its primary purpose. List two commonly used radioactive isotopes in pulse-chase experiments and their roles. [BTL1]
17. Outline the steps for processing autoradiographic films after exposure to isotopes. [BTL3]
18. Compare and contrast chemiluminescence and phospholuminescence with respect to their mechanisms and detection methods. [BTL4]
