**QP Code: P25DRIS013**

**Reg. No : .....**

**Name : .....**

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

## I SEMESTER (CBCSS - PG) DEGREE EXAMINATIONS, NOVEMBER 2025

**(Regular/Improvement/Supplementary)**

**M. Sc. General Biotechnology**

**GBT1C02 : Biomolecules**

**2024 Admission Onwards**

**Time: 3 Hours** **Maximum Weightage:30**

### Part A

*Short answer type questions. Answer **any four**. Weightage **2** for each.*

***(4x2 = 8 Weightage)***

1. Define pKa,pKb, Ka, Kb,and pI of aminoacids.
2. Explain the structure and characteristic features of A-DNA, B-DNA, and Z-DNA.
3. Compare and contrast the structure and functions of different types of polysaccharides.
4. Describe the role of ATP as a free energy carrier in biological systems and explain how thermodynamics governs biochemical processes.
5. Use the Henderson-Hasselbalch equation to determine the pH of a solution, given the concentration of an acid (0.1 M) and its conjugate base (0.05 M).
6. Describe the Reichert-Meissl number and its significance in distinguishing different types of fats.
7. Design an SDS-PAGE experiment to determine the molecular weight of a protein sample, and explain the steps and principles involved in the process.

### Part B

*Short essay-type questions. Answer **any four**. Weightage **3** for each.*

***(4x3 = 12 Weightage)***

8. Describe the concepts of enthalpy, entropy, and free energy, and explain how these principles are applied in biochemical reactions.
9. Compare the aminoacids based on chemical composition of side chains and the polarity of side chains.
10. Why monosaccharides exhibit structural and stereo isomerism? Explain with examples.
11. Define vitamins. Classify vitamins into fat-soluble and water-soluble categories, and provide examples of each.

**Turn Over**

12. Explain the Watson and Crick model of DNA with diagram.
13. Compare the structure and functions of different compound lipids, mention examples and analyse the role of various compound lipids in human body?
14. Analyze the role of mRNA, tRNA, and rRNA in protein synthesis. Discuss how mutations in any of these RNA molecules can lead to defects in protein synthesis and resultant diseases.

## Part C

*Essay-type questions. Answer **any two**. Weightage **5** for each.*
***(2x5 = 10 Weightage)***

15. What are the effects of hypersecretion of growth hormone? How can it be regulated?
16. Examine various systems of nomenclature of fattyacids. Explain with an example. Cite the Genevan names and respective common names of some examples.
17. Compare and evaluate the structural differences between maltose and lactose. How do these differences influence their digestion, enzyme specificity and role in nutrition?
18. Analyze the classification of proteins based on their structure and function. Discuss with specific examples.

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