



Department of Genetic Engineering and Biotechnology
Faculty of Health and Life Sciences
B. Sc. (Hons.) in Genetic Engineering and Biotechnology
Final Examination Summer 2026

Course Code: 0512-1301

Level and Term: L1, T3

Time: 2 Hours

Section: 253 (A+B)

Course Title: Basic Biochemistry

Course Teacher Initials: DMI & AR

Total Marks: 40

Answer the Following Questions:

Marks

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| 1 | (a) Define an essential amino acid. Provide the structures of three essential and three non-essential amino acids. | [CLO2, PLO1, C1] | 4.0 |
| 2 | (b) Elaborate the physical and chemical properties of amino acids. Explain how a peptide bond is formed between two amino acids with a suitable chemical reaction. | [CLO2, PLO1, C2] | 4.0 |
| 3 | (a) Define and classify proteins based on their structure. Illustrate the major structural levels of protein with suitable diagram. | [CLO2, PLO2, C4] | 4.0 |
| 4 | (b) Describe denaturation and renaturation. Explain the major functions of proteins. | [CLO2, PLO1, C6] | 4.0 |
| 5 | (a) Define nucleoside and nucleotide. Illustrate the structural features of a nucleotide with a suitable figure. | [CLO2, PLO1, C5] | 4.0 |
| 6 | (b) What is DNA? Analyze the major features of the Watson-Crick double-helix model of DNA with a suitable diagram. | [CLO2, PLO2, C3] | 4.0 |
| 7 | (a) What is a nitrogenous base? Classify nitrogenous base and explain complementary base pairing according to Chargaff's rules. | [CLO3, PLO1, C2] | 4.5 |
| 8 | (b) Define and classify RNA. Analyze the functions of major types of RNA that contribute to protein synthesis. | [CLO3, PLO2, C4] | 3.5 |
| 9 | (a) Define and classify hormones based on their chemical nature, and state their major functions. | [CLO4, PLO2, C1] | 4.0 |
| 10 | (b) What is vitamin? Classify vitamins based on solubility. Evaluate the importance of vitamins in maintaining normal body functions. | [CLO4, PLO2, C5] | 4.0 |