

**BINDURA UNIVERSITY OF SCIENCE EDUCATION**  
**DEPARTMENT OF BIOLOGICAL SCIENCES**  
**HBSced**  
**BIOCHEMISTRY (BZH108)**

AUG 2023

**EXAMINATION**  
**2 HOURS (100 MARKS)**

**INSTRUCTIONS**

Answer **FOUR** questions. You **MUST** answer **QUESTION 1** (Section A) and any **THREE** questions from section B. Each question carries **25 MARKS**. Where a question contains subdivisions, the mark value of each subdivision is given in brackets. Illustrate your answers where appropriate with large, clearly labelled diagrams. You should not spend more than thirty minutes on each question.

**SECTION A (COMPULSORY)**

- 1a) Describe an experimental procedure to determine the effect of temperature on the enzyme lipase. **(20 marks)**
- b) Plot a graph of time taken for the reaction to occur against temperature. **(5 marks)**

**SECTION B**

2) Write short notes on any FIVE of the following:

- |  |                  |
|--|------------------|
| a) Electron transport chain                            | <b>(5 marks)</b> |
| b) Fluid mosaic model                                  | <b>(5 marks)</b> |
| c) Induced fit model of enzyme action                  | <b>(5 marks)</b> |
| d) Distinguish between a nucleotide and a nucleic acid | <b>(5 marks)</b> |
| e) Base pairing in DNA                                 | <b>(5 marks)</b> |
| f) Phosphorylation                                     | <b>(5 marks)</b> |
| g) DNA replication                                     | <b>(5 marks)</b> |

3)a). Briefly summarize the major functions of the following in the cell surface membranes:

- |                   |                  |
|-------------------|------------------|
| i. Phospholipids  | <b>(3 marks)</b> |
| ii. Cholesterol   | <b>(3 marks)</b> |
| iii. Glycolipids  | <b>(3 marks)</b> |
| iv. Glycoproteins | <b>(3 marks)</b> |
| v. Proteins       | <b>(3 marks)</b> |

b) Draw structures of the maltose and cellulose and state the difference between them. **(10 marks)**

4.a) Describe the formation of a peptide bond.

**(5 marks)**

b) Justify the statement, 'Primary structure of a protein guides the formation of secondary and tertiary structure.' Give suitable examples.

**(20 marks)**

5.) Describe the processes of transcription and translation during protein synthesis. **(25 marks)**

6.a) Adenosine triphosphate (ATP) has a crucial role to play in making energy available for metabolic reactions in all living organisms.

i. Explain how ATP releases energy required for metabolic processes in the body.

**(4 marks)**

ii. List the different components of the ATP molecule. **(3 marks)**

b) Explain the role of human hemoglobin in oxygen transport in the body. **(9 marks)**

c) Describe lipid metabolism **(9 marks)**

**END OF EXAMINATION PAPER**