

UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER 2009

TITLE OF PAPER: BIOCHEMISTRY & CELL BIOLOGY

COURSE CODE: B203

TIME ALLOWED: THREE HOURS

INSTRUCTIONS:

1. ANSWER ANY FOUR QUESTIONS
2. EACH QUESTION CARRIES TWENTY FIVE (25) MARKS
3. ILLUSTRATE YOUR ANSWERS WITH LARGE AND CLEARLY LABELLED DIAGRAMS WHERE APPROPRIATE

SPECIAL REQUIREMENTS:

NONE

THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION HAS
BEEN GRANTED BY THE INVIGILATORS

QUESTION 1

- (a) With reference to maltose and sucrose briefly explain the differences between reducing and non-reducing sugars. (9 marks)
- (b) The energy contained in a molecule of glucose is made available to aerobic organisms by these biochemical processes: glycolysis, citric acid cycle, electron transfer system and oxidative phosphorylation. Outline the essential features of each of these processes. (16 marks)

[TOTAL MARKS = 25]

QUESTION 2

- (a) Outline the structural features of the common fatty acids. (5 marks)
- (b) Explain with examples the differences between saturated and unsaturated fatty acids. (8 marks)
- (c) Describe the structure, properties and functions of triacylglycerols in higher living organisms. (12 marks)

[TOTAL MARKS = 25]

QUESTION 3

- (a) Name the building blocks of proteins and briefly describe their basic chemical structure and properties. (9 marks)
- (b) What are the major break-down products of amino acids? Briefly explain what happens to these products in vertebrates. (16 marks)

[TOTAL MARKS = 25]

QUESTION 4

- (a) What is meant by the following:
- (i) Enzyme activator
 - (ii) Allosteric effector or modifier and
 - (iii) Enzyme inhibitor (10 marks)
- (b) Explain briefly how some heavy metals pesticides and poisons inhibit the action of enzymes in living organisms. (15 marks)

[TOTAL MARKS = 25]

QUESTION 5

- (a) Distinguish between deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) of living cells. (10 marks)
- (b) discuss the roles played by nucleic acids in the biosynthesis of proteins. (15 marks)

[TOTAL MARKS = 25]

QUESTION 6

Explain in detail how adenosine triphosphate (ATP) is generated and utilized in photosynthesis.

[TOTAL MARKS = 25]