

UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER: MAY 2010

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 SHOULD NOT BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATORS

[PLEASE TURN OVER]

Question 1

- (a) With references to sucrose, explain the formation of disaccharides from monosaccharides. (8 marks)
- (b) Explain why sucrose is not a reducing sugar. (5 marks)
- (c) Using glucose as an example, explain ring formation and alpha (α) and beta (β) structures in monosaccharides. (12 marks)

[TOTAL MARKS = 25]**Question 2**

- (a) Outline the functions of proteins. (6 marks)
- (b) Distinguish between native and denatured proteins. (6 marks)
- (c) The following items are classified as protein denaturing agents:
(i) microwave radiation,
(ii) organic solvents,
(iii) strong acids and bases.
Briefly explain how each agent affects the overall (covalent) shape of a protein in biological systems. (13 marks)

[TOTAL MARKS = 25]**Question 3**

Write concise notes on the following:

- (a) ω -3 fatty acids, (8 marks)
- (b) cholesterol, (8 marks)
- (c) lipoproteins. (9 marks)

[TOTAL MARKS = 25]**Question 4**

- (a) With reference to glucose metabolism, outline the steps in **either** the glycolytic pathway **or** the citric acid cycle, highlighting the role of enzymes involved. (12 marks)
- (b) Briefly explain the β -oxidation of lipids, highlighting its significance in cell metabolism. (13 marks)

[TOTAL MARKS = 25]**Question 5**

- (a) Using named examples and schematic diagrams or structures, explain what nucleotides are. (7 marks)
- (b) Explain the structural and functional differences between DNA and RNA. (18 marks)

[TOTAL MARKS = 25]

[PLEASE TURN OVER]

Question 6

- (a) Compare and contrast the processes of photosynthesis and gluconeogenesis in biological systems. (12 marks)
- (b) Name the final products of light reactions of photosynthesis and briefly discuss their fate in metabolism in green plants. (13 marks)

[TOTAL MARKS = 25]

END OF QUESTION PAPER