

UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION PAPER: MAY 2011

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 reference to glucose, sucrose and starch, describe the structure and properties of carbohydrates. (15 marks)
- (b) Using monosaccharides as examples, explain the following:
- (i) chiral carbon, (2 marks)
 - (ii) epimers, (3 marks)
 - (iii) glycosidic bond, (2 marks)
 - (iv) mutarotation. (3 marks)

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

- (a) Discuss the nature and importance of lipids in living organisms. (18 marks)
- (b) Briefly explain the significance of the pentose phosphate pathway in cell metabolism. (7 marks)

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

- (a) Explain what is meant by the following:
- (i) an enzyme activator, (3 marks)
 - (ii) an enzyme inhibitor, (3 marks)
 - (iii) an allosteric effector or modifier. (3 marks)
- (b) State any four properties of enzymes. (4 marks)
- (c) Explain how temperature and pH affect the activity of enzymes. (12 marks)

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

- (a) What are nucleic acids? (5 marks)
- (b) Discuss the differences between DNA and RNA with reference to their structure, function and intracellular localisation. (20 marks)

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

- (a) What is substrate-level phosphorylation in metabolism? (5 marks)
- (b) In aerobic respiration, the energy contained in a glucose molecule is made available to cells by the biochemical processes numbered (i) to (iv) below. Outline the essential features of each of these processes.
- (i) glycolysis, (5 marks)
 - (ii) tricarboxylic acid cycle, (5 marks)
 - (iii) respiratory chain, (5 marks)
 - (iv) oxidative phosphorylation. (5 marks)

[TOTAL MARKS = 25]

[PLEASE TURN OVER]

Question 6

Write a concise essay on photosynthesis, highlighting the importance of this process to eukaryotic organisms. (25 marks)

[TOTAL MARKS = 25]

END OF EXAM PAPER