

UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION PAPER 2007

TITLE OF PAPER: INTRODUCTORY BOTANY

COURSE CODE: B111

TIME ALLOWED: THREE HOURS

- INSTRUCTIONS:
1. THIS PAPER IS DIVIDED INTO TWO SECTIONS. ANSWER EACH SECTION IN A SEPARATE BOOKLET.
 2. EACH QUESTION CARRIES TWENTY FIVE (25) MARKS
 3. ILLUSTRATE YOUR ANSWERS WITH LARGE AND CLEARLY LABELLED DIAGRAMS WHERE APPROPRIATE
 4. ANSWER QUESTION 1 AND ONE OTHER QUESTION FROM SECTION A.
 5. ANSWER ANY TWO QUESTIONS FROM SECTION B.

SPECIAL REQUIREMENTS:

NONE

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

SECTION A

INSTRUCTIONS: ANSWER QUESTION 1 AND ONE OTHER QUESTION FROM THIS SECTION.

QUESTION 1 (COMPULSORY)

a) Define the following terms:

- i. A conjugated protein
- ii. Prosthetic group
- iii. Cofactor
- iv. Coenzyme
- v. Apoenzyme

[5 Marks]

b) What name is given to enzymes which catalyse the following types of reactions:

- i. transfer of groups of atoms from one molecule to another
- ii. splitting of a larger molecule into two smaller molecules with addition of water
- iii. cleavage of C-C, C-O, C-N and C-S bonds without addition of water
- iv. isomerisation reactions

[4 Marks]

c) Name two common structures in the secondary level of protein structures. [2 Marks]

d) Name three types of interactions that stabilise the tertiary structure of proteins. [3 Marks]

e) State any three functions of cholesterol. [3 Marks]

f) Copy and complete the following table [8 Marks]

Molecule	Monomeric residue composed of	Function
Pectins		
Hemicelluloses		
Inulin	Fructose	
Chitin		
Mucopolysaccharides		Component of connective tissue and joint lubricant

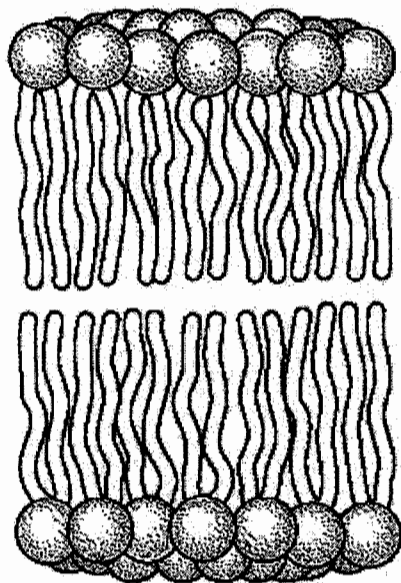
QUESTION 2

- a) State any five properties of living things. [5 Marks]
- b) Briefly discuss the following using large, clearly labelled diagrams to illustrate your answer.
- i. Active transport
 - ii. Phagocytosis
 - iii. The secondary level of protein structure
 - iv. The functions of simple lipids in living organisms
 - v. Feedback inhibition
- [20 Marks]

[TOTAL 25 MARKS]

QUESTION 3

- a) Explain what is shown in the following diagram.



[2 Marks]

- b) Describe fully, the molecular composition and behaviour of this structure. [5 Marks]

- c) Explain where you might find the structure shown in a) above including an account of all other molecules that might be associated with it. [8 Marks]
- d) Describe three mechanisms by which substances may move across the cell membrane, using large, fully labelled diagrams to illustrate your answer. [10 Marks]

[TOTAL 25 MARKS]

SECTION B

INSTRUCTIONS: Answer any TWO (2) questions from this section.

QUESTION 4

- (a) What are the criteria that are used to separate algae into phyla and/or division? [3 marks]
- (b) Draw the representatives of the following phyla:
 - (i) bacillariophyta [3 marks]
 - (ii) chlorophyta [3 marks]
 - (iii) phaeophyta [3 marks]
 - (iv) euglenophyta [3 marks]
- (c) Demonstrate that *Fucus vesiculosus* undergoes both haploid and diploid life cycles. [2 marks]
- (d) Give an account of the economic importance of algae. [2 marks]

[TOTAL MARKS = 25]

QUESTION 5

- (a) Give a brief explanation of the phases of the cell cycle in somatic cells. [5 marks]
- (b) Why must cells divide? [5 marks]

- (c) Draw an animal cell at metaphase and telophase stages of mitosis. [3 marks]
- (d) Given the number of chromosome pairs to be three (3), what is the number of possible chromosome combination at meiosis? [3 marks]
- (e) Outline the genetic significance of mitosis and meiosis. [9 marks]

[TOTAL MARKS = 25]

QUESTION 6

- (a) Explain the types of life cycles in plants. [6 marks]
- (b) Outline the characteristics of non vascular plants. [4 marks]
- (c) What is a gametophyte? What is a sporophyte? How is the gametophyte specialized in plants? [5 marks]
- (d) Draw well labelled diagrams of the following:
 - (i) *Pellia* spp. [3 marks]
 - (ii) *Funaria* spp. [2 marks]
 - (iii) *Dryopteris* spp. [2 marks]
 - (iv) longitudinal section through an archegonium of *Anthoceros* spp. [3 marks]

[TOTAL MARKS = 25]