

**UNIVERSITY OF SWAZILAND**  
**SUPPLEMENTARY EXAMINATION PAPER: JULY 2014**

**TITLE OF PAPER:           INTRODUCTORY BOTANY**

**COURSE CODE:            B111**

**TIME ALLOWED:           THREE HOURS**

- INSTRUCTIONS:**
- 1.   THIS PAPER IS DIVIDED INTO TWO SECTIONS**
  - 2.   **ANSWER 2 QUESTIONS FROM EACH SECTION IN TWO SEPARATE BOOKLETS.****
  - 3.   **ANSWER QUESTION 1 (COMPULSORY) AND ONE OTHER QUESTION FROM SECTION A.****
  - 4.   **ANSWER ANY TWO QUESTIONS FROM SECTION B.****
  - 5.   EACH QUESTION CARRIES TWENTY FIVE (25) MARKS.**
  - 6.   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**

PTO

**SECTION A**

**Question 1 (COMPULSORY)**

Describe and explain the structure of proteins.

(25 marks)

**[Total marks = 25]**

**Question 2**

(a) Explain the different ways by which carbohydrates can be classified. (12 marks)

(b) Explain how in nature triacylglycerols are formed. Hence explain why oils are liquid and fats are solid at room temperature. (6 marks)

(c) Explain the non-covalent forces that keep the native conformation of proteins in place. (7 marks)

**[Total marks = 25]**

**Question 3**

(a) Choose any 3 organelles found in a cell and explain their functions. (3 marks)

(b) Explain how water and metabolites are transported across the plasma membrane. (9 marks)

(c) Using examples, explain the concept of mutarotation. (6 marks)

(d) Explain the process of photosynthesis, highlighting what happens during light-dependent and light-independent reactions. (7 marks)

**[Total marks = 25]**

**PTO**

**SECTION B**  
**ANSWER ANY TWO (2) QUESTIONS FROM THIS SECTION.**

**Question 4**

- (a) Develop your own "species concept" and relate it with the contradicting definition of biological species. (5 marks)
- (b) Name and elaborate on the characteristics used in plant taxonomy. (5 marks)
- (c) Do you think that DNA analysis is important in modern systematics? Elaborate. (5 marks)
- (d) List the principles that underlie the methods of numerical taxonomy. (10 marks)

**[Total marks = 25]**

**Question 5**

- (a) Draw well-labelled diagrams of the following:
  - (i) *Dryopteris* spp. (2 marks)
  - (ii) *Funaria* spp. (2 marks)
  - (iii) *Pellia* spp. (2 marks)
  - (iv) A longitudinal section through an archegonium of *Anthoceros* spp. (3 marks)
- (b) Explain the types of life cycles in plants. (6 marks)
- (c) Write an essay on the ecological relevance of the study of ferns and their relatives. (10 marks)

**[Total marks = 25]**

**Question 6**

- (a) Give your own opinion on temperature requirements in Microbiological Research. (10 marks)
- (b) How would you set a microscope to reach your desired magnification? (3 marks)
- (c) Make a clear distinction between simple and differential staining. (3 marks)
- (d) Why would you wish to stain microorganisms? (4 marks)
- (e) Determine the colour of the bacterium after:
  - (i) simple staining with methylene blue;
  - (ii) simple staining with crystal violet;
  - (iii) the Gram's stain. (5 marks)

**[Total marks = 25]**

**END OF QUESTION PAPER**