UNIVERSITY OF SWAZILAND

MAIN EXAMINATION PAPER, DECEMBER 2011

TITLE OF PAPER : INTRODUCTORY BOTANY

COURSE CODE : B 111

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

SECTION A

Question 1 (COMPULSORY)

(a) (i) State the functional group necessary for a sugar to be reducing. (1 mark)
(ii) Is fructose an aldose or a ketose? (1 mark)
(iii) Does fructose give the same result as glucose when reacted with Benedict's reagent? Explain your answer. (4 marks)
(v) What are anomers? How are they formed? (3 marks)

(b) (i) Draw the general structure of an amino acid. (2 marks)

(c) Name the following:
(i) A bond between two amino acids, (1 mark)
(ii) A bond between two monosaccharide units, (1 mark)
(iii) A bond between two adjacent cysteine residues, (1 mark)
(iv) A bond between two nucleotides, (1 mark)
(v) A functional group with –SH. (1 mark)

(d) State any four non-covalent interactions that stabilise the tertiary structure of proteins. (4 marks)

(e) Define K_m and V_{max} of an enzyme-catalysed reaction. (2 marks)

(f) Explain how the enzyme-substrate affinity can be inferred from K_m. (3 marks)

Total: [25 marks]

Question 2

Write notes on primary, secondary, tertiary and quaternary structures of proteins. (25 marks)

Total: [25 marks]

Question 3

Choose any five organelles in a plant cell and explain their roles in the cell. (25 marks)

Total: [25 marks]

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

Question 4

a) Draw the following:

i)	*Euglena spp*	(1.5 marks)
ii)	*Fucus spp*	(1.5 marks)
iii)	A perithecium	(1.5 marks)
iv)	An apothecium	(1.5 marks)
v)	A basidiocarp	(1.5 marks)
vi)	*Pinnularia spp*	(1.5 marks)
vii)	*Chlamydomonas spp*	(1.5 marks)
viii)	A cleistothesium	(1.5 marks)
ix)	A pycinidium	(1.5 marks)
x)	An acervulus	(1.5 marks)

b) Explain the economic importance of fungi. (5 marks)

c) Write an essay on the importance of algae to the environment. (5 marks)

Total: [25 marks]

Question 5

a) What is a virus? (5 marks)

b) Draw the following:

i)	An icosahedral virus	(1.5 marks)
ii)	A retrovirus	(1.5 marks)
iii)	A rigid rod-shaped virus	(1.5 marks)
iv)	A bacteriophage	(1.5 marks)

c) Explain how viruses multiply within their host cells. (7 marks)

d) What is the relevance of viruses to human? Elaborate. (7 marks)

Total: [25 marks]

Question 6

a) Indicate the functions of the following structures in bacteria.
   i) A capsule (1 mark)
   ii) A pilus (1 mark)
   iii) An endospore (1 mark)
   iv) A flagellum (1 mark)
   v) Poly-β-hydroxybutyrate granules (1 mark)

b) What are the shapes of bacteria? Elaborate. (3 marks)

c) Distinguish between Gram-positive and Gram-negative cell walls of bacteria. (3 marks)

d) Given that the optimal conditions for bacterial growth are never met, Explain the logistic curve of a bacterium. (8 marks)

e) Write an essay on "bacteria useful to humans". (6 marks)

Total: [25 marks]

END OF QUESTION PAPER