UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER 2011/2012

TITLE OF PAPER: SPERMATOPHYTA

COURSE CODE: B301

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 IS NOT TO BE OPENED UNTIL PERMISSION HAS

BEEN GRANTED BY THE INVIGILATORS

QUESTION 1

a) Discuss the life cycle of *Selaginella* using annotated diagrams. (10 marks)

b) What features of *Selaginella* suggest that it could be an ancestor of seed producing plants? (5 marks)

c) How did the microphyllous leaf evolve? Support your answer with illustrations and examples. (10 marks)

[TOTAL MARKS = 25]

QUESTION 2

a) Explain the life cycle of a leptosporangiate pterophyta of your choice using well labelled diagrams and brief notes. (10 marks)

b) What makes a fern leptosporangiate as opposed to eusporangiate? (5 marks)

c) Discuss at least ten ways in which ferns evolved. (10 marks)

[TOTAL MARKS = 25]

QUESTION 3

a) Discuss the life cycle of *Pinus*. Elaborate on the following stages:
(i). Microspore development to the male gametophyte (5 marks)
(ii). Megaspore development to the female gametophyte (5 marks)
(iii). Zygote development to the mature embryo (5 marks)

b) In what ways do cycads differ from pines? (10 marks)

[TOTAL MARKS = 25]

QUESTION 4

a) Draw the evolutionary tree of selected monocotyledons as presented by Bessey, starting from Ranunculaceae. For each named family, supply the following:
- a scientifically named example
- a complete floral formula
- mode(s) of pollination (15 marks)

b) Use this evolutionary line to explain how the flower changed from one family to the next according to Besseyian principles. Point out new floral structures in each family and state their origin and purpose. (10 marks)

[TOTAL MARKS = 25]

QUESTION 5

a) Prepare a table with sketches and diagrams to show anatomical differences between dicotyledons and monocotyledons. (5 marks)

b) Discuss secondary body formation in the stems of dicotyledons. Illustrate your answer. (10 marks)

c) Explain why parenchyma cells are considered essential cells in all plants. (10 marks)

[TOTAL MARKS = 25]

QUESTION 6

(a) What is the function of sclereids in plants? Show details of the wall and its composition to support your answer. (5 marks)

(b) Use annotated diagrams to explain:-

i) maturation of tracheary elements (10 marks)

ii) maturation of sieve tubes and companion cells. (10 marks)

[TOTAL MARKS = 25]