

UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER 2006

TITLE OF PAPER: SPERMATOPHYTA

COURSE CODE: B301

TIME ALLOWED: THREE HOURS

INSTRUCTIONS:

1. ANSWER FOUR QUESTIONS AT LEAST 2 FROM EACH SECTION.
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

SECTION A

Pteridophytes

QUESTION 1

Ferns are the most abundant pteridophytes found in Swaziland. Using Polypodium as your point of reference, discuss the biology and variability among members of Pterophyta.

[25 MARKS]

QUESTION 2

Psilophyta are the most primitive of known pteridophytes. Explain and support this observation using illustrations and named examples from as many groups as you can.

[25 MARKS]

SECTION B

Gymnosperms

QUESTION 3

- a) Draw and label transversal sections of a stem of Pinus to show:
- (i) tissue organization in a primary body
 - (ii) tissue organization in a secondary body (10 marks)
- b) Use annotated diagrams to explain the differentiation of the secondary body from the primary body. (10 marks)
- c) What cellular composition will indicate that this is a gymnosperm stem and that it is Pinus. (5 marks)

[25 MARKS]

QUESTION 4

- a) Using well annotated diagrams and brief explanations, outline the life cycle of Pinus. (15 marks)
- b) At which points of the life cycle does Cycas, a gymnosperm, differ from Pinus. (10 marks)

[25 MARKS]

SECTION C

QUESTION 5

- a) Evolutionary trees enable us to handle, relate and extrapolate information in large biological data bases. Present Bessey's system of a possible method of evolution of the angiosperm flower, to illustrate the relationship of families of flowering plants.
N.B. Draw the tree. (15 marks)
- b) If you are then told that Sterculiaceae evolved directly from Malvaceae, what can you say about its flower. (5 marks)
- c) What can you deduce about flowers of Eriocaulaceae if it evolved together with Poaceae. (5 marks)
- [25 MARKS]**

QUESTION 6

- a) How do angiosperms differ from gymnosperms? (3 marks)
- b) Explain the criteria used to differentiate gymnosperms from angiosperms. (10 marks)
- c) Starting with the sporophyte (a plant) outline a generalized life cycle of an angiosperm. Use Carex and Lillium to explain the variations that can occur in maturation of the embryo sac. (12 marks)
- [25 MARKS]**

SECTION D

Anatomy

QUESTION 7

- a) Draw annotated tissue maps to show the relationship between number and location of initials and derivatives in the root apical meristem of
- (i) grass (Stipa) (5 marks)
- (ii) radish (Raphanus) (5 marks)
- (iii) Spruce (Picea) (5 marks)
- b) From the diagrams presented in Question 7(a), what possible changes occurred in the root apical meristem during the evolution of spermatophytes? (5 marks)
- c) Briefly describe the type of cell one finds in meristems. (5 marks)
- [25 MARKS]**

QUESTION 8

At initiation all plant cells are the same. During differentiation, cells change in order to carry out their functions efficiently. Support this statement using cells in primary xylem.