UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION PAPER 2014

TITLE OF PAPER: SPERMATOPHYTA

COURSE CODE: B301

TIME ALLOWED: THREE HOURS

INSTRUCTIONS:

1. ANSWER ANY FOUR QUESTIONS, ONE QUESTION 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)

Answer **one** question from this section

QUESTION 1

Discuss the theories that have been presented to explain the evolution of the sporophyte (i.e. leaves, sporangia and stele) among pteridophytes.

(25 marks)

QUESTION 2

a) Discuss the life cycles of a typical leptosporangiate fern. Illustrate:
   i) The gamerophyte with gametangia (8 marks)
   ii) Sporangia on sporophyll (7 marks)

b) Briefly define the following asexual processes and explain their consequences
   i) Apogamy (6 marks)
   ii) Apospory (4 marks)

[TOTAL MARKS = 25]

SECTION B (GYMNOSPERMS)

Answer **one** question from this section

QUESTION 3

Explain seed formation in *Pinus* to support its classification as a gymnosperm. Start your presentation from the megasporocyte and microsporocyte stages. Illustrate key steps.

(25 marks)

QUESTION 4

a) How do you characterise a gymnosperm? (3 marks)

b) Prepare a table of criteria that can be used to separate cycads from pines.

(9 marks)

c) List the cells of the xylem and phloem of gymnosperms. (3 marks)

d) Explain the differentiation of the secondary body in the stem of gymnosperms.

(10 marks)

Illustrate the following:
- the primary body
- differentiation in the vascular bundles
- differentiation in the outer cortex

[TOTAL MARKS = 25]

SECTION C (PLANT CLASSIFICATION)

Answer **one** question from this section

QUESTION 5

Discuss the evolution of a flower according to Bessey. Show how this has been used in plant taxonomy. (25 marks)

QUESTION 6

Discuss family Fabaceae (old Leguminosae) and compare its sub-classes Ceasalpinioidae, Mimisoidae and Papilionoidae. (25 marks)

SECTION D (ANATOMY)

Answer **one** question from this section

QUESTION 7

a) Write brief notes on the following cells:

i) Parenchyma (4 marks)

ii) Collenhyma (6 marks)

b) Explain the following theories of structural development and differentiation:

i) Histogen Theory (5 marks)

ii) Apical Cell Theory (5 marks)

iii) Tunica-corpus Theory (5 marks)

[TOTAL MARKS = 25]

QUESTION 8

a) Discuss sclereids under the following subtitles:

i) Cell structure and composition (3 marks)

ii) Cell morphology and function (5 marks)

iii) Distribution and function (2 marks)

b) Discuss seed formation in *Lillium,* an angiosperm with a 5n endosperm. Illustrate key steps. (15 marks)

[TOTAL MARKS = 25]