

UNIVERSITY OF SWAZILAND

MAIN EXAMINATION PAPER: MAY 2011

TITLE OF PAPER: SPERMATOPHYTA

COURSE CODE: B301

TIME ALLOWED: THREE HOURS

- INSTRUCTIONS:**
- 1. THIS PAPER IS DIVIDED INTO FOUR SECTIONS**
 - 2. ANSWER A TOTAL OF FOUR (4) QUESTIONS, CHOOSING ONE (1) QUESTION FROM EACH SECTION**
 - 3. EACH QUESTION CARRIES TWENTY FIVE (25) MARKS**
 - 4. ILLUSTRATE YOUR ANSWER WITH LARGE AND CLEARLY LABELLED DIAGRAMS WHERE APPROPRIATE**

SPECIAL REQUIREMENTS: NONE

THIS PAPER SHOULD NOT BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATORS

SECTION A (PTERIDOPHYTES)
Answer one question from this section.

Question 1

- (a) Prepare a table to suggest possible evolutionary trends among ferns. (10 marks)
- (b) Discuss the evolution of the sporophyte of pteridophytes under the following subtitles:
- (i) Evolution of macrophyllous leaves – Telome Theory, (5 marks)
 - (ii) Evolution of microphyllous leaves – Enation Theory, (5 marks)
 - (iii) Evolution of the pith – Intrusion and Intracyclic theories. (5 marks)

NB: Illustrate your answers.

[TOTAL MARKS = 25]

Question 2

- (a) Discuss the life cycles of a typical leptosporangiate fern. Illustrate:
- (i) the gametophyte with gametangia, (8 marks)
 - (ii) sporangia on a 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]

[PLEASE TURN OVER]

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 megasporocyte and microsporocyte. Illustrate key steps. (25 marks)

[TOTAL MARKS = 25]

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. Illustrate the following: - primary body, - differentiation of the stem, - differentiation in the outer cortex. (10 marks)

[TOTAL MARKS = 25]

[PLEASE TURN OVER]

SECTION C (PLANT CLASSIFICATION)

Answer **one** question from this section.

Question 5

Discuss the monocotyledonous line of evolution according to Bessey.

(25 marks)

[TOTAL MARKS = 25]

Question 6

Discuss family Fabaceae (old Leguminosae) and compare its sub-classes

Ceasalpinioidae, Mimosoidae and Papilionoidae.

(25 marks)

[TOTAL MARKS = 25]

[PLEASE TURN OVER]

SECTION D (ANATOMY)

Answer **one** question from this section.

Question 7

- (a) Write brief notes on the following cells:
- (i) Parenchyma, (4 marks)
 - (ii) Collenchyma. (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-carpus 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 *Lilium*, an angiosperm with a 5n endosperm. Illustrate key steps. (15 marks)

[TOTAL MARKS = 25]

END OF QUESTION PAPER