

UNIVERSITY OF SWAZILAND

MAIN EXAMINATION PAPER: MAY 2015

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) Cite at least five (5) characteristics supporting the possible evolution of pteridophytes from bryophytes. (5 marks)
- (b) Discuss at least ten (10) characters which changed during the evolution of members of Pterophyta. Cite specific examples. (10 marks)
- (c) Discuss the life cycle of a named leptosporangiate fern. Illustrate your answer. (10 marks)

**[Total = 25 marks]**

**Question 2**

- (a) What is apogamy and what are its implications. (5 marks)
- (b) Discuss at least ten (10) aspects that differentiate leptosporangiate ferns from eusporangiate ferns. Tabulate your answer. (10 marks)
- (c) Discuss the life cycle of *Psilotum* using diagrams and brief notes. (10 marks)

**[Total = 25 marks]**

**SECTION B (GYMNOSPERMS)**

Answer one question from this section.

**Question 3**

- (a) Discuss embryo sac maturation in the following genera:
- (i) *Pinus*, (7marks)
  - (ii) *Carex*, (7marks)
  - (iii) *Lilium*. (7marks)
- (b) Considering embryo sac maturation, what do you think happened in the evolution of angiosperms from gymnosperms? (4 marks)

**[Total = 25 marks]**

**Question 4**

- (a) Discuss and illustrate the life cycle of a pine under the following sub-headings:
- (i) maturation of the female gametophyte, (5 marks)
  - (ii) maturation of the male gametophyte, (5 marks)
  - (iii) fertilization and embryo development. (5 marks)
- (b) Draw and label a transversal section of a pine leaf. (5 marks)
- (c) Discuss the economic importance of at least two (2) named genera of gymnosperms found in Swaziland. (5 marks)

**[Total = 25 marks]**

**SECTION C (TAXONOMY)**

Answer **one** question from this section.

**Question 5**

- (a) Explain the Besseyan evolution of angiosperm families and draw the suggested tree. (15 marks)
- (b) Discuss the economic importance of two (2) families on this tree, one monocotyledonous and a dicotyledonous family. (10 marks)

**[Total = 25 marks]**

**Question 6**

- (a) Discuss the family Fabaceae by comparing its component sub-families. (15 marks)

- (b) Draw the floral diagram of the family Papilionaceae. (10 marks)

**[Total = 25 marks]**

**SECTION D (ANATOMY)**

Answer one question from this section.

**Question 7**

- (a) Discuss the maturation of:
- (i) sieve tube members, (7 marks)
  - (ii) vessel member. (8 marks)
- (b) Explain why parenchyma cells are considered "essential" cells of a plant. (10 marks)
- [Total = 25 marks]**

**Question 8**

- (a) Trace the origin of the three tissue systems of a plant as they are produced by diploid cell formed after fertilization in the following plants:
- (i) Dicotyledonous, (13 marks)
  - (ii) Monocotyledonous. (12 marks)
- [Total = 25 marks]**

**END OF EXAM PAPER**