

UNIVERSITY OF ESWATINI
MAIN EXAMINATION PAPER 2018/2019

TITLE OF PAPER: SPERMATOPHYTA

COURSE CODE: B301/BIO252

TIME ALLOWED: THREE HOURS

- INSTRUCTIONS:
1. THIS PAPER IS DIVIDED INTO FOUR SECTIONS
 2. ANSWER ANY FOUR (4) QUESTIONS, ONE (1) QUESTIONS FROM EACH SECTION.
 3. EACH QUESTION COUNTS TWENTY FIVE (25) MARKS.
 4. 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

- a) Discuss five (5) similarities between bryophytes and pteridophytes. (5 marks)
- b) Use labelled diagrams and write brief explanations to explain the following terms:-
- i. Protostele vs siphonostele (2 marks)
 - ii. Homosporous vs heterosporous (2 marks)
 - iii. Endodermis (1 mark)
- c) Discuss the life cycle of *Psilotum*. Use a labelled diagram to describe the following:-
- Sporophyte and sporangia development
 - Gametophyte with location and structure of gametangia (15 marks)
- (25 marks)**

QUESTION 2

- a) Tabulate the ten (10) criteria used to differentiate between leptosporangiate ferns and eusporangiate ferns. (10 marks)
- b) Discuss the life cycle of *Polypodium* (a leptosporangiate fern). Use labelled diagrams to illustrate key structures (15 marks)
- (25 marks)**

SECTION B (GYMNOSPERMS)Answer **one** question from this section**QUESTION 3**

- a)
- i. Define a seed (2 marks)
 - ii. Draw a hypothetical seed that outlines its origins (3 marks)
 - iii. Motivate the theory of a seed developing from a pteridophyte ancestor (5 marks)
- b) Discuss using a labelled diagram the following aspects of the life cycle of a pine (*Pinus*):
- i. from an ovulate cone to a mature female gametophyte. (10 marks)
 - ii. from fertilization to a mature sporophyte. (5 marks)
- (25 marks)**

QUESTION 4

- a) Tabulate the comparison of a cycadophyte plant type and a coniferophyte plant type. Give examples of each type. (5 marks)
- b) Discuss using a labelled diagram the maturation of a staminate cone of *Pinus* to the mature male gametophyte. Describe the origin and fate of all the cells. (15 marks)
- c) Using labelled diagrams illustrate the transversal section of a *Pinus* needle. (5 marks)
- (25 marks)**

SECTION C (TAXONOMY)

Answer **one** question from this section

Question 5

a)

- i. Explain the floral changes that Bessey believes occurred in the evolution of a flower. (6 marks)
- ii. Draw the evolutionary tree of families supported by the Besseyan system. (9 marks)

b) Draw the floral diagram of the flower from the following formula and

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tion: K2 +2, C4, A2 + 4, (G(2))

- Calyx is imbricate
- Corolla is valvate, 2 posterior petals small.
- Stamen with 2 lobes
- Gynoecium is bilocular; placentation is parietal.

(10 marks)

(25 marks)

Question 6

- a) Discuss the family Fabaceae and tabulate a comparison of its subfamilies. (15 marks)
 - b) Draw the floral diagram of the Papilionoidae subfamily. (10 marks)
- (25 marks)**

SECTION D (ANATOMY)

Answer **one** question from this section

QUESTION 7

- a) Use labelled diagrams to explain
- i. the development of a vessel member from a cambium initial. Explain internal changes and wall maturation. (10 marks)
 - ii. the differentiation of a sieve tube member. (5 marks)
- b) Explain why parenchyma are essential to a plant. Present your arguments in point form with subtitles. (10 marks)
- (25 marks)**

Question 8

For each of the listed cell types use a labelled diagram with a brief description to describe the cell structure and content; shape; function and distribution.

- a) Collenchyma (10 marks)
 - b) Sclereids (10 marks)
 - c) Endodermal cells (5 marks)
- (25 marks)**

END OF EXAM PAER