

UNIVERSITY OF SWAZILAND

MAIN EXAMINATION PAPER: DECEMBER 2011

TITLE OF PAPER: CRYPTOGAMIC BOTANY

COURSE CODE: B201

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 (BACTERIA)

Answer **one** question from this section.

Question 1

- (a) Write brief notes about the following:
- (i) composition and functions of cytoplasmic membrane, (5 marks)
 - (ii) composition and functions of the bacterial wall, (5 marks)
 - (iii) composition and functions of bacterial capsule. (3 marks)
- (b) Discuss the various asexual processes observed in bacteria including stages of endospore formation. Cite examples in each case. (12 marks)
- [Total = 25 marks]**

Question 2

- (a) Explain how genetic recombination takes place when the donor is double stranded and when it's single stranded. Illustrate your answer. (5 marks)
- (b) Explain the following processes and their end products:-
- (i) formation of an Hfr, (3 marks)
 - (ii) conjugation of an Hfr with an F⁻, (7 marks)
 - (iii) generalized transduction, (7 marks)
 - (iv) specialized transduction. (3 marks)
- [Total = 25 marks]**

SECTION B (FUNGI)

Answer one question from this section.

Question 3

- (a) Draw the life cycle of a macrocyclic, heteroecious, plant-pathogenic basidiomycete of your choice. (18 marks)
- (b) What are the advantages of heteroecism, karyogamy and meiosis in this pathogen? (7 marks)
- [Total = 25 marks]**

Question 4

- (a) Prepare and fully label a possible evolutionary tree of the peronosporales. (10 marks)
- (b) Draw and briefly explain the life cycle of a zoosporic peronosporale that produces an acervulus. (10 marks)
- (d) Sketch the spore bearing structures of any five genera mentioned in 4(a) and mention their diagnostic features. (5 marks)
- [Total = 25 marks]**

SECTION C (ALGAE)

Answer one question from this section.

Question 5

- (a) Explain the following types of reproduction:
- (i) conjugation in *Zygnema*, (4 marks)
 - (ii) sexual reproduction in *Chara*, (6 marks)
 - (iii) nannandrous oogamous process in *Oedogonium*, (10 marks)
- (b) (i) Prepare a table to compare the cell wall of true desmids and saccodem desmids. (3 marks)
- (ii) How do desmids reproduce asexually? (2 marks)
- [Total = 25 marks]**

Question 6

- (a) Draw a tree to represent possible evolutionary relationships of the various orders of Chlorophyceae. (10 marks)
- (b) Discuss the range of vegetative forms exemplified by these groups of algae, considering how each form could have arisen from the one before it. Cite examples in each order and illustrate key genera. (15 marks)
- [Total = 25 marks]**

SECTION D (BRYOPHYTES)

Answer **one** question from this section.

Question 7

- (a) What are the characteristics of bryophytes? (5 marks)
- (b) Prepare a table to compare bryophytes with thallophytes. List at least ten criteria. (10 marks)
- (c) Using well illustrated diagrams, explain the series of events in *Marchantia* development, starting and ending with a haploid gametophyte. (10 marks)

[Total = 25 marks]

Question 8

- (a) Discuss the variability of the sporophyte in bryophytes in the three bryophyte divisions. Sketch and fully label genera representing each division. (15 marks)
- (b) Explain how each sporophyte you drew in Question 8(a) has evolved to ensure successful survival and dispersal of its spores. (10 marks)

[Total = 25 marks]

END OF QUESTION PAPER