

UNIVERSITY OF SWAZILAND

MAIN EXAMINATION PAPER: DECEMBER 2010

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

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SECTION A (BACTERIA)

Answer **one** question from this section.

Question 1

- (a) Compare Gram negative and Gram positive cell walls:-
(i) structurally and (10 marks)
(ii) chemically. (5 marks)
- (b) What is the structural composition of peptidoglycan in Gram positive and Gram negative cell walls? (5 marks)
- (c) What are the functions of bacterial cell walls? (5 marks)
- [Total = 25 marks]**

Question 2

- (a) How does genetic recombination occur when the donor is:
(i) double stranded? (2 marks)
(ii) single stranded? (3 marks)
- (b) Differentiate between an F⁺ and an Hfr. (2 marks)
- (c) How is the donor DNA transferred and recombination achieved in
(i) conjugation of an Hfr with F⁺? (6 marks)
(ii) transduction ? (10 marks)
- (d) What does a plasmid code for? (2 marks)
- [Total = 25 marks]**

SECTION B (FUNGI)
Answer **one** question from this section.

Question 3

- (a) Draw and fully label the life cycle of *Penicillium/Talaromyces*. (8marks)
- (b) (i) Why does this fungus have two names? (1 mark)
(ii) What proof is present to support that "most deuteromycotina are asexual stages of ascomycotina"? (2 marks)
- (c) Describe and draw **two** of the following fruiting structures:
(i) perithecium, (2 marks)
(ii) acervulus, (2 marks)
(iii) synnema/coremium/stilbum. (2 marks)
- (d) How have details of the asci and the ascocarp been used in classifying the ascomycotina? (6 marks)
- (e) Illustrate how ascocarp ornamentations and the number of asci in the ascocarp have been used to identify actual genera of powdery mildews. (4 marks)
- [Total = 25 marks]**

Question 4

- (a) Draw and fully label the various stages in the life cycle of *Puccinia graminis* var. *tritici*. (10 marks)
- (b) What aspects of the biology of this rust fungus have made it difficult to control? (5 marks)
- (c) Discuss the various vegetative structures observed in fungi and explain how some of them have been used in classification. (10 marks)
- [Total = 25 marks]**

SECTION C (ALGAE)

Answer **one** question from this section.

Question 5

- (a) Explain how photosynthetic pigments and food storage products have been used in the classification of algae. (10 marks)
- (b) Discuss the various organizations of the vegetative thallus observed in the Cyanophyta. Cite named examples for each form. (15 marks)

[Total = 25 marks]

Question 6

Explain sexual reproduction in the following genera of Chlorophyta:

- (a) *Zygnema*, (4 marks)
- (b) *Volvox*, (5 marks)
- (c) *Oedogonium*, (6 marks)
- (d) *Chara*. (10 marks)

Illustrate key steps and unique organs.

[Total = 25 marks]

SECTION D (BRYOPHYTES)Answer **one** question from this section.**Question 7**

- (a) Prepare a table to compare the three subclasses of mosses. (10 marks)
- (b) Draw and fully label the sporophyte of *Mnium* as it is borne by the gametophyte. (10 marks)
- (c) Why are mosses considered to be the most evolutionarily advanced bryophytes? (5 marks)

[Total = 25 marks]**Question 8**

- (a) Prepare a table to compare bryophytes with thallophytes. (10 marks)
- (b) Draw and fully label the sporophyte of *Anthoceros* on its gametophyte. (10 marks)
- (c) Explain why hornworts are better adapted for a terrestrial environment than liverworts. (5 marks)

[Total = 25 marks]**END OF EXAM PAPER**