

UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER: DECEMBER 2009

TITLE OF PAPER: CRYPTOGAMIC BOTANY

COURSE CODE: B201

TIME ALLOWED: THREE HOURS

- INSTRUCTIONS:
1. ANSWER FOUR QUESTIONS, ONE QUESTION FROM EACH SECTION.
 2. EACH QUESTION CARRIES TWENTY FIVE (25) MARKS.
 3. 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

PTO

**SECTION A
(BACTERIA)**

Question 1

- (a) Discuss the various methods of asexual reproduction in bacteria. Use named genera and clear drawings to illustrate your answer. (10 marks)
- (b) Prepare a series of annotated diagrams to illustrate and explain phage-mediated bacterial chromosomal recombination. (15 marks)

[Total marks = 25]

Question 2

- (a) Draw and fully label the two types of bacterial cell walls revealed by Gram staining. (10 marks)
- (b) With the aid of diagrams, briefly explain the rates of recombination and transfer of the plasmid in the following matings:
- (i) $F^+ \times F^-$ (5 marks)
- (ii) $Hfr \times F^-$ (10 marks)

[Total marks = 25]

PTO

**SECTION B
(FUNGI)**

Question 3

- (a) Prepare a dichotomous key to help in classifying the division Ascomycotina. Draw the diagnostic fruiting structures of some of these classes. (10 marks)
- (b) (i) Use drawings and annotated diagrams to explain the life history of a macrocyclic heteroecious rust. (10 marks)
(ii) What has contributed to the success of this fungus as a parasite? (5 marks)

[Total marks = 25]

Question 4

- (a) What are the general characteristics of fungi? (5 marks)
- (b) Prepare an annotated flow chart to illustrate possible evolutionary characteristics among downy mildew fungi. (10 marks)
- (c) Draw and briefly describe the fruiting structures to identify any five of the following fungi:
- (i) *Rhizopus stolonifer*, (2 marks)
 - (ii) *Rhizoctonia*, (2 marks)
 - (iii) *Phycomyces*, (2 marks)
 - (iv) *Phytophthora*, (2 marks)
 - (v) *Pilobolus*, (2 marks)
 - (vi) *Phyllactinia*, (2 marks)
 - (vii) *Uncinula*, (2 marks)
 - (viii) *Uromyces*. (2 marks)

[Total marks = 25]

**SECTION C
(ALGAE)**

Question 5

- (a) Draw a possible evolutionary tree of the various orders observed in Chlorophyta. (10 marks)
- (b) Discuss the range of forms observed in algae, and how they could have arisen in light of the tree you presented in 5(a) above. Use subtitles to discuss each form. (15 marks)
- [Total marks = 25]**

Question 6

- (a) Describe the following sexual processes:
- (i) Oogamy in *Chara*, (10 marks)
- (ii) Oogamous processes in *Oedogonium*. (15 marks)
- In each case, illustrate the gametangia, the gametes and any crucial step(s).
- [Total marks = 25]**

**SECTION D
(BRYOPHYTES)**

Question 7

- (a) Prepare a table to compare the three subclasses of Musci (the mosses).
(10 marks)
- (b) Draw and label the sporophyte of *Anthoceros*. (10 marks)
- (c) List ways in which the sporophyte of mosses is better adapted for terrestrial environment than that of hornworts. (5 marks)

[Total marks = 25]

Question 8

- (a) Explain why a gametangia of bryophytes is considered to be conserved. Draw and label gametangia from all bryophyte classes in order to support this notion. (10 marks)
- (b) Discuss the life cycle of a named moss. Illustrate all key stages. (15 marks)

[Total marks = 25]

END OF EXAM PAPER