

UNIVERSITY OF SWAZILAND

MAIN EXAMINATION PAPER: DECEMBER 2015

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) Differentiate between the following terms by drawing the organism and labelling the relevant nucleic acids.
- (i) Prophage vs. Hfr, (4 marks)
  - (ii) Bacteriophage vs. Transducing phage, (4 marks)
  - (iii) Hfr vs. recombinant. (2 marks)
- b) Explain how bacteriophages can bring about a high rate of recombination in bacteria (specialised transduction). (13 marks)

**[TOTAL MARKS = 25]**

**Question 2**

- a) Show how bacteria (five types) will grow in media in a test tube, depending on their oxygen preferences. Explain your illustrated growth patterns. (10 marks)
- b) Draw and fully label a Gram-negative cell wall. (10 marks)
- c) What are the functions of a bacterial cell wall. (5 marks)

**[TOTAL MARKS = 25]**

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

**Question 3**

- a) Draw the life cycle of *Puccinia graminis* f.sp. *tritici*. Indicate the cytological condition at each stage. (15 marks)
- b) What are the advantages of heteroecism, plasmogamy, karyogamy and meiosis in the evolution and survival of this pathogen. (10 marks)

**[TOTAL MARKS = 25]**

**Question 4**

- a) Explain the possible evolution of the peronosporales using an annotated evolutionary tree. (10 marks)
- b) Draw and mention the identifying features of five of the following fungi:
- (i). *Rhizopus stolonifer*,
  - (ii). *Pilobolus*,
  - (iii). *Phycomyces*,
  - (iv). *Pythium*,
  - (v). *Basidiophora*,
  - (vi). *Albugo*,
  - (vii). *Penicillium*,
  - (viii). *Aspergillus*.
- (5 x 2 marks)
- c) Differentiate between true plasmodia and pseudoplasmodia. (5 marks)

**[TOTAL MARKS = 25]**

**SECTION C (ALGAE)**

Answer one question from this section

**Question 5**

a) Discuss the criteria used to classify algae. (10 marks)

b) Prepare a table to compare Morris' Xanthophyta Chrysophyta and Bacillariophyta. (15 marks)

**TOTAL MARKS = 25]**

**Question 6**

a) Discuss sexual reproduction in  
(i) unicellular Zygnematales, (2 marks)  
(ii) filamentous Zygnematales, (3 marks)  
(iii) *Chara* (illustrate the gametangia). (10 marks)

b) List the characteristics of thallophytes (fungi and algae). (10 marks)

**[TOTAL MARKS = 25]**

**SECTION D (BRYOPHYTES)**

Answer one question from this section

**Question 7**

Discuss the life cycle of *Marchantia*. (10 marks)

Illustrate the following:

- i) Morphology of a male and female gametophyte, (2 marks)
- ii) Transversal section of the gametophyte, (4 marks)
- iii) Male and female gametangia, (4 marks)
- iv) Mature sporophyte. (5 marks)

**[TOTAL MARKS = 25]**

**Question 8**

a) Prepare a table to compare the three sub-classes of Musci (10 marks)

b) Draw and label the sporophyte of *Mnium* and explain how it is more advanced than that of *Marchantia*. (15 marks)

**[TOTAL MARKS = 25]**

**END OF EXAM PAPER**