UNIVERSITY OF SWAZILAND

MAIN EXAMINATION PAPER : DECEMBER 2007

TITLE OF PAPER: INTRODUCTORY BOTANY

COURSE CODE: B111

TIME ALLOWED: THREE HOURS

INSTRUCTIONS:

1. THIS PAPER IS DIVIDED INTO TWO SECTIONS. ANSWER EACH SECTION IN A SEPARATE BOOKLET.
2. EACH QUESTION CARRIES TWENTY FIVE (25) MARKS.
3. ILLUSTRATE YOUR ANSWERS WITH LARGE AND CLEARLY LABELLED DIAGRAMS WHERE APPROPRIATE.
4. ANSWER ANY TWO QUESTIONS FROM EACH SECTION.

SPECIAL REQUIREMENTS:

NONE

THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION HAS

BEEN GRANTED BY THE INVIGILATORS

SECTION A

INSTRUCTION: **Answer question 1 and ONE (1) Other question in this Section.**

QUESTION 1

(a) List the major classes of biological compounds found in living cells. **[2 marks]**

(b) Give the full terminology of DNA, RNA and ATP. List three differences between DNA and RNA. **[5 marks]**

(c) What name is given to the following:

(i) A molecule composed of a lipid and a protein. **[1 mark]**

(ii) A molecule composed of a pentose sugar and nitrogenous bases. **[1 mark]**

(iii) The bond linking a nucleoside and a phosphate group. **[1 mark]**

(d) With reference to the nucleus, name the molecules that are exported across the nuclear membrane in cells. **[2 marks]**

(e) Name the processes by which dissolved and solid substances are taken into cells. **[1 mark]**

(f) List three essential amino acids and briefly explain why these amino acids are called essential amino acids. **[4 marks]**

(g) Write short notes on any Two of the following: (i) Omega-3-fatty acid, (ii) Cholesterol and (iii) Phospholipid. **[8 marks]**

[TOTAL MARKS = 25]

QUESTION 2

(a) List five properties of enzymes. **[5 marks]**

(b) Explain how enzymes are named and how they are classified giving one example in each case. **[8 marks]**

(c) Briefly explain the effects of temperature and pH on enzyme action. **[8 marks]**

(d) What are enzyme inhibitors? **[4 marks]**

[TOTAL MARKS = 25]

QUESTION 3

(a) What is a cell? Compare and contrast between Prokaryotic and Eukaryotic cells. **[6 marks]**

(b) With the aid of large and clearly labelled diagrams state the differences and similarities of typical animal and plant cells. **[10 marks]**

(c) Give the functions of the following organelles found in eukaryotic cells; (i) Cytoskeleton, (ii) Peroxisome and (iii) Lysosomes. **[9 marks]**

[TOTAL MARKS = 25]

SECTION B

INSTRUCTIONS: Answer any TWO (2) questions from this section.

QUESTION 4

(a) Name the criteria that are used to separate algae into phyla and/or divisions. **[3 marks]**

(b) Draw the following:
- (i) a diatom **[3 marks]**
- (ii) a green algae **[3 marks]**
- (iii) a brown algae **[3 marks]**
- (iv) an euglenoid **[3 marks]**

(c) Demonstrate that a common rock weed (*Fucus vesiculosus*) undergoes both haploid and diploid life cycles. **[4 marks]**

(d) Give an account of the economic importance of algae. **[6 marks]**

[TOTAL MARKS = 25]

QUESTION 5

(a) What is a virus? **[5 marks]**

(b) Explain how viruses reproduce within cells. **[5 marks]**

(c) How would you tell that cells have been infected with viruses? **[5 marks]**

(d) What is viral transmission? **[5 marks]**

(e) Briefly discuss bacteriophages. **[5 marks]**

[TOTAL MARKS = 25]

QUESTION 6

(a) Explain the structure of a bacterium. **[5 marks]**

(b) What is conjugation in bacteria? **[3 marks]**

(c) Distinguish between the following:
- (i) psychrophiles and mesophiles **[3 marks]**
- (ii) thermophiles and acidophiles **[2 marks]**
- (iii) aerobes and anaerobes **[2 marks]**
- (iv) autotrophs and heterotrophs **[5 marks]**

(d) Explain the typical growth curve of a bacterium. **[5 marks]**

[TOTAL MARKS = 25]

UNIVERSITY OF SWAZILAND

MAIN EXAMINATION PAPER 2008

TITLE OF PAPER : **INTRODUCTORY ZOOLOGY**

COURSE CODE : **B112**

TIME ALLOWED : **THREE HOURS**

INSTRUCTIONS :

1. **THIS PAPER HAS TWO SECTIONS, A AND B**
2. **USE ONE (1) ANSWER BOOKLET FOR EACH SECTION**
3. **IN SECTION A, ANSWER QUESTION 1 (COMPULSORY) PLUS ANY OTHER QUESTION; IN SECTION B, ANSWER ANY TWO QUESTIONS.**
4. **EACH QUESTION CARRIES TWENTY FIVE (25) MARKS**
5. **WHEREVER POSSIBLE ILLUSTRATE YOUR ANSWERS WITH LARGE CLEARLY LABELLED DIAGRAMS**

SPECIAL REQUIREMENTS: **NONE**

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SECTION A

QUESTION 1 **(Compulsory)**

1. The protective outer covering in arthropods is known as the _____

2. Arthropoda means _____

_____

3. What is metamorphosis? _____

_____

4. Protists are classified on the basis of their _____ organelles.

5. Name one feature characteristic of all members in the phylum Chordata. _____

_____

6. In reptilian eggs, the _____ provides water for the developing embryo.

7. Name one weight saving modification observed in birds. _____

_____

8. In classification, each category is called a _____

9. Name one function of the phospholipid bilayer. _____

_____

10. An individual's genetic make up is known as its _____

11. In heterozygotes, the full expression of both alleles is due to _____

12*. Name two procedures used to detect genetic defects _____

_____

13. _____ skeletons provide support from within the body.

14. Biomes with intense solar radiation, winds and little moisture are known as _____

15. The transfer of elements between the biotic and abiotic environments is illustrated by

_____

16. Give an example of an altruistic act _____

17. Heterotrophic nutrition by ingestion is known as _____ feeding.

18. Organisms which are firmly and permanently attached onto a hard surface are said to be _____

19. The number of individuals that can be supported in an area without damaging resources available is known as that environment's _____

20. Name one factor characteristic of *r*-selected organisms _____

_____

21. In heterozygotes, the intermediate expression of a trait is due to _____

_____

22. _____ is when animals choose their partners on the basis of their phenotype.

23. _____ structures have little or no function in present day organisms.

24. Give an example of a post-zygotic barrier which prevents reproduction between species. _____

[Total = 25 marks]

QUESTION 2

A population of rodents has the following life-history characteristics. Assume they are all females.

The young suffer 80% mortality in their first year;
20% between age 1 and 2 years;
20% during their third year;
20% during their fourth year;
50% during their fifth year; and all are dead at age 6
Females produce an average of 2.5 female young at ages 1, 2, 3, 4 and 5 years.

Some useful equations

Survivorship of next cohort = Survivorship of last cohort – (Survivorship of last cohort x Mortality rate of last cohort)

# of offspring per ♀ before death = Survivorship of cohort x Reproductive rate

a. Fill out the data on the following life-table, remembering that females produce their young on their birthdays:

Age interval	Survivorship at beginning of age interval	Mortality rate through interval	Survival rate through interval	Reproductive rate at beginning of interval
0 – 1				
1 – 2				
2 – 3				
3 – 4				
4 – 5				
5 – 6				

(18)

b. It is argued that there is a surplus in the present population that can be trapped. Is this correct? Explain your answer. (7)

[Total = 25 marks]

QUESTION 3

a. What advantages do insects have over other arthropods that have contributed to their success. (15)

b. Describe the process of conjugation in ciliates and briefly state its importance. (10)

[Total = 25 marks]

SECTION B

QUESTION 4.

(a) What is meant by 'open circulatory system'? (5 Marks)

(b) By means of suitable sketches compare the hearts of amphibians, fish and mammals (20 Marks)

[Total Marks = 25]

QUESTION 5.

Write a brief essay on EACH of the following:

(i) Mechanical digestion (6 Marks)
(ii) Autotrophic nutrition (5 Marks)
(iii) Swallowing in humans (8 Marks)
(iv) Gastric juice (6 Marks)

Total Marks = 25]

QUESTION 6.

Describe and discuss the formation of urine in mammals. (25 Marks)