

UNIVERSITY OF ESWATINI

MAIN EXAMINATION 2019

TITLE OF PAPER: INTRODUCTORY ZOOLOGY

COURSE CODE: BIO102

TIME ALLOWED: THREE HOURS

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

SPECIAL REQUIREMENTS: NONE

THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATORS

**SECTION A**

**QUESTION 1 (COMPULSORY)**

NOTE: All questions = 1 marks except \* = 2 marks;

1. Name a characteristic observed in cells which indicates life
2. Which interaction arises as a result of resource utilization?
3. Name a strategy used by predators to maximize their predation skills
4. Which type of feeding only occur in water
5. Alternate forms of genes are known as \_\_\_\_\_
6. \*What is ecology?
- 7.\* Name two characteristics common to all members of the Phylum Chordata
8. \*Give two advantages of parental care
9. Name one factor which might limit population growth rate
10. \*Give two reasons why Protista are economically important
11. State Mendel's law of Independent assortment
12. In which class is the first amniotic egg observed?
13. Each step along a feeding pathway is known as \_\_\_\_\_
14. Terrestrial and aquatic habitats covering large areas with identical climatic conditions are known as \_\_\_\_\_
15. \*Name TWO non-genetic factor which may influence the expression of genes
16. Name one adaptation for flight observed in birds
17. \*State TWO ways by which we can get evidence of evolution
18. What does ovoviviparous mean?
19. Sessile animals usually illustrate \_\_\_\_\_ symmetry

**[Total Marks = 25]**

## QUESTION 2

a). Explain the role played by producers, consumers and decomposers in any natural ecosystem (6)

b). Outline the essential features of the carbon cycle and include short notes on greenhouse effects and global warming (9)

c). One gene locus has alleles A and a. Another has alleles B and b.

(i). For each genotype listed below state the gametes that will be produced, assuming the principle of independent assortment

1) AABB (1)

2) AaBB (1)

3) Aabb (1)

4) AaBb (1)

5) aaBB (1)

(ii) State the genotypes of the offspring from the following mating and indicate their respective frequencies.

1) AABB x aaBB (2.5)

2) AaBB x AAbb (2.5)

[Total Marks = 25]

## QUESTION 3

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

The young suffer 80% mortality in their first year;

40% between age 1 and 2 years

20% during the third year

15% during their fourth year

60% during their fifth year; and all are dead at age 6

Females produce an average of 2.5 females young at ages 1, 2, 3 and 4, while producing 3 at 5 years

### Some useful equations

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

Number 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 (proportion alive at start of interval)	Mortality rate through interval	Survival rate through interval	Reproductive rate (number produced by each at start of interval)
0 – 1				
1 – 2				
2 – 3				
3 – 4				
4 – 5				
5 – 6				

(12)

b. Due to changes in environmental conditions, conservationists are concerned that the rodents are endangered. Is this true? (5)

c. Define the following:

(i) Carrying capacity (3)

(ii) Binomial system of nomenclature (2)

(iii) Natural selection (3)

[Total Marks = 25]

## SECTION B

### QUESTION 4

Make large labelled sketches of the following:

(a) A nephron (12)

(b) The human female reproductive system (13)

[Total Marks = 25]

### QUESTION 5

What are the constituents of mammalian blood? What is the role of each of the constituents? [25 marks]

### QUESTION 6

Write a brief essay on EACH of the following

- (i) Mechanical digestion (6)
- ii) Heterotrophic nutrition (5)
- (iii) Swallowing in humans (8)
- (iv) Sphincter muscles (6)

**[Total Marks = 25]**