

UNIVERSITY OF FORT HARE

**ANIMAL DIVERSITY AND
CONSERVATION 1
ZOO314**

DEGREE EXAMINATIONS

JUNE

2023

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Time: 180 minutes

Subject: ZOO314

Marks: 100

This paper consists of _ pages including the cover page

Internal Examiners

**Dr W Coetzer
Dr C Andrews
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**External Examiners
(If externally moderated)**

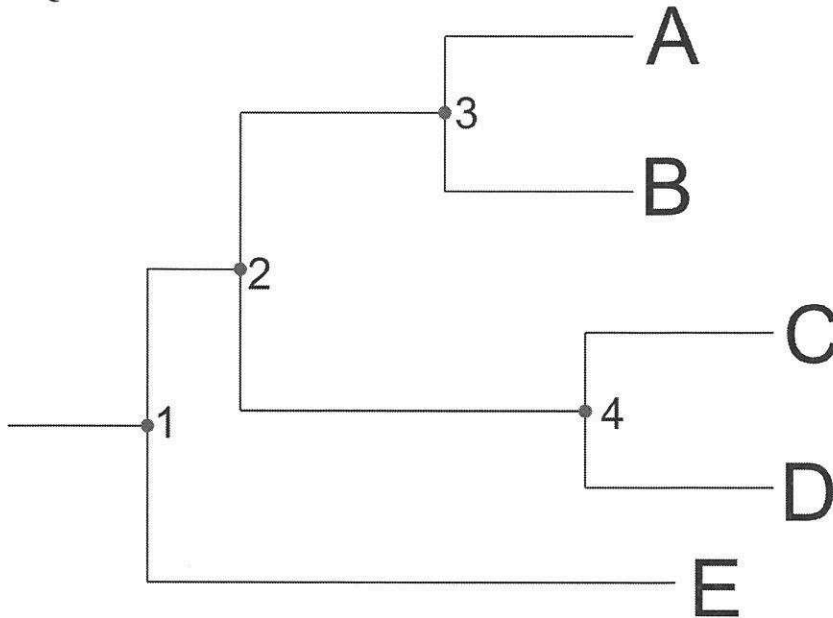
Dr A Macdonald (UKZN)

INSTRUCTIONS

**Answer all the questions
Read the questions carefully**

Question 1

[6]



1. Given the above phylogenetic tree with taxa A - E, name the following features:
 - 1.1 Assume this is a rooted phylogenetic tree, which taxon represents the outgroup? (1)
 - 1.2 What is the relationship between taxa A and B? (1)
 - 1.3 What is the definition of a clade? (2)
 - 1.4 Which taxa form part of a clade in the above tree? (1)
 - 1.5 What are the black circles on the tree representing? (1)

Question 2

[8]

- 2.1 What was Carolus Linnaeus' contribution to the field of Taxonomy? (1)
- 2.2 What is the definition of a homologous structure? (2)
- 2.3 Name the four (4) goals of Systematics. (4)
- 2.4 Provide the most commonly used definition of a cryptic species. (1)

Question 3

[6]

Name and define the two types of genetic variation which can be used as a tool during phylogenetic research.

Question 4

[5]

Maximum likelihood (ML) is a well-established and widely used method used in molecular systematics. Discuss three (3) advantages and two (2) disadvantages linked to this method and its use in phylogenetic reconstruction.

Question 5

[5]

Molecular markers are widely used for phylogenetic reconstruction. There are many advantages and disadvantages linked to using such markers. As a new researcher at your molecular laboratory, explain to me at least five advantages of using DNA markers for phylogenetic reconstruction.

Question 6**[5]**

One of the roles of systematics is to identify and document earth's biodiversity. Several methods are currently in use to perform biodiversity research, including DNA barcoding. What is the basic definition of DNA barcoding? Define four (4) possible limitations to DNA barcoding.

Question 7**[10]**

Your new employee, the Eastern Cape Parks and Tourism Agency has tasked you to come up with a publicity (education) campaign to increase biodiversity awareness in the Eastern Cape [when answering the questions below please consider options that make sense in the context of the Eastern Cape].

- i) Explain two approaches that you will use for this education campaign (2)
- ii) Highlight at least three (3) target groups that you will try and reach (3)
- iii) Provide two (2) reasons why biodiversity is so important for the Eastern Cape that you can use in the publicity campaign. (2)
- iv) You have no current budget, provide three (3) ways in which the publicity campaign can be funded. (3)

Question 8**[4]**

Explain how an ecosystem can have high alpha diversity and low beta diversity? How different would the alpha and gamma diversity be?

Question 9**[4]**

Consider a fragment of natural thicket that has just had an electricity line developed through the middle of it. Explain four (4) things that could happen to the thicket habitat along the newly erected power line?

Question 10**[3]**

What is extinction and explain why we are so worried about the current extinctions even though extinction is a natural process?

Question 11**[7]**

Explain to your class mates the relationship between population size and extinction risk, drawing a graph to support your description of this relationship. Furthermore, identify the dependent and independent variables in the relationship.

Question 12**[7]**

The population in sub-Saharan Africa is going to double in the next 30 years. This increase in population is going to require considerably more food and space to survive.

- i. To achieve this we need to first increase the output of food – how can this be achieved while ensuring that the impact of biodiversity is kept to a minimum? (4)
- ii. The increase in land required is going to bring humans into contact with wildlife. What human wildlife conflict may be expected given this eventuality and how will we deal with this conflict? (3)

Question 13

[5]

Considering the supercontinent, Pangaea, and the events of the last 225 million years, why are the animals and plants of Australia and Madagascar so unique?

Question 14

[5]

The paper by Masters et al. 2020 provides a synopsis of the hypotheses that underscore the current fauna on the island of Madagascar. What could explain the absence of medium-to-large mammals?

Question 15

[5]

What evidence supports the idea that the continents once made up the supercontinent of Gondwanaland?

Question 16

[4]

What has led to the very incomplete fossil record and how has this impacted reconstructing a species' evolutionary trajectory?

Question 17

[5]

What makes rafting and/or sweepstakes such an unlikely colonization event when considering Malagasy mammals? Define and provide an alternative hypothesis to support your answer.

Question 18

[6]

What are some of the limitations and/or barriers to dispersal including vicariant events that needs to be considered when mulling successful colonization and establishing a viable population?

Total: 100