UNIVERSITY OF FORT HARE

ANIMAL DIVERSITY AND CONSERVATION 2
ZOO 315

DEGREE EXAMINATIONS

JUNE

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Time: 3HRS

Subject: ZOO 315

Marks: 100

This paper consists of FIVE (5) pages including the cover page

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INSTRUCTIONS

Answer BOTH questions 1 and 2 in Section A
and
Answer any TWO of Questions 3 – 5 in Section B

Mark allocation for each question is indicated by the number in [square brackets]

SECTION A

Answer BOTH Questions 1 and 2.

Question 1 [30 marks]

a) Describe the mode of introduction and impact on local fauna and ecosystem of rodents and the African catfish as alien invasive species. [15]

b) Rutherford and Westfall (1994) map seven biomes of South Africa. Discuss what is meant by the term biome. What are some of the conservation challenges faced by biomes in South Africa? [15]

Question 2 [30 marks]

a) In animal physiology, what is the fundamental difference between a proximate and an ultimate explanation for an adaptation? Provide an example to illustrate your answer. [8]

b) Comparative physiology involves the comparison of physiological features in different types of organisms, an approach that comes with several important benefits. Explain one way in which a comparative approach to animal physiology is advantageous for understanding animal physiological traits. [2]

c) Name and explain the famous principle formulated by German physiologist Hans Kreb in 1975 that forms the approach for most comparative physiology research aimed at understanding the diversity and universality of animal adaptations. Provide an example of an animal physiological feature that has been become well understood based on this principle. [6]

d) Using surface area and volume as basic mathematical principles, explain why larger organisms tend to retain heat more easily than smaller organisms of a similar shape. [6]

e) What does the term 'homeostasis' mean in animal physiology? How is it that a cell deep inside a multicellular vertebrate organism, such as a mammal, can maintain a state of homeostasis even though it has no direct contact with the external environment? Explain your answer using the exchange of oxygen and carbon dioxide as an example. [6]

f) What is the ultimate (<u>not</u> proximate) explanation for why animals need to eat? [2]

SECTION B

Answer any TWO of Questions 3 – 5.

Question 3 [20 Marks]

The Amathole region is highly biodiverse and includes threatened Afromontane forests and grasslands with endemics. Describe two of the Amathole endemics. What are the threats to Amathole biodiversity?

Question 4 [20 marks]

a) Differentiate between the meanings of standard metabolic rate (SMR) and basal metabolic rate (BMR). [4]

b) Why is there a tendency for animals to be fatter in cold climates at high latitudes and leaner in tropical areas? Your answer should describe one thermal reason for this trend and one reason related to maintaining energy balance. [4]

c) What is the meaning of the terms ectotherm, endotherm, poikilotherm and homeotherm? [4]

d) Describe three types of heterothermy and provide an example of each. [6]

e) Describe one observed thermal impact of climate change on animals during the current Anthropocene period. [2]

Question 5 [20 marks]

a) Organisms that are non-native to an ecosystem and cause harm have been described as "alien invasive species". Describe how species become alien invasive and discuss the features of such species giving examples. [10]

b) What are the two major fluid compartments within a multicellular animal's body? [2]

c) Marine chondrichthyans and coelocanths are hypo-ionic osmoconformers. Explain how these animals differ from strict osmoconformers (most marine invertebrates)? [4]

d) Freshwater presents an unfavourable environment for life from an ionic regulation perspective. Firstly, why is this so? Secondly, provide a brief description of two adaptations that freshwater animals have evolved to cope with living in their environment. [4]

[END OF EXAM]