

UNIVERSITY OF FORT HARE

**ANIMAL ECOLOGY 2
ZOO325**

SUPPLEMENTARY EXAMINATIONS

December

2025

.....
Time: 180 minutes

Subject: ZOO325

Marks: 100



This paper consists of 4 pages including the cover page

University of Fort Hare
Together in Excellence

Internal Examiners

**Assoc. Prof. N Vine
Assoc. Prof. C Tambling
Dr S Marr**

**External Examiners
(If externally moderated)**

Dr Haemish Melville

INSTRUCTIONS

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

1. Abiotic parameters are important in the habitat in which an organism or biotic community live. However, these abiotic parameters must be measured in a habitat before their role in shaping the biota can be determined. Which equipment is required to measure the following abiotic parameters. (2)
 - a. Photosynthetically active radiation
 - b. Total dissolved solute concentration
2. Species accumulation curves are vital tools used in collecting and analysing biodiversity data. These curves help determine the number of samples needed for a biodiversity study or estimate the total species richness at a site based on replicated samples. **How would you construct a species accumulation curve for a sampling site using replicated sample data from that site?** (5)
3. Your research is evaluating the impact of annual killifish *Notobranchius pienaari* on the aquatic invertebrate communities in the water column of wadable (less than 1 m deep) temporary wetlands on the Mozambique coastal plain. A new National Park has been established that has temporary wetlands with and without killifish. No other fish are present in these temporary wetlands. The abundance and diversity of macroinvertebrates have been selected as the metrics to determine the impact of killifish on the aquatic invertebrate community. **Describe the equipment and methodology you would use to collect macroinvertebrates from the water column from 10 pans with killifish and 10 pans without killifish to evaluate the impact of killifish on the aquatic invertebrate community.** (5)
4. Your research includes a biodiversity assessment of the intertidal invertebrate community in the mudflats at a remote mangrove-lined estuary near Port St Johns that has been proposed for protection as an area of conservation importance. The donors require a comprehensive biodiversity study of the intertidal area of the mangrove mudflats to determine whether the area is sufficiently unique to be classified as a conservation area of importance. **Describe the equipment and methodology, including timing, you would use to sample the intertidal soft sediment of the mudflats to determine whether there are unique invertebrate taxa of conservation importance in the mangrove habitat.** (5)
5. The East Cape Parks and Tourism Agency (ECPTA) is interested in assessing the distribution of tree hyraxes (*Dendrohyrax arboreus*) in the Raymond Mhlaba Municipality, Eastern Cape. As a recently graduated BSc degree holder, with a specialization in Zoology, provide them with a set of approaches that can be followed to determine the distribution of the tree hyrax. In your response, provide the steps that you would use for each of the approaches that you recommend. (10)



6. Explain and draw the expected relationship between harvest rate and resource density and how can this be used to estimate the level of predation risk that an animal experiences when foraging? (10)
7. When marking animals, describe 3 (three) considerations that need to be kept in mind to ensure that your data are adequate to answer your research questions and that your approach is ethically acceptable. (3)
8. Radio Tracking is an established technique for studying mammals.
- Contrast how GPS tracking and VHF tracking differ in terms of the receiving and transmitting platforms, cost and size of the units. What implications do these factors play in the different species that can be monitored using the different types of collars. (6)
 - Come up with a research question (on any mammal) that can be answered using radio tracking. Explain which radio tracking platform you would use, why, and what data you would collect to answer the question of interest. (4)
9. Hearing fantastic things about your knowledge of aquaculture, a new koi carp (*Cyprinus carpio*) breeding farm located in a remote area of the western Cape has head-hunted you as their farm manager. The farm uses eight 10m³ tanks to house the broodstock (four adult fish to a tank or $\approx 1\text{kg/m}^3$ stocking density) which are connected to a recirculating system containing mechanical, biological and ultraviolet filters and air supplied by a blower. The juvenile koi are kept in six large (10m x 20m x 1m deep) freshwater ponds which are supplied with cooler water by pump from the nearby river. The ponds are aerated using a paddle wheel and the water has a light green colour. Only four of the six ponds currently have fish in them at a stocking density of $\approx 10\text{kg/m}^3$.
- The farm is running well and your first sale for the year is in two weeks' time. Upon returning from a weekend in Cape Town in January, you realize that during a huge thunderstorm on the Friday, the powerlines (which supply electricity to you) were struck. To make matters worse, your farm helpers didn't think it was necessary to alert you and you have just found out that damaged lines will take up to the next Friday to repair during which time you will not have electricity (and only with the possibility of a small generator which could run the blower arriving only later in the week).
- Describe what is likely to have happened to the various pond and tank water quality parameters (which we discussed during the course) and their interactions with the fish over the weekend up until the time you arrived at work. (16)
 - Before the arrival of the generator, what (and why) would your immediate solutions be to control and manage the situation thereby reducing the potential loss of fish? (5)
 - Once the electricity was back, what (and why) management interventions would you make to mitigate for a problem like this in future? (4)
10. Why is it important to maintain the alkalinity above 40mg/L in ponds containing fish? (5)

11. For any freshwater aquaculture facility to be successful, it requires a regular supply of good quality water. Water can be obtained from a variety of sources, each of which have both favourable and problematic issues for the farmer and the culture organism. Discuss the five sources of freshwater and for each of them provide a respective advantage and disadvantage. (15)
12. What are the benefits of using a Recirculating Aquaculture System (RAS) over other aquaculture systems such as ponds or cages? (5)



University of Fort Hare
Together in Excellence