

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**FACULTY OF APPLIED SCIENCES**

**DEPARTMENT OF ENVIRONMENTAL SCIENCE AND HEALTH**

**FINAL EXAMINATION**

**ECOLOGICAL TECHNIQUES: ESH 4103**

**May 2012**

**Time Allowed: 3 hours**

**Total Marks: 100**

**INSTRUCTIONS:**

**Answer any FOUR questions. Each question carries 25 marks.**

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**Question 1**

The Ministry of Environment and Tourism in Zimbabwe wishes to review the conservation status of the Black Rhinoceros (*Diceros bicornis*) as an endangered species, and as such need to estimate the population density of this species. Discuss how the mark and recapture method can be employed in this task.

**Question 2**

Discuss the various animal sampling techniques you can use to collect/capture invertebrates in both aquatic and terrestrial ecosystems.

**Question 3**

Describe the various methods used to measure the rate of primary production highlighting their limitations and advantages.

**Question 4**

The Forestry Commission of Zimbabwe wishes to characterise a 1 000 hectares of virgin forest land in terms of plant species diversity. Outline a GIS and Remote Sensing based approach to address this task.

**Question 5**

With the help of relevant ecological examples, briefly explain the following:

(a) Transect sampling (15 marks)

(b) Accuracy and Precision (10 marks)

**Question 6**

Describe a laboratory based experiment you would carry out to measure net primary of grass

**End of paper**

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**SUPPLEMENTARY EXAMINATION**

**ECOLOGICAL TECHNIQUES: ESH 4103**

**July 2012**

**Time Allowed: 3 hours**

**Total Marks: 100**

**INSTRUCTIONS:**

**Answer any FOUR questions. Each question carries 25 marks.**

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**Question 1**

Write short notes on

- |   |            |
|---|------------|
| (a)The Bramm-Blanquet method              | (8 marks)  |
| (b)The Plot (quodraft) Sampling technique | (10 marks) |
| (c)The Reductiuonism and Holism concepts  | (7 marks)  |

**Question 2**

Discuss the various animal sampling techniques you will use to do a fish survey of Kapenta (*Limnothrissa miodon*) in Lake Kariba.

**Question 3**

- |   |            |
|---|------------|
| (a)Describe how you would determine diatom diversity in Umguza Dam.                       | (20 marks) |
| (b)What is the significance of the diatom diversity Index (DDI) in ecological assessment. | (5 marks)  |

**Question 4**

Discuss how GIS and /Remote Sensing can be integrated in a monitoring programme to conserve the threatened cheetah (*Acinonyx Jubatus*).

**Question 5**

Describe a method you would use to estimate primary productivity in a small aquatic ecosystem such as a pond.

**Question 6**

Design a study to investigate the impact of ammonium nitrate water pollution on benthic macro invertebrates such as stonefly nymphs (plecoptera) and mayfly nymphs (Ephemeroptera). State your hypothesis.

**End of paper**