NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF ENVIRONMENTAL SCIENCE

DEPARTMENT OF GEOSPATIAL SCIENCE

MSC DEGREE IN APPLIED GEOGRAPHICAL INFORMATION SCIENCE AND REMOTE SENSING

RESEARCH METHODS FOR SPATIAL SCIENTISTS

EGR 5103

November 2024

This examination paper consists of 2 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: Statistical tables

Examiner's Name: Prof Donald Mlambo

External Examiner: Dr M Shekede

INSTRUCTIONS

1. Answer **QUESTION ONE** and any **THREE** others
2. Each question carries 25 marks
3. Use of calculators is permissible

MARK ALLOCATION

QUESTION	MARKS
1.	**25**
2.	**25**
3.	**25**
4.	**25**
5.	**25**
6.	**25**
TOTAL	**100**

1. Citing specific examples, describe the key elements of a scientific research process.

2. Develop a research design based on a topic of your own choice and describe the following:

   a) Research problem **[9 marks].**

   b) Major objective and hypothesis **[6 marks].**

   c) Data analysis **[10 marks].**

3a) Briefly explain the importance of spatial data collection in Geographical Information System research **[4 marks].**

b) Describe **three** different techniques used to gather geographic data, and explain the advantages and limitations of each method **[21 marks].**

4) There are reports that elephants in Hwange National Park are damaging mopane woodlands close to water points. You are required to investigate into this problem by conducting a scientific inquiry. Explain how you would collect the data to test the hypothesis that vegetation type and proximity to water points have an effect on the density of trees damaged by elephants.

5) Data in Table 2 show the number of respondents in a questionnaire survey who expressed willingness or unwillingness to conserve elephants in three communities that were stratified according to distance from a Park.

Table 2. Number of respondents in three communities who expressed willingness or unwillingness to conserve elephants.

Willingness to conserve elephants	Distance from park boundary		
	1-5 km (Near)	10-20 km (Intermediate)	30-40 km (Far)
Yes	10	30	40
No	40	30	10

a) Using data in Table 2, suggest an appropriate topic, research question and hypothesis **[8 marks].**

b) Test the hypothesis you have suggested in 5a using the most suitable statistical test **[17 marks].**

6. Evaluate the usefulness of the following data collection instruments:

   a) Focus group discussions **[8 marks]**

   b) Key informant interviews **[8 marks]**

   c) Questionnaires **[9 marks]**