NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

## FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

### DEPARTMENT OF LAND AND SPATIAL SCIENCES

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| **QUALIFICATION:** DIPLOMA IN GEOMATICS, BACHELOR OF GEOMATICS, BACHELOR OF GEOINFROMATION TECHNOLOGY, BACHELOR OF LAND ADMINISTRATION, BACHELOR OF TOWN AND REGIONAL PLANNING, BACHELOR OF PROPERTY STUDIES, DIPLOMA IN PROPERTY STUDIES, BACHELOR OF REGIONAL & RURAL DEVELOPMENT | |
| **QUALIFICATION CODE:** 06DGEO,07BGEO,07GEI,07BLAM, 07BTAR, 06DPRS,08BPRS, 07BRAR | **LEVEL:** 5 |
| **COURSE CODE:** GES512S | **COURSE NAME:** GEOGRAPHIC INFORMATION SYSTEMS 1 |
| **SESSION:** NOVEMBER 2022 | **PAPER:** THEORY |
| **DURATION:** 3 HOURS | **MARKS:** 100 |

| FIRST OPPORTUNITY EXAMINATION QUESTION PAPER | |
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| **EXAMINER** | **MS ROXANNE MURANGI** |
| **MODERATOR** | **MR MIGUEL VALLEJO** |

**INSTRUCTIONS**

1. Write your student number on each answer sheet used.
2. Answer ALL the questions.
3. Read each question carefully before attempting to answer.
4. Write clearly and neatly.
5. Materials allowed: non-programmable calculator, Ruler, Pen, Pencil, Eraser (rubber).

**THIS PAPER CONSISTS OF FOUR (4) PAGES (EXCLUDING THIS COVER PAGE)**

**Question 1**

State if the following statements are True or False:

1.1 The term "locational query" refers to the process of filtering data based on the specific content stored in a field. (1)

1.2 A vector data model uses points to build curvature within a line. (1)

1.3 Re-projecting is a method used to align an unreferenced dataset with one that has spatial reference information. (1)

1.4 A thematic map that displays a quantitative attribute using ordinal classes is called a choropleth map. (1)

1.5 Overlay analysis is based on Boolean logic. (1)

1.6 A small-scale map would show a smaller geographic area than a large-scale map. (1)

1.7 Nominal data exists as discrete, named values without a natural order amongst the values. (1)

1.8 Raster graphic in GIS represents data in a rectangular grid of pixels. (1)

1.9 Intersect is the topological integration of two geographic data sets that preserves features that fall within the geographic extent common to both input data sets. (1)

1.10 Data accuracy is the smallest difference between adjacent positions that can be recorded and stored. (1)

**[10]**

**Question 2**

Define the following terms:

2.1 Latitude-Longitude (2)

2.2 Topology (2)

2.3 Horizontal Datum (2)

2.4 Attribute Table (2)

2.5 Digitizing (2)

**[10]**

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**Question 3**

3.1 What do you understand by Geographic Information Systems or GIS? In your answer, discuss the functions and components of GIS. *(Five marks for functions and five marks components). Two marks for the GIS explanation.* (12)

3.2 Explain the differences between geographic coordinate systems and projected coordinate systems. (4)

3.3 Discuss cylindrical and azimuthal/planar projections. (4)

3.4 Describe the three types of map projections by the distortion properties. (6)

3.5 Define UTM and outline any four properties of the UTM Coordinate System. (4)

**[30]**

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## Question 4

4.1 Name the two main data models used in Geographic Information Systems and differentiate between how the two symbolizes the data types. (4)

4.2 There are four categories of GIS analytical functions. Briefly discuss overlay functions and connectivity operations, provide an example of each. (4)

4.3 Explain the difference between thematic rasters and image rasters. (2)

4.4 Suppose you want to select only the point features that are found within the circle in **Figure 1**. Explain how you will achieve that using GIS analytical tools. (4)

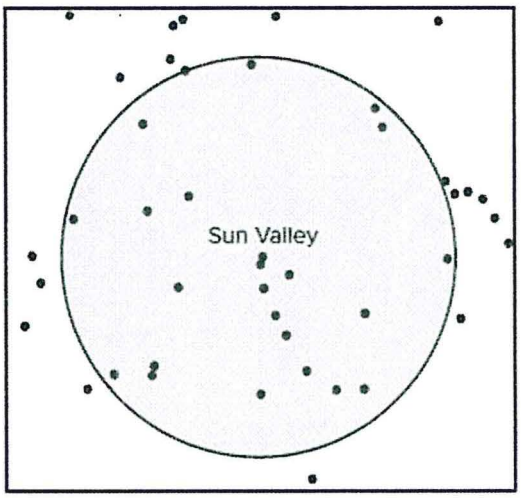


**Figure 1**

4.5 Outline only two problems of map digitization. (2)

4.6 Which two GIS data selection methods can be used in ArcMap? List these methods and provide a brief description of each. (4)

**[20]**

**Question 5**

The cartographer's job is to create attractive maps that can convey the intended message. Answer the following questions based on map production.

5.1 Define what is a map scale. List the three forms a map scale can presented. (4)

5.2 Differentiate between large-scale or small-scale, provide an example for each. (3)

5.3 Outline six factors that will influence the map's scale selection. (6)

5.4 Briefly explain any four (4) basic map elements. (4)

5.5 Describe the three different types of thematic maps. Give two examples of each, as well as the data type that is used to display the data. (9)

5.6 List any two rules which must be followed when classifying data. (2)

5.7 Outline any two methods that can be used to create vector data type. (2)

**[30]**