nAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

DEPARTMENT OF LAND AND SPATIAL SCIENCES

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: JANUARY 2023	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

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.

THIS PAPER CONSISTS OF SIX (6) PAGES (EXCLUDING THIS COVER PAGE)

Question 1

Define the following terms:

1.1   False easting   (2)

1.2   Developable surface   (2)

1.3   Vector   (2)

1.4   Topology   (2)

1.5   Polygon overlay   (2)

1.6   Geographic phenomena   (2)

1.7   Attribute query   (2)

1.8   Geocode   (2)

1.9   Cartesian coordinate system   (2)

1.10 Geographic analysis   (2)

                                                                    [20]

Question 2

Geographic Information Systems (GIS) can be used to display spatial data and to solve problems that involve spatial factors.

2.1   Outline the three purposes of a GIS. Provide an example of each.   (6)

2.2   Explain data analysis and manipulations as one of the functions of a Geographic
      Information System (GIS).   (4)

2.3   Geographic phenomena can be categorized in two forms; explain the two types of a
      geographic phenomenon and provide two examples of each.   (6)

2.4   Explain the two types of GIS concepts.   (4)

                                                                                           [20]

Question 3

3.1   Outline four uses of a coordinate system.   (4)

3.2   Briefly discuss two properties of equivalent and equidistant map projection. Provide
      one example of each map projection.   (6)

3.3   What are UTM zones, and where is the origin of a zone in the southern hemisphere?   (4)

3.4   How are negative coordinates avoided in UTM?   (4)

3.5   Aspects are another way to describe map projections. What is the difference between
      oblique and transverse projection?   (2)

                                                                                           [20]

Question 4

4.1   Raster data can be produced using a variety of techniques. Briefly discuss any two techniques.   (4)

4.2   Name three disadvantages the vector data model has over the raster data model.   (3)

4.3   Different methods of vector-based overlay are possible. Discuss point-in-polygon overlay and polygon-in-polygon overlay briefly.   (4)

4.4   What is spatial analysis?   (3)

4.5   List the three concepts of an attribute table.   (3)

4.6   The following attribute table (**Figure 1**) contains some of the conservation areas found in the Zambezi Region, stored as conservation areas layer in a GIS. Select geographic features from the current selection where number of species is less or equals to 3000. Write down the syntax of your selection query and the conservation areas that meet the criteria.   (3)

Shape	NAME	CATEGOR	TYPE	Area_km2	NO_SPECIES	SP_density
Polygon	Wuparo	Registered co	animals	4237	2134	0.503658
Polygon	Salambala	Registered co	animals	6845	3123	0.456245
Polygon	Kwandu	Registered co	birds	2453	9786	3.989400
Polygon	Mayuni	Registered co	animals, forest	3567	9999	2.803200
Polygon	Caprivi Forest	Forest conser	animals, forest	9678	9899	1.022840
Polygon	Mashi	Emerging con	animals, birds	5685	9786	1.721370

Figure 1

[20]

Question 5

5.1   List the three types of reports that can be generated in a GIS.   (3)

5.2   Examine the map in **Figure 2** and determine the type of map.   (1)

Average annual temperaures in Namibia

Figure 2
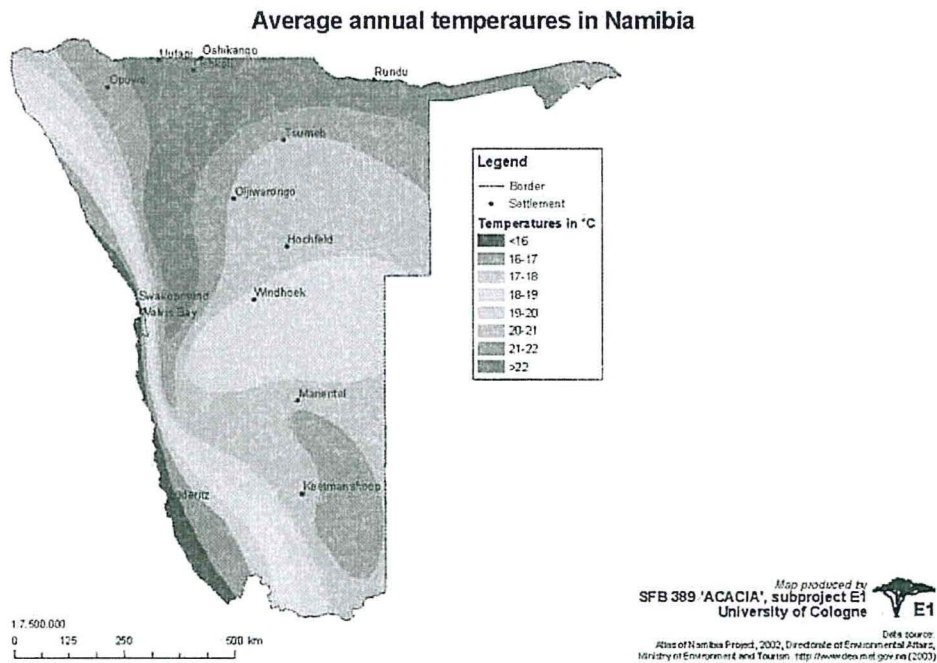
5.3   Identify the data type used to indicate the annual temperatures in Namibia in the map
       legend of **Figure 2**.   (1)

5.4   Under which map category would you classify the map in **Figure 2**? Motivate your
       answer.   (3)

5.5   List the map elements found in **Figure 2**.   (5)

5.6   What are the main classification decisions made during the map production process?   (3)

5.7   Data accuracy expresses how closely a set of data represents reality. Identify any four
       (4) indicator aspects that can be used to describe accuracy.   (4)

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