NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

DEPARTMENT OF LAND AND SPATIAL SCIENCESS

QUALIFICATION: DIPLOMA IN GEOMATICS, BACHELOR OF GEOMATICS, BACHELOR OF GEOINFORMATION TECHNOLOGY, DIPLOMA IN LAND ADMINISTRATION, BACHELOR OF LAND ADMINISTRATION, BACHELOR OF TOWN AND REGIONAL PLANNING, BACHELOR OF PROPERTY STUDIES, DIPLOMA IN PROPERTY STUDIES, BACHELOR OF REGIONAL & RURAL DEVELOPMENT, BACHELOR OF NATURAL RESOURCE MANAGEMENT	
QUALIFICATION CODE: 06DGEO, 06DIPS, 06DPRS, 07BGEI, 07BGEO, 07BLAM, 07BNRS, 07BORR, 07BRAR, 07BTAR, 07BURP, 08BOPS, 08BPRS	**LEVEL:** 5
COURSE CODE: GES512S	**COURSE NAME:** GEOGRAPHIC INFORMATION SYSTEMS 1
SESSION: NOVEMBER 2024	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
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THIS QUESTION PAPER CONSISTS OF (5) PAGES

(Excluding this front page)

INSTRUCTIONS

1. Write clearly and neatly
2. **Answer ALL the questions.**
3. Number the answers clearly.

PERMISSIBLE MATERIALS

1. Examination paper.
2. Examination script.
3. Calculator, ruler, pencils, eraser

Question 1 State if the following statements are True or False.

1.1. To locate spatial features on the Earth's surface, we can use either a geographic or a projected coordinate system. (1)

1.2. A Map projection is made up of a class and aspect. (1)

1.3. In the location selection method, the features of the layer being selected are not compared spatially with the features of the second layer to see which ones meet the criteria, and features meeting the criteria are selected. (1)

1.4. The prime meridian and the equator serve as the baselines of the geographic coordinate system. (1)

1.5. A GIS operation that combines the geometries and attributes of the input layers to create the output is known as erase. (1)

1.6. Data processing is not regarded as one of the functions of an Information Systems. (1)

1.7. The context-diagram is used to isolate the data objects and to define the relationship between them. (1)

1.8. A phenomenon that populates the study area is known as a geographic object. (1)

1.9. In a raster data model, the cell size does not affect the spatial resolution. (1)

1.10. Geospatial data describe both the locations and characteristics of spatial features. (1)

[10]

Question 2

2.1 Define the following terms and provide one example of each:

a) Scale (2)

b) A geographic information system (GIS) (2)

c) Buffer (2)

d) A datum (2)

e) Geographical Features (2)

2.2. Explain hardware and people as components of GIS. (4)

2.3. Give one (1) example each of geographic features that can be represented by a Point, Line and Polygon on a map. (3)

2.4. The library building of the Namibia University of Science and Technology (NUST) can be considered a geographic phenomenon. Explain why it can be considered as such. (3)

2.5. Explain how the vector data model differs from the raster data model in representing spatial features and provide one suitable example of what each can represent. (4)

2.6. Describe the three types of map projections by the projection or developable surface. (6)

2.7. Briefly explain how a UTM zone is defined in terms of its central meridian, standard meridian, and scale factor. (5)

2.8. Define buffering and provide an application example. (2)

2.9. Suppose you need a map showing 4G LTE coverage in Namibia. You have downloaded a shapefile from the Digital Namibia: Namibia-NSA website that shows 4G LTE coverage in every region in Namibia. What kind of operation will you use on the 4G LTE coverage layer so that you can get only the region you need? Motivate your answer. (2)

[39]

Question 3

3.1. There are many ways to classify the analytical functions of a GIS, describe what you can achieve using the below functions with clear examples:

a) Classification (2)

b) Retrieval functions (2)

c) Measurement (2)

3.2. Name four methods of vector data creation. (4)

3.3. Write a valid SQL expression to select "Cities" with people between 1000 and 10,000 using a field called POP2000 from Citizens layer. (3)

3.4. Identify and explain the two labels in **Figure 1.** (4)

A.

B.

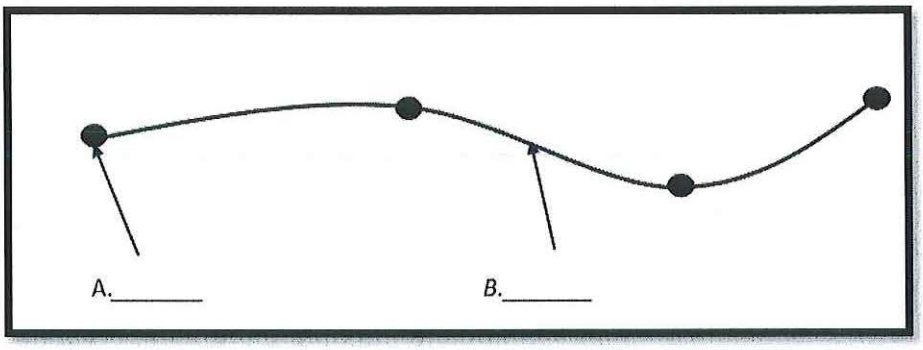


Figure 1

3.5. Explain the concept of utilising counts and cell value within a raster data model. (4)

3.6. Describe the concepts of GIS attribute tables based on **Figure 2**. (6)

Table

Parks

FID	Shape *	name	area	designatio	year	source
0	Polygon	Al-Ais Hotsprings Game Park	4311.9	Game Park		Map
1	Polygon	Mudumu National Park	1019	Game Park	1990	Map
2	Polygon	Mahango Game Park	241.9	Game Park		Map
3	Polygon	Khaudum Game Park	3855.2	Game Park	1989	Map
4	Polygon	Waterberg Plato Park	410.2	Game Park	1972	Map
5	Polygon	Daan Viljoen Game Park	39.9	Game Park	1968	Map
6	Polygon	Bwabwata National Park	5818.8	Game Park		Map
7	Polygon	Naute Recreation Resort	226.8	Recreation Resort	1988	Map
8	Polygon	Mamili National Park	403.1	Game Park	1990	Map
9	Polygon	Von Bach Recreation Resort	46.3	Recreation Resort	1972	Map
10	Polygon	Popa Falls Game Park	0.1	Game Park		Diagram
11	Polygon	Skeleton Coast Park	16751.2	Game Park	1971	Map
12	Polygon	Namib Naukluft Park	50658.4	Game Park	1979	Map
13	Polygon	Etosha National Park	22888.4	National Park	1907	Map
14	Polygon	Hardap Recreation Resort	242.7	Game Park	1968	Map
15	Polygon	Restricted Diamond Area	21596.1	Restricted Area		Map
16	Polygon	Gross Barmen Hot Springs	0.9	Game Park	1968	MET
17	Polygon	National West Coast Tourist Recreation Area	7360.7	Recreational Area	1973	Various

1 (0 out of 18 Selected)

Parks

Figure 2

3.7 Name and explain the two forms of a geographic phenomenon. (4)

[31]

Question 4

4.1 Study the map in **Figure 3** and list the map elements found in the map. (5)

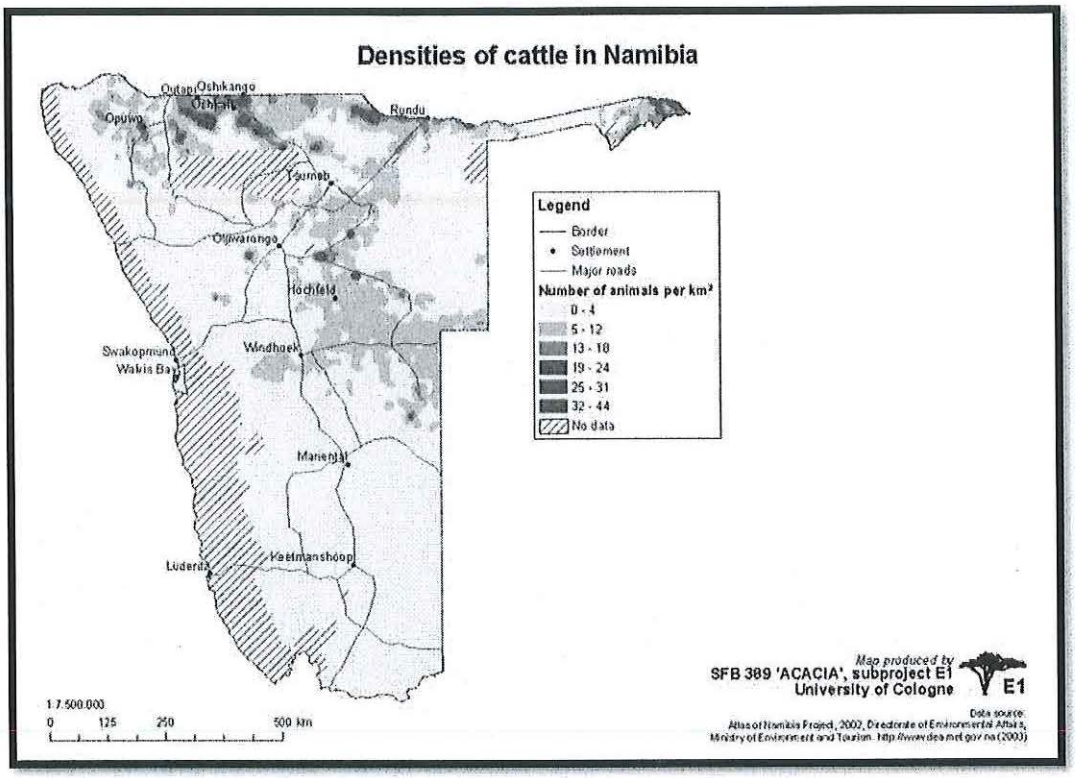


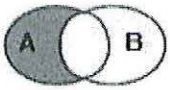
Figure 3

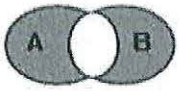
4.2. Identify the data type used to indicate the number of animals in the map legend of **Figure 3.** (1)

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

4.4. Identify the below Boolean operators and explain what each entails. (3)

A . 

B. 

C. 

4.5. There are three types of vector-based overlays. Briefly discuss the point-in-polygon and line-in-polygon overlays. (4)

4.6. Data accuracy is a statement of how closely a set of data represents the real world. Name any indicator aspects which can be used to describe accuracy. (4)

[20]