UNAM
UNIVERSITY OF NAMIBIA

FACULTY	AGRICULTURE, ENGINEERING AND NATURAL SCIENCES		
DEPARTMENT	ENVIRONMENTAL SCIENCES		
SUBJECT	GEOGRAPHICAL INFORMATION SYSTEMS		
SUBJECT CODE	GIS 3732		
DURATION	3 HOURS	MARKS	100

SUPPLEMENTARY EXAMINATION

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Internal Moderator: Martin Hipondoka, PhD

INSTRUCTIONS

1. Work in an orderly manner and present your work as neatly as possible.
2. This paper consists of **FOUR** (4) pages (excluding this front page).
3. Read the entire question paper before answering the questions
4. Number your questions correctly and clearly.
5. Answer all the questions in Section A, B and C.

SECTION A /27/

1. **Define** the following terms: /4/
   a) Mind Map (2)
   b) Spatial query (2)

2. **Differentiate** between the following terms: /8/
   a) Models and Model Builder (4)
   b) Interpolation and Extrapolation (4)

3. Name and explain ANY Three activities that constitute map generalization. (6)

4. Name FIVE major Functions in GIS. (5)

5. Describe ANY two scales of measurements used to categorize different types of variables. (4)

SECTION B /33/

6. You were provided with two maps, one is a small-scale map and the other is a large-scale map.
   a) **Identify** which of the following scales represents a small-scale map and large-scale map: **1/30,000 and 1/300,000.** (2)
   b) Further, compare four differences between small scale and large-scale map. (8)

7. The shape of the earth can be modelled into two forms. Identify and discuss the two shapes of the earth in figure 1. (8)

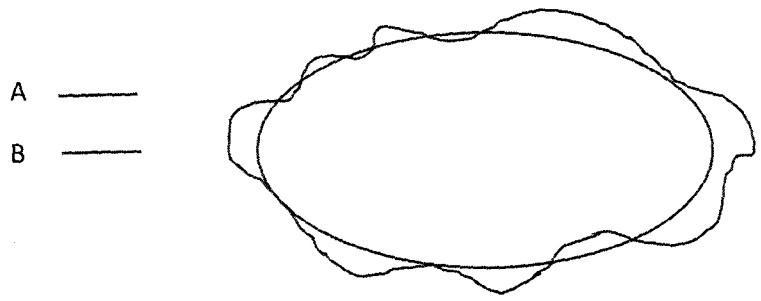

Figure 1: Shape of the earth

8. Map projections are designed for specific purpose. Study the Figure below and answer the following questions: /9/

   a) Identify the THREE (3) types of map projections in fig 2. (3)

   b) Describe each of the THREE (3) types of map projections in fig 2. (6)

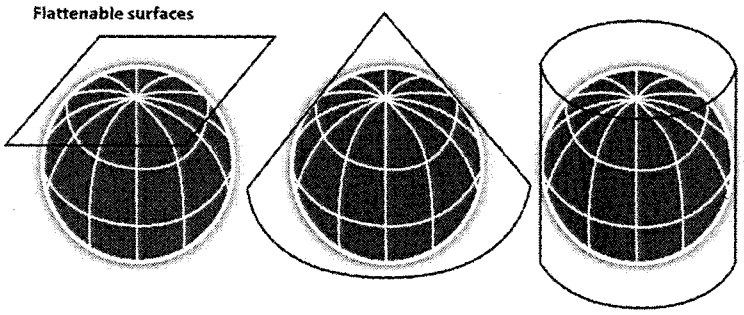

Figure 2: Map projections

9. Logical operators are those that are true or false. They return true or false values to combine one or more true or false values. Given region ABC in figure 3, draw and shade the regions that represents the following Boolean operators: **NOT (A OR B); NOT (A AND B); (A AND B) OR C** (6)

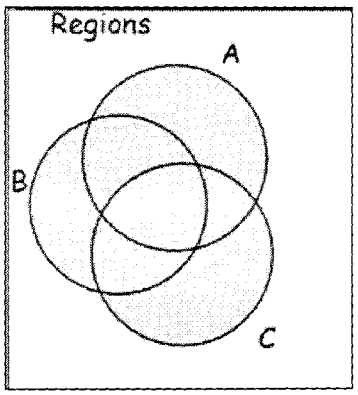

Figure.3

SECTION C **/40/**

10. Spatial Analysis and Modelling are integral parts of any GIS process. A complete understanding of these concepts is necessary to properly design your GIS application. **/13/**

    a) Distinguish between Spatial Analysis and Spatial Modelling? (4)

    b) List FIVE (5) categories of which spatial analysis can be displayed. (5)

    c) Name and explain TWO (2) types of map overlays of which spatial data can be displayed in GIS. (4)

11. Using Table 1 as a source, **construct a query** using the general form for ArcGIS query expressions for each of the target outputs mentioned below and where applicable, answer the follow up question. **/14/**

a) Select records where land use is residential, or Constituency is Khomasdal. (3)

b) **How many** records would be selected once a (correct) formula specified in a) above is applied? (2)

c) Select records where area is more than 25 ha and Constituency is Windhoek Rural. (3)

d) **How many** records would be selected once a (correct) formula specified in c) above is applied? (2)

e) Select records where population density is less than 120 people per ha. (4)

Table 1: Attribute table of selected Constituency in Windhoek

ID	Land Use	Constituency	Population	Area (ha)
1	Business	Khomasdal	3500	25
2	Business	Katutura East	4100	30
3	Residential	Katutura East	300	5
4	Residential	Windhoek Rural	2500	167
5	School	Khomasdal	200	2
6	School	Windhoek Rural	5000	200
8	Sport	Katutura East	2600	2
9	Sport	Khomasdal	5000	20
10	Sport	Windhoek Rural	19000	3600

12. You are employed as a GIS Analyst working for the Ministry of Higher Education. One of your objectives is to identify the optimal location for a new school to be established in Omusati region. The main purpose would be to allocate the right number of households to those schools in the region and minimize the distance the children must travel to and from their schools. The schools should not be established on Mountains or in Flood prone areas and they should be located within 100 feet from the roads.

What GIS tools can be used to determine potential areas to establish new school and on what basis will you establish the schools given that you have data covering the whole of Namibia. The coverage should include input layers, suitable data format, Queries, Spatial Operations. /13/

a) Identify any **FIVE** spatial datasets you would require for conducting the analysis to locate the potential site for the schools. (5)

b) Write down **FOUR** different tools that you will use to complete the task. (4)

c) What is the difference between a 'Spatial data and 'Non-spatial data? (4)

END