UNAM

UNIVERSITY OF NAMIBIA

| | | | |
|---|---|---|---|
| **FACULTY** | AGRICULTURE, ENGINEERING AND NATURAL SCIENCES | | |
| **DEPARTMENT** | ENVIRONMENTAL SCIENCE | | |
| **SUBJECT** | CARTOGRAPHY AND MAPPING | | |
| **SUBJECT CODE** | GCM3711 | | |
| **DATE** | JUNE 2022 | | |
| **DURATION** | 3 HOURS | **MARKS** | 100 |

**Supplementary/Special Examination**

Examiner: Andreas Amukwaya

Internal Examiner: Martin Hipondoka (PhD)

This question paper consists of four (4) pages excluding this front page.

**Instructions**

1. Work in an orderly way and present your work as neatly as possible.
2. Mark your questions correctly and clearly.
3. Answer all questions
4. The use of a calculator is allowed.

## QUESTION 1 [20]

1.1 From the following statements, choose the correct answer.

a) The science of map making is best called..... (2)

*a. Cartology*
*b. Cartography*
*c. Cartographic*
*d. Cartograph*

b) Professional map makers may use a number of visual variables such as: (2)

*a. Size and shape*
*b. Texture or pattern*
*c. a and b above*
*d. None of the above*

c) The lines of latitude are measured in degrees beginning from the..... (2)

*a. Equator to the pole*
*b. Prime meridian*
*c. Tropic of Cancer*
*d. North Pole*

d) When preparing maps that record land records and parcels, map projections are preferred that has the following properties: (2)

*a. Constant length*
*b. Azimuthal*
*c. Equal area*
*d. Constant scale*

e) Scale can appropriately defined the following statement(s): (2)

*a. A conversion factor used to transform map projections.*
*b. An indication of how big an object represented on the map is on the ground.*
*c. The lines on a map representing north-south and east-west directions.*
*d. The ratio of a distance on a map to the opposite distance on the ground.*

1.2 State whether the following statements are true or false.

a) A line is a string of (x, y) coordinates joined together in order and connected with straight lines. (2)
b) Island polygons are only used to represent real world islands that are surrounded by water. (2)
c) The depth of water in a lake is an example of a ratio scale measurement. (2)
d) A map at a scale of 1:2,000 would be suitable for planning street engineering works such as repairs to gas or water pipes. (2)
e) A map at a scale of 1:250,000 would be suitable for navigation whilst on a mountain trek. (2)

## QUESTION 2 [55]

2.1 Briefly explain in what sense map making is an art and a technology of creating and studying maps. (4)

2.2 When producing a map, one can make use of different attributes of a single colour (value, hue and saturation), for example the map in figure 1 below.

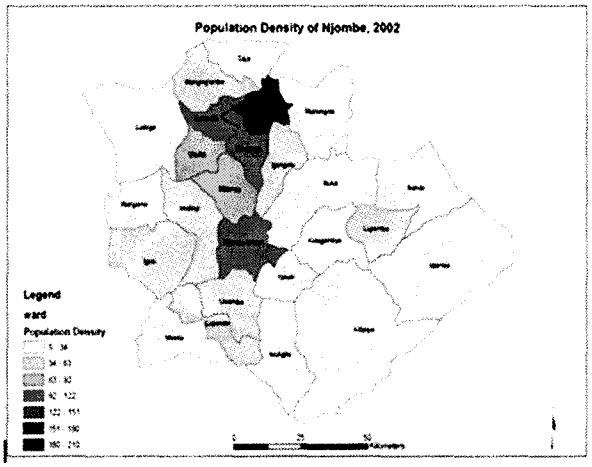



*Figure 1. Population density map.*

Briefly describe these three attributes. (6)

2.3 Map users have an intuitive perception of the meaning of symbols in a map, which we need to take into account. List these perception properties. (4)

2.4 Different countries establish their own horizontal datum. Explain how these horizontal datum are defined and why they are needed. (4)

2.5 With the help of figure 2 below, give a brief contrast between Mercator and Transverse Mercator projections. (4)

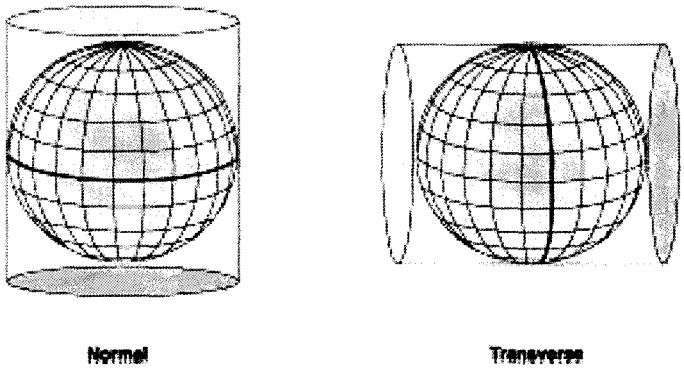



*Figure 2: Cylindrical projections*

2.6 Identify any three generalization operators and indicate what each one is used for. (6)

2.7 Map projections are designed for specific purposes. Briefly discuss the following types of projections: Conformal and Equal Area projections. (6)

2.8 Analyse the two images below, from which you are to capture geographic phenomena that will be represented in the map. With the help of the two images, differentiate between discrete and continuous phenomena and give an example for each. (6)

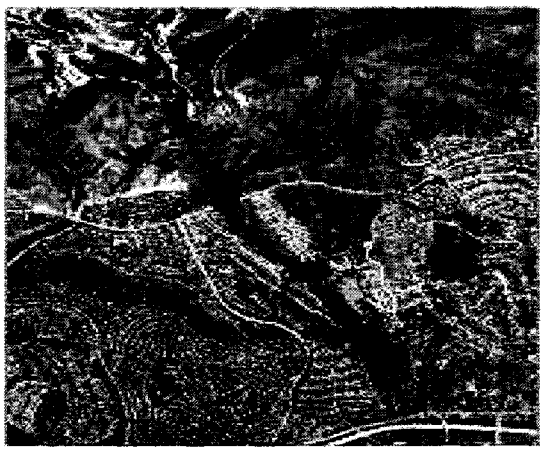
(a)  (b) 

*Figure 3: Aerial images*

2.9 Given an orthophoto in figure 4 below, you are tasked to produce a map covering part of Windhoek. This map should contain as much information of the available geographic features within the mapped area. The provided orthophoto is having a scale of 1: 10 000.

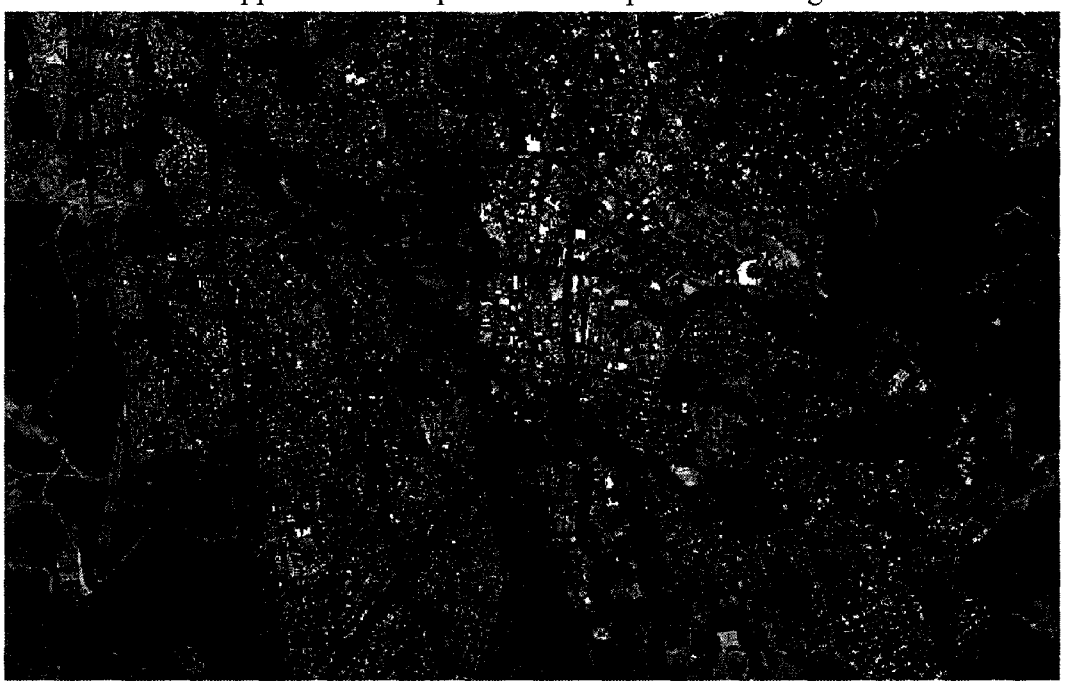


*Figure 4. An orthophograph covering part of Windhoek.*

a. From the description and looking at the image, what type of map that will be produced? Justify your answer. (3)
b. Reason why not all the details / features from the orthophoto were captured and reflected on the map? (3)
c. Briefly explain why it is very important for each map produced to have a title and a legend. (4)

2.10 Placement of textual information in the map is very important so to avoid doubt on which feature the label/text belongs. Explain how a name can be placed within a map, and in your elaboration take into consideration the name placement for points and lines. (5)

**QUESTION 3** **[25]**

3.1 Given the location coordinates of Rundu (369379, 8016757) and Windhoek (714212, 7503757), calculate the length of a line connecting the two towns. These are UTM coordinates and measured in meters. (5)

3.2 As a subject expert, you are requested to produce a topographic map of a town Okakarara and given geospatial data from different sources and in different projections. Write an essay on how you can produce a cartographically good map layout, highlighting the goals, layout type and balance. (20)