



NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY
FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES

DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES

QUALIFICATION: Bachelor of Natural Resource Management Honours	
QUALIFICATION CODE: 09MNRM	LEVEL: 8
COURSE CODE: GRS811S	COURSE NAME: GIS and remote sensing in practice
DATE: June 2022	PAPER: THEORY
DURATION: 3 Hours	MARKS: 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Dr Vera De Cauwer
MODERATOR:	Ms Foibe Nelao Johannes

INSTRUCTIONS
<ol style="list-style-type: none">1. Write clearly and neatly.2. Number your answers clearly.3. Make sure your student number appears on the answering script.4. Include the formulas used for each calculation.

PERMISSIBLE MATERIALS

1. Calculator

THIS QUESTION PAPER CONSISTS OF 4 PAGES (Including this front page)

Question 1**[6]**

What are the advantages of vector data versus raster data in a GIS?

Question 2**[12]**

Convert the following coordinates to decimal format.

One of the coordinates has an error – indicate which coordinate, whether it is latitude or longitude, and why it is wrong (do not convert the coordinate with the error).

1. $16^{\circ} 18.9' S, 20^{\circ} 54.8' E$
2. $S 25^{\circ} 45.1251', E 19^{\circ} 79.2581'$
3. $18^{\circ} 59' 55'' S, 23^{\circ} 4' 22'' W$

Question 3**[4]**

Point A is situated at $19^{\circ}05' S, 21^{\circ}30' E$ and point B at $19^{\circ}35' S, 21^{\circ}30' E$. What is the distance in metric units between the two points? Explain (and show your calculations)

Question 4**[10]**

Compare the use of a UAV with that of an aeroplane to collect remote sensing data by describing the differences.

Question 5**[27]**

Indicate if the following statements are True or False. If false, correct the statement.

1. Electromagnetic radiation with a long wavelength has a high frequency.
2. Visible light contains more energy than radio waves.
3. A vector line consists of minimum two nodes.
4. Thermal radiation from animals and humans is emitted in the visible light range.
5. Thermal radiation can be carried through a vacuum.
6. Satellite images record the light absorbed by objects.
7. Chlorophyll absorbs green light.
8. A ship can serve as a remote sensing platform.
9. RADAR systems detect electromagnetic radiation with a short wavelength.
10. The Sentinel sensor is operated by the European Space Agency.
11. The distance between two meridians of longitude is a constant (always the same).
12. Coordinates of latitude represent the X-axis for the grid of latitude and longitude lines covering the world.
13. It is best to use satellite images of the warm, dry season to map vegetation in Namibia.

14. The SRTM data we used during the practical exercises (small_altitude.asc) represents terrain elevation collected by a radar system.
15. Vector data can be imported into Google Earth if it is in gpx format.
16. If you want to share your GIS project with others, you only have to give them your project file in qgz format.
17. It is advised to always use illumination from the southwest to display hill shades on a map.

Question 6

[5]

In the practical exercises, you have identified and digitized vegetation on aerial photos. What is the difference with identifying vegetation through image classification?

Question 7

[6]

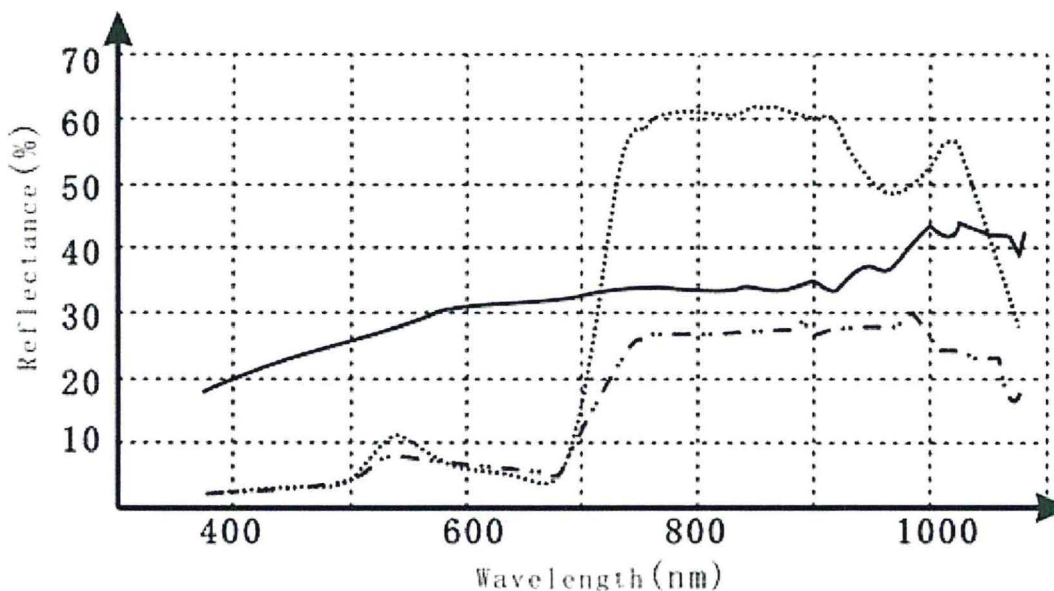
Why did you learn to work with Terraincognita during the course, considering that you can also access Google Earth and Bing images directly in QGIS with the QMS plugin? Give an example of when you would use Terraincognita and how.

Question 8

[10]

The figure underneath shows three different lines, each from a different land cover type.

1. What do you call the graph represented in figure 1?
2. What land cover type does each of the three lines (full, ... dots, -.- dash-dot) in the graph represent? Explain why (for each line).



Question 9**[6]**

What is a GIS metadata file? Give five types of information that can be stored in such a file.

Question 10**[4]**

What is the difference between geographical and projected coordinates?

Question 11**[7]**

Underneath is an attribute table of a GIS layer.

1. How many features does the GIS layer contain?
2. List the attributes of the GIS layer.
3. What is "ID" referring to? Explain.
4. Does the attribute table contain any geospatial information? Explain very briefly.

ID	Species	DBH	Height
6	Acacia erioloba	35	8.2
2	Boscia albitrunca	12	3.3
3	Ziziphus mucronata	18	3.8
9	Acacia erioloba	29	5.3
8	Combretum apiculatum	15	4.0

Question 13**[3]**

Give the expression that shows the relation between frequency and wavelength.
What is this expression representing?