



**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES**

**DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES**

<b>QUALIFICATION:</b> Bachelor of Natural Resource Management Honours	
<b>QUALIFICATION CODE:</b> 09MNRM	<b>LEVEL:</b> 8
<b>COURSE CODE:</b> GRS811S	<b>COURSE NAME:</b> GIS and remote sensing in practice
<b>DATE:</b> July 2022	<b>PAPER:</b> THEORY
<b>DURATION:</b> 3 Hours	<b>MARKS:</b> 85

<b>SECOND OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
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<b>MODERATOR:</b>	Ms Foibe Nelao Johannes

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

**PERMISSIBLE MATERIALS**

1. Calculator

**THIS QUESTION PAPER CONSISTS OF 3 PAGES (Including this front page)**

**Question 1** [4]  
What is the SMART system? Explain briefly

**Question 2** [16]  
Convert the following coordinates to decimal format.

1.  $16^{\circ} 6.9' S, 23^{\circ} 55.9' E$
2.  $S 45^{\circ} 45.6258', E 29^{\circ} 15.5582'$
3.  $18^{\circ} 19' 36'' S, 21^{\circ} 54' 2'' W$
4.  $S 28^{\circ} 59', E 21^{\circ} 8'$

**Question 3** [4]  
Point A is situated at  $19^{\circ}55' S, 21^{\circ}30' E$  and point B at  $20^{\circ}55' S, 21^{\circ}30' E$ . What is the distance in metric units between the two points? Explain (and show your calculations)

**Question 4** [2]  
Why is the surveyed area by an UAV relatively small?

**Question 5** [18]  
Indicate if following statements are True or False. If false, correct the statement.

1. Electromagnetic radiation with a long wavelength has a low frequency.
2. X-rays contain more energy than radio waves.
3. Each image layer in a GIS has an attribute table.
4. Thermal radiation from the sun is emitted in the visible light range.
5. Green plants absorb green light.
6. Topography can be recorded by RADAR systems.
7. The distance between two meridians of longitude is a constant (always the same).
8. Coordinates of latitude represent the X-axis for the grid of latitude and longitude lines covering the world.
9. Vector data can be imported into Google Earth if it is in klm format.
10. You can open a QGIS project (a file in qgz format) on a computer without having the GIS data used in the project.
11. It is advised to always use illumination from the southwest to display hill shades on a map.
12. A contour line is a isopleth.

**Question 6** [6]  
What is cartography? Why is it such an important discipline?

**Question 7** [3]  
What is terrain relief? How can you display terrain relief on a map?

**Question 8****[9]**

Electromagnetic radiation consists of electromagnetic waves characterised by wavelength and frequency.

1. Explain wavelength.
2. Explain frequency.
3. What is the relation between wavelength and frequency?
4. Give an example of electromagnetic radiation with a large wavelength.
5. Give an example of electromagnetic radiation with a high frequency.

**Question 9****[5]**

What is the difference between active and passive remote sensing sensors?

**Question 10****[4]**

What is the difference between geographical and projected coordinates?

**Question 11****[9]**

Underneath is an attribute table of a GIS layer named "vegetation".

1. How many features does the GIS layer contain?
2. List the attributes of the GIS layer.
3. QGIS uses another name for attribute, which one?
4. What is "ID" referring to? Explain.
5. Does the attribute table contain any geospatial information? Explain very briefly.
6. Is "vegetation" a point, line or polygon layer? Why?

ID	Vegetation type	Area_km2
6	Mopane woodland	150.6
2	Riverine vegetation	2.5
3	Mountain shrub savanna	26.3
9	Bare soil – no vegetation	0.4

**Question 13****[5]**

What is a vegetation index? Why are they used? Which is the most used vegetation index?